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AICRP on COTTON

ALL INDIA COORDINATED RESEARCH PROJECT ON COTTON

ANNUAL REPORT:2019-20

Photo: M. Sabesh

भा.कृ.अनु.प.
ICAR

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Preface

Cotton is a unique natural fiber producing most common fiber crop of the world, which provides humanity with cloth and vegetable oil, medicinal compounds, meal and hull for livestock feed, energy sources, organic matter to enrich soil, and industrial lubricants.

Archeological evidence indicates cotton fiber was used by human being for at least more than four to seven thousand years ago, and cotton started to be grown as a fiber crop around three thousand years ago. Demands for natural fiber and cotton products has led to progressive scientific advances on cotton biotechnology and decoding of cotton genomes have resulted in the development of novel cotton cultivars with high yield, early maturity, improved resistance to pests, and superior fiber quality; however, a negative correlation between fiber traits and yield components/maturity as well as genetic "bottlenecks" in cultivar germplasm still hinders to overcome conventionally longstanding problems of simultaneous yield and quality improvements in cotton

The resilient Breeding programmes, location-specific production and cotton protection technologies like Integrated Nutrient management, Integrated Weed Management, Integrated pest management etc. Interactive Public-Private partnership programmes, especially in the evaluation of the production potential of Bt cotton hybrids, led to revolution in cotton production in the country. During the year 2019-20, the total acreage in India was around 125.84 lakh ha and production is estimated to be around 360 lakh bales of 170 kg with a productivity of 486 kg lint/ha.

Twelve non Bt Variety / Hybrid and nineteen Bt varieties/ Hybrids was identified for release during 2019-20 for various agro-climatic regions. In addition to accelerate agricultural development, we are working as a nodal center under PPV & FRA to protect plant breeders' right to stimulate investment for research and development for the development of new plant varieties.

Leading from the front is **Dr. Trilochan Mohapatra**, Secretary, DARE, Ministry of Agriculture and Farmers Welfare & Director General, ICAR, New Delhi. I express my deep sense of gratitude to our Hon'ble Director General, ICAR, for his valuable guidance and direction in running the activities of AICRP on cotton.

I place on record my sincere thanks to **Dr. T. R. Sharma**, Hon'ble Deputy Director General (Crop Science), ICAR, New Delhi for constant encouragement and guidance for the progress of AICRP. **Dr. R. K. Singh**, Assistant Director General (Commercial Crops), ICAR, New Delhi, **Dr. V. N. Waghmare,** Director, ICAR-CICR, Nagpur, **and Dr. P. G. Patil**, Director, ICAR-CIRCOT, Mumbai, who have been very helpful and remain as sources of strength and knowledge for efficient running of the AICRP programme, for which I am greatly indebted to them. It is a great pleasure to acknowledge the full cooperation extended by **Dr. S. Manickam**, Principal Investigator (Plant Breeding), **Dr. K Sankaranarayanan**, Principal Investigator (Agronomy), **Dr. (Mrs.) B. Dharajothi,** Principal Investigator (Entomology), **Dr. D. Monga**, Principal Investigator(Pathology), **Dr. P. K. Mandhyan**, Principal Investigator (Fiber Technology), **Dr. M. Sabesh,** Senior Scientist (Computer Applications) and **Dr. (Mrs.) S. Usha Rani**, Principal Scientist (Extension), **Dr. K. Rathinavel**, Principal Scientist (Seed Tech.,), **Dr. S. K Sain**, Senior Scientist (plant Pathology) **Dr. Y. P. Singh**, Principal Scientist, ICAR, New Delhi in running various technical activities of this huge Project. The Scientists and Staff of ICAR-CICR, Regional Station, Coimbatore deserve a special mention for extending whole-hearted support in the general activities of the Project, without whom it would be very difficult to carry out the assignments. I acknowledge the sincere efforts put in by my team **Sh. S. Sathyakumar** (Senior Technical Officer), **Sh. N. Ramesh**(Assistant) and **Sh. K. Vedavyas** (Stenographer), ICAR-CICR,RS, Coimbatore for assisting me in the regular correspondence, Administrative and financial matters. I also would like to place on record the timely assistance rendered by **Sh. A. Goswami** (Senior Administrative Officer), **Sh. Y. V. Sorte** (Sr. Finance & Accounts Officer) and their team at CICR, Nagpur without whom the timely disbursal of funds to participating centres would have been impossible. It is a testimony to the quality, dedication and professionalism of our AICRP scientists that we have seen significant progress on implementing both the new organizational structure and made a significant start on improving knowledge-sharing and increasing multidisciplinary projects.

With the threat of climate change looming large, natural resources becoming more scarcer by the day, burgeoning population, shrinking land holdings, ever-rising cost of inputs, public sector research plans and vision for the future becomes immensely challenging. Cotton industry *per se* needs to enhance the scientific research capability, acquire new talent and facilitate the local and global exchange of ideas required to strengthen our adaptive capacity. Let us join hands and ensure we are prepared and ready to respond to the changing environment.

A. H. Prakash
Project Coordinator (Cotton Improvement)

Contents

Topic	Page No.
Project Coordinator Report	A 1 - A 10
Research Highlights	B 1 - B 6
Research Findings	
Crop Improvement	C 1 - C 163
Crop Production	D 1 - D 84
Crop Protection	
- *Entomology*	E 1 - E 186
- *Plant Pathology*	F 1 - F 109

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Report of
Project Coordinator

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PROJECT CO-ORDINATOR'S REPORT

Introduction

The scintillating research work done at AICRP on Cotton network over the years has brought strong knowledge base in crop improvement and also crop production and protection. The impact of AICRP on Cotton has been development and identification of high yielding, pest & disease tolerant and superior fiber quality cotton varieties and hybrids according to the demand and specifications of the textile industry from time to time. The technical program under AICRP on Cotton are framed with a vision that "how to double the farmers income?" Accordingly, technologies evaluated and generated under AICRP on Cotton are farmer friendly with enhanced income through enhanced yield; saving in cost of cultivation through optimum use of inputs; additional income through improved cropping system; and value addition to the main crop.

Locally and globally, cotton continues to be the most important textile raw material. Indeed, it is a matter of pride that India continues to be the global leader in raw cotton production in recent years, besides its increasing global market share in cotton textiles and apparels. It is also a known fact that during the last five years, export of cotton and cotton - based textiles account for as much as one third of the total export earnings of the country.

Indian Cotton Scenario

The cotton production in India during 2019-20 is expected around 360 lakh bales of 170 kg from 125.84 lakh hectares with a productivity of 486 kg lint/ha (CAB as on 28:11:2019). During the current year 2019-20, Maharashtra, Gujarat and Telangana were the major cotton growing states covering around 69.60% (87.59 lakh hectare) in area under cotton cultivation and 63.88% (230 lakh bales) of cotton production in India.An area of around 17.38 lakh ha (Punjab=3.92, Haryana=7.01& Rajasthan=6.45) was sown under cotton during 2019-20 in North zone.Though 8.29% increase in cotton area, the cotton production increased just 1.69% that is 59 lakh bales last year to 60 lakh bales this year in North Zone. Significantly, change in area (46.27%) and production (30%) in Punjab compared to last year could not make change in cotton production scenario due to 11% reduction in productivity.

In Central Zone states comprises- Gujarat, Maharashtra, Madhya Pradesh and Odisha, occupies 60.46% of the total cotton area in India and produces 54.72% of total cotton production. The Gujarat cotton production expected to increase from 87.5 to 95 lakh bales compared to last year,similarly, Maharashtra to increase from 75.5 to 82 lakh bales compared to last year. The productivity has significantly reduced from 665 last year to 557 kg/ha this year in Madhya Pradesh, made slump in production to the tune of four lakh bales.

In Southern Zone states comprising of Telangana, Andhra Pradesh, Karnataka and Tamil Nadu, occupies 24% of the total cotton area in the country and produces 26.94% of total cotton production. The figures from Andhra Pradesh is more encouraging that production enhancement of 5.5 lakh bales compared to last year, despite 35,000 ha reduction in cotton area in the state. Similarly, Karnataka produced three lakh bales higher than last year, despite 1,86,000 ha reduction in cotton area in the state. Both Andhra Pradesh and Karnataka state recovered significantly from pink bollworm damage last year and recorded productivity enhancement of 46% and 60%, respectively, compared to last year. Telangana state also recovered from last year poor yield and recorded 10 lakh bales higher than last year.

State wise Cotton Area (in Lakh ha)

State	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19p	2019-20p
Punjab	5.60	4.80	4.46	4.20	3.39	2.85	2.91	2.68	3.92
Haryana	6.41	6.14	5.36	6.48	6.15	5.70	6.65	7.08	7.01
Rajasthan	4.70	4.50	3.93	4.87	4.48	4.71	5.84	6.29	6.45
NORTH ZONE	**16.71**	**15.44**	**13.75**	**15.55**	**14.02**	**13.26**	**15.40**	**16.05**	**17.38**
Gujarat	29.62	24.97	25.19	27.73	27.22	23.82	26.24	26.60	26.29
Maharashtra	41.25	41.46	41.92	41.90	42.07	38.00	43.51	42.54	43.69
Madhya Pradesh	7.06	6.08	5.14	5.74	5.63	5.99	6.03	6.14	6.10
CENTRAL ZONE	**77.93**	**72.51**	**72.25**	**75.37**	**74.92**	**67.81**	**75.78**	**75.28**	**76.08**
Telangana				17.13	17.73	14.09	18.97	18.27	17.61
Andhra Pradesh	18.79	24.00	23.89	8.21	6.66	4.72	6.46	6.21	5.86
Karnataka	5.54	4.85	6.62	8.75	6.42	5.10	5.47	7.36	5.50
Tamil Nadu	1.33	1.28	1.52	1.87	1.42	1.42	1.83	1.33	1.28
SOUTH ZONE	**25.66**	**30.13**	**32.03**	**35.96**	**32.23**	**25.33**	**32.73**	**33.17**	**30.25**
Odisha	1.02	1.19	1.24	1.27	1.25	1.36	1.45	1.58	1.70
Others	0.46	0.51	0.33	0.31	0.50	0.50	0.50	0.50	0.43
TOTAL	**121.78**	**119.78**	**119.60**	**128.46**	**122.92**	**108.26**	**125.86**	**126.58**	**125.84**

State wise Cotton Production (in Lakh bales of 170 kg)

State	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19p	2019-20p
Punjab	20.00	21.00	21.00	13.00	6.25	9.00	11.76	10.00	13.00
Haryana	26.00	26.00	24.00	23.00	14.50	20.50	21.48	23.00	22.00
Rajasthan	18.00	17.00	14.00	17.00	15.00	16.50	23.26	26.00	25.00
NORTH ZONE	**64.00**	**64.00**	**59.00**	**53.00**	**35.75**	**46.00**	**56.50**	**59.00**	**60.00**
Gujarat	122.00	93.00	124.00	112.00	90.00	95.00	103.84	87.50	95.00
Maharashtra	76.00	81.00	84.00	80.00	76.00	88.50	83.35	75.50	82.00
Madhya Pradesh	18.00	19.00	19.00	19.00	18.00	20.50	22.14	24.00	20.00
CENTRAL ZONE	**216.00**	**193.00**	**227.00**	**211.00**	**184.00**	**204.00**	**209.33**	**187.00**	**197.00**
Telangana				50.50	58.00	48.00	54.44	43.00	53.00
Andhra Pradesh	60.00	84.00	78.00	26.50	23.75	19.00	21.26	14.50	20.00
Karnataka	15.00	17.00	23.00	34.00	19.50	18.00	17.32	15.00	18.00
Tamil Nadu	6.50	6.00	5.00	6.00	6.00	5.00	5.50	5.00	6.00
SOUTH ZONE	**81.50**	**107.00**	**106.00**	**117.00**	**107.25**	**90.00**	**98.52**	**77.00**	**97.00**
Orisha	3.50	4.00	4.00	3.00	3.00	3.00	3.65	4.50	4.00
Others	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Total	**367.00**	**370.00**	**398.00**	**386.00**	**332.00**	**345.00**	**370.00**	**330.00**	**360.00**

State wise Cotton Productivity (in kg/ha)

State	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19p	2019-20p
Punjab	607	744	800	526	313	536	687	634	564
Haryana	690	719	761	603	401	611	549	552	534
Rajasthan	651	642	605	593	569	595	677	703	659
NORTH ZONE	**651**	**704**	**729**	**579**	**433**	**590**	**624**	**625**	**587**
Gujarat	700	633	837	687	562	678	673	559	614
Maharashtra	313	332	341	324	307	396	326	302	319
Madhya Pradesh	433	531	628	563	544	582	624	665	557
CENTRAL ZONE	**471**	**452**	**534**	**476**	**418**	**511**	**470**	**422**	**440**
Telangana				501	556	579	488	400	512
Andhra Pradesh	543	595	555	549	606	684	559	397	580
Karnataka	460	596	590	661	516	600	538	346	556
Tamil Nadu	831	797	559	545	718	599	511	639	797
SOUTH ZONE	**540**	**604**	**561**	**553**	**566**	**604**	**512**	**397**	**545**
Odisha	583	571	548	401	408	375	428	484	400
India	**512**	**525**	**565**	**511**	**458**	**542**	**500**	**443**	**486**

Note: p – provisional; Source: CAB estimate as on 28:11:2019

Cotton Balance Sheet

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19p
SUPPLY									
Opening stock	40.50	45.77	40.00	40.00	33.00	66.00	36.44	43.76	47.12
Crop	339.00	367.00	370.00	398.00	386.00	332.00	345.00	370.00	361.00
Import	2.38	7.51	14.59	11.51	14.39	22.79	30.94	15.80	15.00
Total Supply	381.88	420.28	424.59	449.51	433.39	420.79	412.38	429.56	423.12
DEMAND									
Mill Consumption	221.77	223.59	251.74	268.03	278.06	270.20	262.70	275.91	278.00
S.S.I Consumption	24.46	22.12	23.59	25.20	26.38	27.08	26.21	27.20	27.00
Non-Mill Consumption	13.38	5.00	7.83	6.32	5.00	18.00	21.50	11.50	12.00
Export	76.50	129.57	101.43	116.96	57.72	69.07	58.21	67.83	65.00
Total Demand	336.11	380.28	384.59	416.51	367.16	384.35	368.62	382.44	382.00
Closing Stock	45.77	40.00	40.00	33.00	66.23	36.44	43.76	47.12	41.12

p – Provisional; Source: CAB estimate as on 22:11:2018

World Cotton Scenario

India occupies 37.56% of world cotton area and produces 24.26% of world cotton production and stands tall. The second largest producer of cotton- China, occupies 9.97% of world cotton area and produces 22.41% of world cotton production. India, China, United States and Brail together take the share of 74% of world cotton production. Significant reduction of area under cotton recorded in Australia, it was 3,80,000 ha area under cotton reduced to 60,000 ha this year. Contrarily, United States augmented 6,47,000 ha this year for cotton cultivation.

This year, the leading cotton importer, China, likely to reduce the import quantum by 14% from 96.4 to 82.5 lakh bales of 480 lb. Pakistan likely to import 42 lakh bales which is 47% more than last year import. The more import in Pakistan is due to reduction in cotton production by 10 lakhs bales this year. The United States likely to export 165 lakh bales up from 147 lakh bales last year. The United States and Brazil together expected to export 58% of the global export of cotton. China expected to lead the domestic consumption with 365 lakh bales which is 30.84% of global consumption; the second largest consumer, India, likely to consume 245 lakh bales which is 20.70% of global consumption.

World cotton situation in major cotton producing countries: 2019-20

	Area Harvested	Production	Imports	Exports	Domestic Consumption	Yield
World	34612 (33483)	121592 (118609)	43573 (42503)	43599 (41348)	118348 (120421)	764 (771)
India	13000 (12600)	29500 (25800)	2300 (1800)	3600 (3511)	24500 (24000)	494 (446)
China	3450 (3500)	27250 (27750)	8250 (9640)	175 (213)	36500 (39500)	1720 (1726)
United States	4777 (4130)	19800 (18367)	5 (3)	16500 (14763)	3055 (2957)	902 (968)
Brazil	1700 (1640)	13000 (13000)	25 (17)	8800 (6018)	3400 (3400)	1665 (1726)
Pakistan	2500 (2300)	6600 (7600)	4200 (2850)	100 (60)	10825 (10725)	575 (719)
Uzbekistan	1010 (1100)	3500 (3275)	0 (0)	300 (750)	3300 (2800)	754 (648)
Benin	675 (650)	1450 (1400)	0 (0)	1400 (1400)	15 (15)	468 (469)
Mali	735 (725)	1350 (1270)	0 (0)	1300 (1350)	25 (25)	400 (381)
Burkina	575 (630)	1000 (850)	0 (0)	900 (940)	25 (25)	379 (294)
Cote d'Ivoire	425 (392)	1000 (937)	0 (0)	1000 (895)	25 (25)	512 (520)
Turkmenistan	545 (545)	1000 (910)	0 (0)	250 (150)	825 (800)	399 (364)
Australia	60 (380)	675 (2200)	0 (0)	1300 (3632)	35 (35)	2449 (1261)
Cameroon	260 (250)	645 (600)	0 (0)	600 (575)	20 (20)	540 (523)

Sudan	200 (180)	600 (500)	0 (0)	500 (425)	75 (75)	653 (605)
Egypt	100 (141)	350 (500)	500 (520)	250 (350)	640 (610)	762 (772)
Chad	250 (60)	325 (40)	0 (0)	200 (100)	10 (10)	283 (145)
Ethiopia	80 (77)	250 (243)	40 (30)	10 (8)	295 (275)	680 (687)

Note: Figures in brackets pertains to 2018-19; Area in 1000 ha; yield in kg/ha; quantity in 1000 bales of 480 lb. Source: USDA as on 04:04:2020.

Notification of Cotton Varieties and Hybrids

Cotton Varieties/ Hybrids identified for release by the CVIC held on 30th May, 2019. Twelve varieties/ Hybrids have been identified for varied agroclimatic zones as described below:

Sl.No.	Variety/Hybrids	Species	Developed at	Recommended for
1.	RS 2814	*G. hirsutum*	SKRAU, Sriganganagar	North zone (irrigated)
2	GSHV 172	*G. hirsutum*	NAU, Surat	Central zone (irrigated)
3	GSHV 180	*G. hirsutum*	NAU, Surat	Central zone (rainfed)
4	GTHV 13/28	*G. hirsutum*	SDAU, Talod	central zone (irrigated)
5	ARBB 1502	*G. barbadense*	UAS, Dharwad	Central zone (irrigated)
6	ARBH 1551	*G. hirsutum*	UAS, Dharwad	Central zone (rainfed)
7	JLA 0906	*G. arboreum*	MPKV, Jalgaon	Central zone (rainfed)
8	CNA 1028	*G. arboreum*	ICAR-CICR, Nagpur	Central zone (rainfed)
9	PA 812	*G. arboreum*	VNMKV, Parbhani	Central zone (rainfed)
10	BGDS 1066	*G. hirsutum*	UAS, Raichur	South zone (irrigated)
11	LHDP 1	*G. hirsutum*	ANGRAU, Guntur	South zone (irrigated)
12	ARBH 1551	*G. hirsutum*	UAS, Dharwad	south zone (rainfed)

List of Bt Cotton Variety / Hybrid recommended by CVIC on 12/12/2019 for 2019-20

S. No.	Name	Species	Date of Approval
1.	PAU Bt 2 (PBH Bt 5)	Hirsutum	12/12/2019
2.	PAU Bt 3 (FBt 16-4)	Hirsutum	12/12/2019
3.	ICAR-CICR 16 Bt	Hirsutum	12/12/2019
4.	ICAR-CICR 902 Bt	Hirsutum	12/12/2019
5.	Raghuvir BG II	H X H	12/12/2019
6.	RCH 846 BG II	H X H	12/12/2019
7.	RCH 926 BG II	H X H	12/12/2019
8.	Hemang BG II	H X H	12/12/2019
9.	SP 7670 BG II	H X H	12/12/2019
10.	NBC 1103 BG II*	H X H	12/12/2019
11.	PRCH 2799 Bt 2*	H X H	12/12/2019
12.	RCH 929 BG II	H X H	12/12/2019
13.	YCH 7475 Bt 2*	H X H	12/12/2019
14.	ACH 1155-2 BG II	H X H	12/12/2019

15.	Samir BG II	H X H	12/12/2019
16.	JKCH 1551 BG II	H X H	12/12/2019
17.	NBC 1111 BG II*	H X H	12/12/2019
18.	Indam 1642 BG II	H X H	12/12/2019
19.	NBHB 2205 BG II*	H X B	12/12/2019

*- The Bt Hybrids are recommended and approval will be subjected to submission of "affidavit of ownership Bt Cotton Hybrid/Variety" by the company

Breeder Seed Production

During the year 2019-20, Breeder Seed production of Parental lines of hybrids and varieties presented below tables

S. No	Name of the Producing centre	Parents of Hybrid Name	Year of Notification	Indent (Q)	Production (Q)
1	CCSHAU, Hisar	AAH-1 (DESI COTTON HYBRID-1) (M)	1999	0.04	0.05
2	CCSHAU, Hisar	AAH-1 (DESI COTTON HYBRID-1) (F)	1999	0.10	0.10
3	PDKV, Akola	PKHY-2 AK-32A	1983	0.04	0.10
4	PDKV, Akola	PKHY-2 DHY-286R	1983	0.02	0.10
5	UAS, Dharwad	DCH-32 DS-28A	1981	0.01	0.02
6	UAS, Dharwad	DCH-32 SB-425 YFR	1981	0.01	0.02
			Parent Total	0.22	**0.39**
			Grand Total	17.27	**62.54**

Variety-wise

(q)

S. No	Name of the Producing centre	Variety Name	Year of Notifi-cation	Indent	Production
1	PDKV, Akola	AKA-5 (AKH-605)	1983	0.50	1.00
2	PDKV, Akola	AKA-7 (AKA 8307)	2001	1.00	1.50
3	PDKV, Akola	AKA-8	2008	0.10	0.20
4	PDKV, Akola	AKH-081 Non Bt.	1988	0.02	0.10
5	PDKV, Akola	AKH-84635 Non Bt.	1996	0.02	0.10
6	CICR, Nagpur	CICR Bt.1 (Suraj)	2017	0.30	0.00
7	CICR, Nagpur	CICR Bt.12 (AKH-081 Bt.)	2017	0.20	0.00
8	CICR, Nagpur	CICR Bt.2 (AKH-84635Bt.) Rajat	2017	0.20	0.00
9	PAU, Ludhiana	Desi Cotton LD-949	2017	1.00	2.49
10	PAU, Faridkot	F 1861	2004	0.25	1.65
11	PAU, Faridkot	F 2228	2016	2.20	23.50
12	PAU, Faridkot	F 2383	2016	3.30	13.20
13	PAU, Faridkot	F-1378	1997	0.45	4.60
14	PAU, Faridkot	F-505	1987	0.30	1.00
15	PAU, Faridkot	F-846	1993	0.40	2.20
16	PAU, Faridkot	FDK-124	2011	0.10	2.80
17	CCSHAU, Hisar	H-1098	1997	0.20	0.30
18	CCSHAU, Hisar	HD-123	2000	0.50	0.60
19	PAU, Ludhiana	LD-1019	2019	0.10	0.65

20	PAU, Ludhiana	LH-2108	2012	0.10	3.67
21	VNMKV, Nanded	NH-615	2009	0.10	1.00
22	VNMKV, Nanded	NHH-44 AC-738R	1985	0.04	0.04
23	VNMKV, Nanded	NHH-44 BN1A	1985	0.05	0.05
24	MPKV, Jalgaon	Phule LJA-794	2005	0.50	0.60
25	SKRAU, Sriganganagar	RG - 542	2013	1.00	0.30
26	SKRAU, Sriganganagar	RG-8	1988	3.20	0.50
27	SKRAU, Sriganganagar	RST-9	1992	0.80	0.00
28	CICR, Coimbatore	SUBIKSHA	2018	0.05	0.05
29	CICR, Coimbatore	SUCHITRA	2018	0.05	0.05
30	CICR, Coimbatore	Suraj Non-Bt.		0.02	0.05
			Variety Total	**17.05**	**62.15**

Implementation of PVP legislation, 2001 and DUS testing of cotton under ICAR-SAU system

ICAR-CICR, Regional Station, Coimbatore is designated as the Nodal center for Implementation of PVP legislation, 2001 and DUS testing of cotton. This programme is operative since 2008 in tune with AICRP (Cotton), This is a centrally sponsored scheme funded by PPV&FRA, New Delhi with an objective for establishment and maintenance of database of extant cotton varieties, Conduct DUS test on new candidate, Varieties of common knowledge (VCK), Farmers varieties (FV) and essentially derived varieties (EDV), maintenance breeding of reference cotton varieties, morphological characterization of extant cotton varieties and also Registration of centrally released extant cotton varieties under this act. In addition to this providing guidance to SAUs in matters related to registration of cotton varieties. This programme is being conducted with the support of participating centers viz., ICAR-Central Institute for Cotton Research, Nagpur; National Seeds project Unit, UAS, Dharwad; Department of Cotton CCSHAU, Hisar; Regional Research Station Bhatinda, PAU and the Department of Cotton, MPKV, Rahuri

Details of DUS trial at ICAR-CICR, Regional Station, Coimbatore

S.No.	Reg No	Category	Denomination	Reference varieties
Second year of testing 2019-2020				
1	Reg/2013/221	New	PSCP 35 BG-I	Sahana, Abadhitha
2	Reg/2013/225	New	PSCP 36 BG-II	BN-1, Sahana
3	Reg/2013/226	New	PSCP 16 BG-II	Laxmi, Sumangala
4	Reg/2013/203	New	PRCH-742 BG-II	G Cot. 12 , BUNNY-(HXH)
5	Reg/2010/57	New	PCH-888 Bt.2	*Tested as EDV in 2014-15*
6	Reg/2018/593	VCK	Vega (MC5456BGII)	AC 738, MCU-10, ACP-71
7	REG/2011/488	VCK to New	NCS 9025 Bt 2	MCU 5, MCU 8, Suman
First year of testing 2019-2020				
1		New	2877/4088	RHCb001, SVG04-19, NC-182, NC-61
2		New	2880/3220	Sujatha, Suvin, TCB 209, G898516, Tulasi333, NCHB940 Bt., Gold kavitha BGII
3		New	2884/2112	JK4,GSHV112, MCU10, MRC7377, NCS456 BGII, JKCH8665BGII
4		New	2870/2241	

During the year 2019-2020, the data base on extant cotton varieties has been updated as and when cotton varieties are identified and notified. Seed multiplication, Characterization and maintenance breeding of 180 extant cotton varieties were carried out. Reference varieties for conduct

of DUS test in tetraploid and Diploid cotton is maintained 141 in *G. hirsutum*, 34 in *G. arboreum,* 5 in *G. herbaceum* and 5 in *G. barbadense*

Field trials for the establishment of Distinctiveness, Uniformity and Stability of new cotton genotypes, varieties of common knowledge, and essentially derived variety was conducted in tetraploid cotton at CICR, Coimbatore and UAS, Dharwad. There were 6 new candidate varieties and one varieties of common knowledge in the second year testing trial. In the first year trial there were 4 new tetraploid candidate varieties were grown along with 10 reference varieties. The trial was conducted as per test guidelines of tetraploid and diploid cottons; Field sowing was taken up on 19.9.2018 in randomized block design with 3 replications. Germination count at 12 DAS in corresponding field was recorded in all the entries. Morphological characters were recorded form seedling to fiber. The data received from participating centers were compiled and submitted to PPV&FRA for issue of registration certificate.

Front Line Demonstrations (FLD) under NFSM-Commercial Crops

Front Line Demonstrations in Cotton have been conducted by the ICAR- All India Coordinated Research Project on Cotton since 1996-97. All the networking centers of ICAR- AICRP on cotton, main and regional stations of ICAR- Central Institute for Cotton Research are actively involved in this proven approach of Transfer of Technology in cotton. The objectives of the program are demonstrating the usefulness of the latest improved crop production and protection technologies to the farmers, reducing the time gap between technology generation and its adoption, enabling the scientists to obtain direct feedback from cotton farmers and suitably reorient their research programmes to develop appropriate technology packages and creating effective linkage among scientists, extension personnel and farmers. Until 2013, these demonstrations were conducted on Production Technology, Integrated Pest Management and on Farm implements under Technology Mission on Cotton, Mini Mission II. From 2014-15 onwards, these FLDs have been conducted under National Food Security Mission (NFSM) (Commercial Crops) as three different components viz., Integrated Crop Management (ICM), Desi / ELS / Seed Production in cotton and Intercropping in cotton.

During the year 2019-20 under NFSM - Commercial Crops, a total of 522 Front Line Demonstrations on Integrated Crop Management on cotton, 243 Front Line Demonstrations on Desi / ELS cotton / ELS cotton seed production and 175 Front Line Demonstrations on intercropping with cotton were conducted by nineteen centers of ICAR - All India Coordinated Research Project on Cotton with a budget outlay of 77.63 lakh rupees.

Details of Front-Line Demonstrations Conducted under NFSM-Commercial Crops through ICAR-AICRP on Cotton during 2019-20

S. No	Centres	FLDs on ICM		FLDs on Desi / ELS cotton / ELS cotton seed production		FLDs on Intercropping in cotton	
		A	C	A	C	A	C
1	PAU, Faridkot	20	25	20	25	-	-
2	CCSHAU, Hisar	30	30	30	30	-	-
3	SKRAU, Sriganganagar	40	30	40	30	-	-
4	ICAR – CICR, Sirsa	60	60	-	-	-	-
5	NAU, Surat	20	20	20	20	10	10
6	JAU, Junagadh	30	30	-	-	10	10
7	PDKV, Akola	15	15	-	-	25	25

8	MAU, Nanded	20	20	20	20	20	20
9	MPKV, Rahuri	20	20	-	-	10	10
10	ICAR-CICR, Nagpur	20	32	20	8	20	20
11	RVSKVV, Khandwa	0	10	-	-	0	10
12	ANGRAU, Guntur	50	50	-	-	10	10
13	RARS, Nandhyal	20	20	30	30	-	-
14	PJTSAU, Warrangal	10	10	15	15	10	10
15	UAS, Dharwad	30	30	10	10	30	30
16	UAS, Raichur	30	30	15	15	-	-
17	UAS, Chamrajnagar	30	30	-	-	-	-
18	TNAU, Coimbatore	20	20	20	20	20	20
19	CICR, Coimbatore	20	40 (20*)	20	20*	20	0
Grand Total		**485**	**522**	**260**	**243**	**185**	**175**

(**A** – No. of FLDs allotted in hectares; **C** – No. of FLDs conducted actually in hectares)
(* Conducted under Summer Irrigated Condition)

Monitoring of AICRP on Cotton trials

Four monitoring teams was constituted by the council to monitor the AICRP on cotton trials with the composition of each team with cotton breeder, agronomist, entomologist, pathologist and social scientist as given in the below table. The team monitored trials conducted in different zones and submitted the report to Project coordinator (Cotton Improvement).

State	Breeder	Agronomist	Entomologist	Pathologist	Social Scientist
North Zone (Punjab, Haryana & Rajasthan - Sriganganagar)	Dr. Rajeswari, TNAU, Coimbatore	Dr. S. Bharathi, RARS, Lam	**Dr. B. Dharajothi,** ICAR-CICR, Coimbatore	Dr. B. Sreelakshmi, RARS, Lam	Dr. S. Usharani, ICAR-CICR, Coimbatore
Central Zone (Maharashtra & Bhawanipatna)	**Dr. S. Manickam,** ICAR-CICR, Coimbatore	Dr. R. Raja, ICAR-CICR, Coimbatore	Dr. S. K. Parsai, RVSKVV, Khandwa	Dr. Satish K Sain, ICAR-CICR, Sirsa	Dr. M. Sabesh, ICAR-CICR, Coimbatore
Central Zone (Gujarat, Banswara of Rajasthan, Madhya Pradesh)	Dr. Paramjit Singh, PAU, Bathinda	Dr. B. S. Nayak, Bhawanipatna	Dr. Rishi Kumar, ICAR-CICR, Sirsa	**Dr. D. Monga,** ICAR-CICR, Sirsa	Dr. Karpagam, ICAR-CICR, Coimbatore
South Zone (Andhra Pradesh, Karnataka & Tamil Nadu)	Dr. D. M. Patel, NAU, Surat	**Dr. K. Sankara narayanan,** ICAR-CICR, Coimbatore	Dr. H. R. Desai, NAU, Surat	Dr. Prashant Sandipan, NAU, Surat	Dr. A. R. Reddy, ICAR-CICR, Nagpur

ICAR AICRP ON COTTON REMITTANCE DETAILS FOR THE YEAR 2019-2020 (Rs. in Lakhs)

S. No.	Name of the centre	Salary Head	Other than Salary Head, Other than TSP NEH & SCSP	Other than Salary Head, NEH	Total
1	GUNTUR	91.45	9.45	0.00	100.90
2	NANDYAL	52.53	5.67	0.00	58.20
3	JUNAGADH	72.00	7.56	0.00	79.56
4	SURAT	110.91	11.34	0.00	122.25
5	HISAR	103.15	6.54	0.00	109.69
6	BANGALORE	40.90	3.78	0.00	44.68
7	DHARWAR	103.15	11.34	0.00	114.49
8	RAICHUR	60.32	5.67	0.00	65.99
9	KHANDWA	72.00	7.56	0.00	79.56
10	AKOLA	72.00	7.56	0.00	79.56
11	NANDED	72.00	7.56	0.00	79.56
12	RAHURI	60.32	5.67	0.00	65.99
13	BHAWANIPATNA	52.53	5.67	0.00	58.20
14	BHATINDA	64.21	7.56	0.00	71.77
15	FARIDKOT	79.78	7.56	0.00	87.34
16	BANSWARA	40.90	3.78	0.00	44.68
17	SRIGANGANAGAR	72.00	7.56	0.00	79.56
18	COIMBATORE	72.00	7.56	0.00	79.56
19	SRIVILLIPUTUR	60.32	5.67	0.00	65.99
20	KANPUR	29.19	1.89	0.00	31.08
	Total	**1381.66**	**136.95**	0.00	**1518.61**
21	CENTRAL AGRICULTURAL UNIVERSITY, IMPHAL			8.00	**8.00**
22	PC Cell	-	38.05	0.00	**38.05**
	Grand Total	**1381.66**	**175.00**	**8.00**	**1564.66**

AICRP on COTTON

ANNUAL REPORT:2019-20

Project Coordinator (Cotton Improvement)
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ICAR-Central Institute for Cotton Research
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RESEARCH HIGHLIGHTS

CROP IMPROVEMENT

- In Initial evaluation trials of North Zone, RS 2928 (3440 kg/ha), PBD 92 (3033 kg/ha) and KR 155 (3314 kg/ha) were promising in the respective trials and have been promoted to coordinated trials.
- In North Zone, *hirsutum* genotype F 2662 was promising in normal spacing, whereas, PBH 174 was better in closer spacing. Among *desi* cotton, PBD 36 was promising among varieties and KR 136 was promising hybrid.
- In Initial evaluation trials of Central Zone, under irrigated conditions, the genotypes *viz*., GJHV 566, DHCC 1901, RHC-HD 1405, CCB 141, and the hybrid DHB 1902 were promising in the respective trials and have been promoted to coordinated trials.
- In Central Zone, under irrigated conditions, TCH 1828 was promising with good overall yield among *hirsutum* genotypes in normal spacing, whereas, RHC HD 1406 was better in closer spacing for high density planting system.
- In Initial evaluation trials of Central Zone, under rainfed conditions, the genotypes *viz*., NH 702, GTHV 18/19, NDLA 3116-3, CINA 1069, and DDCC 1902 were promising in the respective trials and have been promoted to coordinated trials.
- Under rainfed conditions in Central Zone, the genotype NDLH 2051-1 was the best in normal spacing, while RHC HD 1433 was promising in closer spacing.
- Among *desi* in rainfed situations of Central Zone, GAM 259 (*arboreum* variety) and NACH 556 (*desi* hybrid) were better and has been recommended for agronomic evaluation.
- In Initial evaluation trials of South Zone, under irrigated conditions, the genotypes *viz*., TSH 383, CCHC 19-2, RHC-HD 1312, DB 1901, and hybrid DHB 1902 were promising in the respective trials and have been promoted to coordinated trials.
- In South Zone, RHC 1217 was better in irrigated conditions under normal spacing, while RHC HD 1433 was promising with closer spacing.
- For the first time, naturally coloured cotton was tested for three years consecutively in South Zone and the genotypes *viz*., 16301 DB among *hirsutum* and DDCC 1 among arboreum were recommended for agronomic evaluation.
- Among extra long staple *G. barbadense* genotypes, DB 1701 was promising in South Zone and has been recommended for agronomic evaluation.
- Similarly, ELS interspecific H x B hybrid, RHB 1002 was prominent in South zone under irrigated conditions and has been recommended for agronomic evaluation.
- In Initial evaluation trials of South Zone, under rainfed conditions, the genotypes *viz*., NDLH 2051-3, DSC 1951, NDLA 3116-3, PAIG 396, and DDCC 1902 were promising in the respective trials and have been promoted to coordinated trials.
- In rainfed situations of South Zone, the *hirsutum* genotype NDLH 2051-1 and *arboreum* genotype PA 837 have been recommended for agronomic evaluation.

CROP PRODUCTION

- Optimization of spacing and nutrient requirement is the pre requisite for releasing of promising genotypes. Agronomic requirements of RHC 1217, GISV 310, CPD 1652,AKH 09/5, DB 1602, SB SG 1-5, CNA 1032, PA 810 and AJAH 101 in central zone, SCS 1061, CPD 1652, ARBHB 1601, LAHB 1 DB 1601, DB 1602, JLA 1110 and PA 810 in south zone were worked out.
- Nutrient and geometry requirements were worked out for RS 2818 , RS 2827, ARBC 1601, BS 30 GISV 298, DSC 1651 and ARBC 1651 under High Density Planting System (HDPS).
- In Chamrajnagar, basic studies to find out season and times of sowing of ELS cotton under rainfed condition found that the domain is having bimodal rainfall and having two distinct seasons respectively summer and kharif for ELS cotton cultivation. The summer sowing window of 15th April to 30th May and kharif season sowing window of 15th July to15th August were standardised.
- Research on reducing nitrogen dose and enhancing of nitrogen use efficiency in Bt cotton found that 25 % of Nitrogen saving by application of 75% of RDN + Placement (Spot application in 4 splits) + Foliar application of 1 % urea (3 times) + raising of sunnhemp/fodder cowpea between rows incorporated before flowering at Rahuri. The result at Hisar, Khandwa and Chamrajnagar, Junagadh, Dharwad and Nandyal revealed that application of 75% of RDN + Placement (Spot application in 4 splits) + Foliar application of 1 % urea (3 times) found optimum.
- Organic nutrient management packages including seed treatment, soil application of recommended bio fertilizers, foliar application of **Pink Pigmented Facultative Methylotrops (PPFM)** at flowering, soil application of Neem cake @ 250 kg/ha and raising and incorporation of Sunnhemp / fodder cowpea between rows registered significantly higher seed cotton yield at Khandwa (1203 kg/ha), Srivilliputhur(1493 Kg/ha and Coimbatore (1703 kg/ha). Seed treatment and soil application of recommended bio fertilizers and foliar application of PPFM with Neem cake 250 kg/ha and Intercropping with green gram/black gram/ ground nut/soybean registered significantly higher seed cotton yield at Junagadh(1415 kg/ha), LAM (959 kg/ha) and Raichur (1195 kg/ha).
- Labour saving package including land shaping by machine, pre and post emergence application of weed control, intercultural operation by animal and boom / other sprayer for spraying registered the least labour requirement of 126,115,70,138,113 and 98 respectively at Bhawanipatna, Nanded, Akola, LAM , Surat and Raichur respectively, which was 35.1,17.3, 19.5, 43.0,41.5 and 14.0 per cent less for one hectare of cotton cultivation as compared to control.
- Canopy management in HDPS cotton cultivation using growth retardant found that mepiquat chloride application @ 20 g a.i. / ha. at 60 and 75 DAS reduced sympodial length/plant height by 15.6,13.3,14.7 and 10.9 per cent respectively at Surat, Junagadh, Dharwad and Khandwa. The same chemical and the dose increased the seed cotton yield respectively of 13.56, 10.5,12.1 and 4.4 per cent at Surat, Junagadh, Dharwad and Khandwa.
- Conservation agriculture results found that Conventional tillage+ No residue management had been observed higher seed cotton yield at Rahuri (2415 kg/ha), Chamrajnagar (2047 kg/ha) and Srivilliputhur (1803 kg/ha). Permanent bed system + Zero tillage+ 100 % residue management observed significantly higher seed cotton yield at Junagadh (2698 kg/ha). Which registered the highest net return of Rs1,14,262/-, 89,900/- and 54,430/- at Rahuri, Junagadh and Chamrajnagar respectively.
- Cost of cultivation per quintal on the basis of Cost C3 was arrived as Rs.3,984, 4,276, 4,543, 4,820 and 4,229 respectively for Faridkot (Bt hybrid), Faridkot (non Bt), Bathinda (Bt hybrid) , Bathinda (non Bt hybrid) and Hisar (Bt hybrid) in North Zone. In central Zone, cost of cultivation per quintal arrived as Rs. 6070, 5015,5264,4509, 3625 and 3465 /ha respectively with Akola (Bt hybrid), Nanded (Bt hybrid), Bhawanipatna (Bt& non Bt hybrids), Rahuri (Bt hybrid), Junagadh (Bt hybrid) and Surat (Bt hybrid).In south Zone, cost of cultivation per quintal arrived as Rs.3866,7488,4523,

4201, 5736, 4289 and 4385/ha respectively with Chamrajnagar(Bt hybrid (HxB)), Nandyal (Bt hybrid), LAM (Bt hybrid), Srivilliputhur(*hirsutum*, HDPS) Raichur (Bt hybrid (I)), Raichur (Bt hybrid (R) and Coimbatore (Bt hybrid)

- Formation of Soil crust immediately after cotton is serious problem; which hamper germination in North Zone could be solved practically and economically by Chopped crop residue/wheat bhusa @ 3 t/ha , Farm yard manure @ 3 t/ ha in seed rows , running of peg/spike tooth weeder (two days after crust)) , application of super absorbent @ 50 kg/ha and goondkathira @ 25 kg/ha
- Performance of Bt varieties in Central Zone found that PKV 081 registered significantly higher seed cotton yield at Akola (1584 kg/ha) and Rahuri(2667 kg/ha) .The genotype, Rajat Bt registered significantly higher seed cotton yield at Surat(2185 kg/ha), Nanded (1848 kg/ha), Khandwa(1115 kg/ha) and Junagadh (2136 kg/ha).
- Effect of PGR on seed cotton yield found that ethrel @45 ppm at 40DAS followed by mepiquatchloride@100ppm at 90 DAS registered significantly higher seed cotton yield of 2573,1755, 1632, 3502, 1654, 2547, 2515 and 2580 kg/ha respectively at Rahuri, Khandwa, Nanded, LAM, Dharwad, Raichur, Srivilliputhur and Coimbatore which were 8.1,35.0, 21.4, 15.4,3.32,10.7,14.4, and 16.7 per cent respectively higher than control .
- Attempt was made to induce flowering and yield enhancement in late sown Desi cotton by spraying PGRs found that application of Salicylic Acid @ 0.5 mM at 45 &60 DAS increase seed cotton yield at Surat, Junagadh and Dharwad . However, in LAM, foliar application of 2,3,5Triiodo benzoic acid (TIBA) @ 100 ppm at 45 & 60 DAS observed higher performance.
- In moisture stress management, stress imposed by providing limited moisture at critical condition is managed by osmoprotectants. The osmoprotectants identified as PPFM@1 % at Hisar (3763 kg/ha). Application of 2% KNO3 - four sprays at Bathinda (3115 kg/ha), Sirsa (2789 kg/ha), Dharwad (1513 kg/ha) and LAM (2874 kg/ha) observed higher performance. Application of Salicylic acid @ 100 ppm at Faridkot (3158 kg/ha) and Sriganganagar (3627 kg/ha) and 2% Urea – 4 spray at Surat (2159 kg/ha) found effective.
- Drought tolerance genotypes, H 1567, H 1569 and H 1530 were identified at Hisar .Significantly higher oil content was observed in GISV-323 (18.95%),GJHV-566 (18.50%) , GJHV-566 (19.96%) and LRA-5166 (19.73%) at Hisar. The lowest gossypol content was observed in G.Cot-16 and GISV-323 (0.38%) and the highest gossypol content was found in GISV-319 (0.74%) at Surat. Genotypes viz., ARBC1651, ARBH813, DSC1651, CPD1652, LAHB-1 were identified as drought tolerant at Dharwad.
- Effect of Plant Growth Regulators (PGRs) on insect resistance in cotton found that mepiquat chloride @ 50 ppm foliar spray at 90 DAS registered significantly the least population of Jassid (9.46/plant), the highest of MDA content (0.475 mg/g) , phenolic contents (1.062 mg/g) , flavanoids content (0.873mg/g) and total gossypol content (0.925%). Levels of secondary metabolites and defensive enzymes were found altered significantly due to the PGR sprays and found higher with PGR sprayed plots.
- Biochemical basis of tolerance/susceptibility of Bt hybrids were investigated at Dharwad .Bt hybrid observed with least jassid infestation had positive correlation with high phenol, tannins, flavonoids and gossypol content. HxB hybrids exhibited high sucking pest damage as compared to H X H hybrids throughout the stages of plant development due to high levels of carbohydrates and protein content associated with HXB.

CROP PROTECTION
ENTOMOLOGY

- Sucking pests tolerant genotypes were identified from National and Zonal breeding trials of North Zone, Central Zone and South Zone and the identified entries are as follows.
- Under National trials 3, 18, 23 entries and under zonal trials 2, 14, 35 entries were identified as moderately tolerant to leaf hopper at North, Central and South Zones respectively.
- Advanced screening of promising entries for leaf hopper tolerance indicated 7 entries at North Zone (Bathinda, Faridkot, Hisar and Sriganganagar), 10 entries at Central Zone (Junagadh, Surat, Akola, Nanded and Rahuri), 8 entries at South Zone (Dharwad and Raichur) were tolerant to leafhopper.
- Seasonal dynamics of key pests in relation to climatic conditions recorded at North, Central and South Zone centres on Non Bt and Bt genotypes under unprotected conditions indicated that leaf hopper occurred at moderate level in all the centres of North Zone and crossed ETL in Rajasthan (Banswara), Maharashtra, Gujarat and Orissa of Central Zone during August to December (34th - 52nd SMW). In South zone leafhopper was above ETL in Andhra Pradesh, Karnataka and Tamil Nadu during September to November (37th - 49th SMW).
- Peak population of thrips was observed in Hisar and Bathinda during July (27th - 30th SMW) and July II FN to August II FN (30th - 33rd SMW) as compared to other centres of North Zone. In central Zone, thrips crossed ETL only in Rahuri and Surat during August to September (31st - 39th SMW).
- Bollworm infestation was moderate on Non Bt in all the centres throughout the season and on Bt, infestation of Spotted Boll Worm (SBW), Pink Boll Worm (PBW) was negligible in North India. Infestation of *H. armigera* and *Earias* sp. was reported in Central India. However, infestation of PBW was above ETL in Gujarat, Maharashtra, Madhya Pradesh (Khandwa) and in Gujarat, Maharashtra on NBt and Bt respectively during October to December.In South India, *H. armigera* was reported as above ETL from September II FN to (38th to 40th SMW) in Dharwad on NBt. Infestation of PBW was reported as above ETL in Andhra Pradesh, Karnataka and Tamil Nadu from November II FN to January (46th - 3rd SMW) on NBt. On Bt only in Lam Guntur, Dharwad and Coimbatore was reported as above ETL from October to January (43rd - 4th SMW).
- Activity of predators namely spiders, *Chrysoperla*, Coccinellid & syrphid fly were recorded throughout the cropping season.
- Through survey for key and emerging pests in farmers fields for weekly advisory in North Zone indicated, among the sucking pests **leaf hopper** crossed ETL in maximum locations in Faridkot and Bathinda, **thrips** in Bathinda and Sriganganagar, **whitefly** in Hisar and Faridkot. In Central Zone, **leafhopper** crossed ETL in maximum locations of Maharashtra and Orissa, Rajasthan (Banswara), **thrips** in Junagadh, Maharashtra and Bhawanipatna, **pink bollworm** crossed ETL in Maharashtra, Gujarat (Junagadh). In South Zone, **leafhopper** crossed maximum locations in all the centres, **whitefly** in Nandyal, thrips and **pink bollworm** in Raichur.
- The trial on determination of nymphal based ETL estimation and yield losses for cotton whitefly (*Bemisia tabaci*) in the treatments T1 (30 or more live red eyed nymph/30 leaves) and T2 (60 or more live red eyed nymph/30 leaves) recorded no yield reduction, T3 (120 or more live red eyed

nymph/30 leaves) and T4 (180 or more live red eyed nymph/30 leaves) recorded minimum yield reduction as compared to other treatments.

- Estimation of yield losses and management of pink bollworm studies revealed that the interventions T8 (Neem based insecticide spraying at 45 DAS followed by Thiodicarb spraying at60 DAS, Chloropyriphos spraying at 90 DAS and Lambda-Cyhalothrin at 120 DAS) and T6 (Thiodicarb spraying at 60 DAS, Chloropyriphos spraying at 90 DAS andLambda- Cyhalothrin at 120 DAS) recorded minimum percentage of pink bollworm damage and yield loss.
- Biorational options namely Pongamia oil 10ml/lit, Neem 1500ppm-5ml/lit, castor oil 10 ml/ lit and neem 300ppm/lit were identified for the management of thrips.
- Trial on enhancing the efficacy of yellow sticky trap using essential oils against sucking pests of cotton indicated that numerically higher number of leaf hopper and whiteflies was recorded in yellow sticky trap + sandal wood oil and yellow sticky trap + basil oil.
- In North Zone, Evaluation of new Bt formulations against bollworm complex of cotton indicated that Bt formulation at the rate of 4.0 ml/lit was comparable with chlorantraniliprole 18.5 SC at the rate of 0.6 ml/ lit in reducing the population of Spotted Boll Worm (SBW).
- In Central and South Zones, among the new microbial formulations against bollworm complex of cotton Brigade – B WP formulation @ 7g/l, 5g/l and Bt 127 SC @4ml/l performed better than other treatments and inferior to insecticide Chlorantraniliprole @ 0.6ml/l.
- Validation of trials on IPM Module in Central and South Zones indicated that, infestation of sucking pests was low in IPM when compared to farmers practice. Infestaion of PBW was also lower than non IPM due to synchronized sprays based on ETL and implementation of other components of IPM.
- Evaluation of BVG Agrosafe (A product from plant extracts) on pest complex significantly reduced the sucking pest population and the percent bollworm damage to green bolls, open bolls and locule @ the dosage of 6 ml and 4.5 ml per litre.

CROP PROTECTION
PLANT PATHOLOGY

- Screening trials of AICRP Bt cotton hybrids and varieties were conducted at the stations in North, Central and South Zones and compiled data for various diseases was submitted.
- Cotton leaf curl virus in the north zone, bacterial blight, grey mildew and *Alternaria* leaf blight in the central zone and *Alternaria leaf blight*, bacterial blight, grey mildew in the south zone were the major diseases reported during 2019-20 crop season. Corynesporium leaf spot at Guntur and Nagpur was recorded up to 28.7 and 8.7%, respectively.
- Cotton leaf curl virus disease (CLCuD) appeared in 24th met week at Hisar, 26th SMW at Sirsa, 27th SMW at Faridkot and at Sriganaganagar in screening nurseries. Whereas in farmer fields in all three states, based on survey conducted under AICCIP, the average PDI of 16.44, 17.27 and 11.84 was recorded in Sirsa (Haryana), Sriganganagar (Rajasthan) and Faridkot (Punjab) respectively.
- The occurrence of Tobacco streak virus (TSV) as per survey carried out in different locations of Marathwada and Vidarbha region, no incidence of TSV was observed during the survey. The incidence of TSV in different hybrids varied from 0% to 4.0% at Guntur, Andhra Pradesh. The incidence of TSV varied from 5.0 to 10.0% in Dindigul and Coimbatore districts in Tamilnadu.
- In the experiment for confirmation of disease resistance, Genotype RAH-0603 exhibited resistance to *Alternaria* blight, at Junagarh during 2019. The genotypes SVA-1118 exhibited resistant reaction to *Alternaria* blight, Bacterial blight (disease-free) and Grey mildew (disease-free) at Dharwad.
- At Bhatinda, foliar spray of 10 ppm Cobalt chloride immediately after the occurrence of disease followed by drenching of plants with a mixture of Copper oxychloride (COC) 50 WP@ 25g and 200 Urea in 10 litre of water found best however at Hisar, foliar spray of 10 ppm Cobalt chloride immediately after the occurrence of disease followed by foliar spray 50ppm of Sodium Benzoate immediately after the occurrence of disease showed maximum recovery of plants from parawilt.
- Among eight treatments and control, the lowest pooled mean PDI of Alternaria leaf spot and bacterial blight was recorded in treatment seed and soil application of *Bacillus aryabhatti* + *Bacillus tequeilencis.*The overall pooled mean seed cotton yield was highest in this treatment (25.4 Q/ha).However, the lowest pooled mean PDI of grey mildew was recorded in Foliar application of Pyraclostrobin (0.1%).
- Crop loss estimation studies due to CLCuD revealed reduction (%) in seed cotton yield reduction (Grade wise from 2-6) ranged from 20.3 to 85.2, 16.4 to 73.5, 20.2 to 69.4 and 18.0 to 69.0% in Bt hybrids US-51, RCH 773 BG II, NCS 9013 BGII and Bioseed 6688 BG II respectively. Based on mixed grades it was 37.0, 34.1, 37.6 and 30.9%, respectively in US-51, RCH 773 BG II, NCS 9013 BGII and Bioseed 6688 BG II at Faridkot, Hisar and Sriganganagar.
- Based on pooled results (2017-18-2018-19, 2019-20), all the nine treatments showed a numerical reduction of sooty mold over control. Based on pooled data the highest reduction of sooty mold caused by whitefly/hid was recorded by three sprays of Copper oxychloride (COC) 50 WP @ 2.25 g/litre of water followed by Propiconazole 25EC @ 1ml / litre of water. Among these treatments, the highest yield was recorded with Copper oxychloride (COC) 50 WP @ 2.25 g/litre of water followed by Propiconazole 25EC @ 1ml / litre of water and Mancozeb 50 WP @ 2.0g /L of water.

AICRP on COTTON

ANNUAL REPORT:2019-20

Results of Crop Improvement

Photo: M. Sabesh

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CROP IMPROVEMENT

National Trials – North Zone

Br. 02a - Initial Evaluation Trial of *G. hirsutum* (Irrigated)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Sriganganagar	Hisar	Sirsa (CICR)	Faridkot	Bathinda	Kanpur*	Mean NZ	Rank
1.	101	RS 2915	1907	3251	2874	2444	1955		2486	10
2.	102	F 2685	2278	3745	2590	3246	2774		2927	5
3.	103	HS 304	2228	3004	3823	2501	2243		2760	6
4.	104	LC	1936	2757	2588	2503	2169		2391	11
5.	105	CSH 1715	1501	3210	2378	1679	1535		2061	14
6.	106	H 1528	1589	2428	2502	2369	2823		2342	12
7.	107	PBH 56	1985	4486	3412	3021	2893		3159	2
8.	108	Quality Check (CSH 3129)	1958	3210	3203	2238	2160		2554	8
9.	109	RS 2920	2740	3663	3167	2956	2119		2929	4
10.	110	F 2720	1923	3663	3246	3114	2778		2945	3
11.	111	H 1520	2306	3539	2466	2078	2305		2539	9
12.	112	CSH 1725	2160	2798	2420	1745	2354		2295	13
13.	113	PBH 86	2349	3663	3088	2223	2346		2734	7
14.	114	ZC (F 2228)	2323	5021	3829	2642	2572		3277	1
		CD @ 5 %	431	714	526	441	411			
		CV %	12	12	11	11	10			
		Local Checks	**RS 2013**	**H 1098i**	**CSH 3129**	**LH 2108**	**LH 2108**	**CSH 3129**		

*Poor Yield, data rejected

Br. 02a - Initial Evaluation Trial of *G. hirsutum* (Irrigated)
Lint Yield (kg/ha)

S. No.	Code No.	Entries	Sriganganagar	Hisar	Sirsa (CICR)	Faridkot	Bathinda	Mean NZ
1.	101	RS 2915	714	1111	977	810	647	852
2.	102	F 2685	847	1239	830	1090	948	991
3.	103	HS 304	874	1192	1475	994	757	1058
4.	104	LC	745	954	854	931	716	840
5.	105	CSH 1715	585	1101	845	579	489	720
6.	106	H 1528	600	817	857	799	962	807
7.	107	PBH 56	775	1590	1230	1037	984	1123
8.	108	Quality Check (CSH 3129)	782	1012	1052	757	641	849
9.	109	RS 2920	1061	1340	1089	1084	650	1045
10.	110	F 2720	744	1273	1161	1070	849	1019
11.	111	H 1520	894	1300	901	769	782	929
12.	112	CSH 1725	772	983	835	610	736	787
13.	113	PBH 86	895	1109	1070	772	747	919
14.	114	ZC (F 2228)	863	1634	1287	850	744	1076

Ginning outturn (%)

S. No.	Code No.	Entries	Sriganganagar	Hisar	Sirsa (CICR)	Faridkot	Bathinda	Mean NZ
1.	101	RS 2915	37.5	34.3	34.0	33.1	33.2	34.4
2.	102	F 2685	37.2	33.1	32.0	33.6	34.3	34.0
3.	103	HS 304	39.2	39.7	38.6	39.6	33.7	38.2
4.	104	LC	38.5	34.6	33.0	37.2	32.9	35.2
5.	105	CSH 1715	39.0	34.3	35.5	34.5	31.9	35.0
6.	106	H 1528	37.7	33.7	34.3	33.8	34.0	34.7
7.	107	PBH 56	39.1	35.5	36.0	34.3	34.0	35.8
8.	108	Quality Check (CSH 3129)	39.9	31.5	33.1	33.8	29.7	33.6
9.	109	RS 2920	38.7	36.5	34.4	36.6	30.6	35.4
10.	110	F 2720	38.7	34.8	35.8	34.4	30.6	34.9
11.	111	H 1520	38.8	36.7	36.6	36.9	33.9	36.6
12.	112	CSH 1725	35.7	35.2	34.6	35.0	31.3	34.4
13.	113	PBH 86	38.1	30.3	34.6	34.6	31.9	33.9
14.	114	ZC (F 2228)	37.2	32.5	33.6	32.1	28.8	32.8

Br. 02a - Initial Evaluation Trial of *G. hirsutum* (Irrigated)

Bolls/plant

S. No.	Code No.	Entries	Sriganganagar	Hisar	Sirsa (CICR)	Faridkot	Bathinda	Mean NZ
1.	101	RS 2915	21.0	30.0	31.7	41.8	42.2	33.3
2.	102	F 2685	20.0	34.0	32.3	51.8	35.8	34.8
3.	103	HS 304	23.0	45.0	28.7	43.4	37.2	35.5
4.	104	LC	25.0	38.0	28.3	38.5	40.0	34.0
5.	105	CSH 1715	19.0	48.0	29.0	30.3	47.8	34.8
6.	106	H 1528	18.0	48.0	28.7	33.2	44.0	34.4
7.	107	PBH 56	22.0	44.0	35.7	50.0	45.8	39.5
8.	108	Quality Check (CSH 3129)	20.0	39.0	41.3	43.5	36.6	36.1
9.	109	RS 2920	23.0	43.0	29.0	46.2	27.7	33.8
10.	110	F 2720	21.0	44.0	32.3	51.1	33.8	36.4
11.	111	H 1520	20.0	51.0	30.7	30.4	32.0	32.8
12.	112	CSH 1725	29.0	40.0	29.0	34.2	37.8	34.0
13.	113	PBH 86	24.0	42.0	31.7	35.7	29.7	32.6
14.	114	ZC (F 2228)	19.0	46.0	37.3	34.3	29.7	33.3

Boll weight (g)

S. No.	Code No.	Entries	Sriganganagar	Hisar	Sirsa (CICR)	Faridkot	Bathinda	Mean NZ
1.	101	RS 2915	2.8	3.4	2.8	3.8	3.8	3.3
2.	102	F 2685	3.1	4.0	3.2	3.8	4.2	3.7
3.	103	HS 304	2.3	3.4	3.0	4.4	4.0	3.4
4.	104	LC	2.0	3.1	2.9	3.5	4.0	3.1
5.	105	CSH 1715	2.0	3.3	2.6	3.5	3.6	3.0
6.	106	H 1528	2.2	3.3	2.9	3.7	4.2	3.3
7.	107	PBH 56	2.2	3.7	3.0	3.8	4.3	3.4
8.	108	Quality Check (CSH 3129)	2.5	3.4	2.8	3.6	3.9	3.2
9.	109	RS 2920	2.7	3.9	3.2	3.7	3.8	3.5
10.	110	F 2720	2.6	4.0	2.9	3.7	4.0	3.4
11.	111	H 1520	2.9	4.1	3.1	4.2	3.8	3.6
12.	112	CSH 1725	2.0	3.5	2.7	2.9	3.6	2.9
13.	113	PBH 86	2.3	4.1	3.5	3.7	3.9	3.5
14.	114	ZC (F 2228)	3.0	4.2	3.4	3.9	4.1	3.7

Br. 06a – Initial Evaluation Trial of Compact genotypes (Irrigated)

Total Seed Cotton Yield at 160 DAS (Total of 130 DAS + 160 DAS) (Kg/ha)

S. No.	Code No.	Entries	Faridkot	Bathinda	Hisar	Sriganganagar	Mean NZ	Rank
1.	121	F 2560	2638	3676	3786	2574	3169	3
2.	122	Local Check	2316	2373	3566	1816	2518	8
3.	123	PBH 78	2508	2258	3786	2019	2643	7
4.	124	RS 2928	2942	3564	4527	2727	3440	1
5.	125	ZC (CSH 3075)	2342	3298	3950	1702	2823	5
6.	126	CSH 100	2426	2867	4307	2015	2904	4
7.	127	F 2757	3283	3514	4197	2436	3358	2
8.	128	RS 2921	2390	2431	3676	2336	2708	6
9.	129	H 1563	2043	2355	2634	2480	2378	9
		CD @ 5 %	453	369	502	361		
		CV %	10	7	8	9		
		Local Checks	**F 2383**	**F 2383**	**H 1098-I**	**RS 875**		

Seed Cotton Yield (130 DAS) (Kg/ha)

S. No.	Code No.	Entries	Bathinda	Hisar	Sriganganagar	Mean NZ
1.	121	F 2560	1193	1948	2138	1760
2.	122	Local Check	1001	1920	1060	1327
3.	123	PBH 78	653	1893	1527	1358
4.	124	RS 2928	999	2222	1909	1710
5.	125	ZC (CSH 3075)	933	2195	1044	1391
6.	126	CSH 100	988	2387	1362	1579
7.	127	F 2757	837	2167	2077	1694
8.	128	RS 2921	974	1728	1856	1519
9.	129	H 1563	919	1317	1768	1335

Br. 06a – Initial Evaluation Trial of Compact genotypes (Irrigated)

Seed Cotton Yield (160 DAS) (Kg/ha)

S. No.	Code No.	Entries	Bathinda	Hisar	Sriganganagar	Mean NZ
1.	121	F 2560	2483	1838	436	1586
2.	122	Local Check	1372	1646	756	1258
3.	123	PBH 78	1605	1893	492	1330
4.	124	RS 2928	2565	2304	818	1896
5.	125	ZC (CSH 3075)	2365	1756	658	1593
6.	126	CSH 100	1879	1920	653	1484
7.	127	F 2757	2678	2030	359	1689
8.	128	RS 2921	1457	1948	480	1295
9.	129	H 1563	1436	1317	712	1155

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Faridkot	Bathinda	Hisar	Sriganganagar	Mean NZ
1.	121	F 2560	901	1198	1228	959	1071
2.	122	Local Check	742	694	1250	720	851
3.	123	PBH 78	808	755	1285	794	911
4.	124	RS 2928	1073	1265	1675	1037	1263
5.	125	ZC (CSH 3075)	848	1112	1386	649	999
6.	126	CSH 100	876	936	1541	772	1031
7.	127	F 2757	1190	1179	1444	974	1197
8.	128	RS 2921	876	844	1307	876	976
9.	129	H 1563	763	719	978	951	853

Br. 06a – Initial Evaluation Trial of Compact genotypes (Irrigated)

Ginning outturn (%)

S. No.	Code No.	Entries	Faridkot	Bathinda	Hisar	Sriganganagar	Mean NZ
1.	121	F 2560	34.2	32.6	32.4	37.3	34.1
2.	122	Local Check	32.0	29.2	35.1	39.6	34.0
3.	123	PBH 78	32.3	33.4	33.9	39.4	34.7
4.	124	RS 2928	36.5	35.5	37.0	38.0	36.8
5.	125	ZC (CSH 3075)	36.2	33.7	35.1	38.1	35.8
6.	126	CSH 100	36.1	32.6	35.7	38.3	35.7
7.	127	F 2757	36.2	33.6	34.4	40.0	36.0
8.	128	RS 2921	36.6	34.7	35.6	37.5	36.1
9.	129	H 1563	37.4	30.5	37.1	38.3	35.8

No. of bolls/m^2

S. No.	Code No.	Entries	Bathinda	Hisar	Sriganganagar	Mean NZ
1.	121	F 2560	164.0	81.8	102.7	116.2
2.	122	Local Check	145.0	72.5	101.0	106.2
3.	123	PBH 78	133.0	81.8	101.7	105.5
4.	124	RS 2928	152.7	109.2	145.8	135.9
5.	125	ZC (CSH 3075)	169.7	89.8	76.3	111.9
6.	126	CSH 100	175.7	90.6	82.7	116.3
7.	127	F 2757	175.7	81.5	93.3	116.8
8.	128	RS 2921	128.0	74.1	126.7	109.6
9.	129	H 1563	149.3	60.3	104.3	104.7

Br. 06a – Initial Evaluation Trial of Compact genotypes (Irrigated)

Plant height (cm)

S. No.	Code No.	Entries	Faridkot	Bathinda	Hisar	Sriganganagar	Mean NZ
1.	121	F 2560	131.1	201.4	155.3	152.0	160.0
2.	122	Local Check	128.7	159.8	184.7	141.0	153.5
3.	123	PBH 78	140.6	178.1	172.7	161.0	163.1
4.	124	RS 2928	148.1	178.8	179.0	143.0	162.2
5.	125	ZC (CSH 3075)	136.3	161.4	165.3	156.0	154.8
6.	126	CSH 100	139.2	181.1	177.7	143.0	160.3
7.	127	F 2757	148.0	183.0	182.7	153.0	166.7
8.	128	RS 2921	133.9	180.8	159.3	157.0	157.8
9.	129	H 1563	138.3	182.3	172.3	146.0	159.8

No. of monopodia / plant

S. No.	Code No.	Entries	Faridkot	Bathinda	Hisar	Sriganganagar	Mean NZ
1.	121	F 2560	0.0	2.6	2.6	2.0	1.8
2.	122	Local Check	0.0	0.2	2.6	2.0	1.2
3.	123	PBH 78	0.2	0.9	2.3	1.0	1.1
4.	124	RS 2928	0.8	0.7	2.3	2.0	1.4
5.	125	ZC (CSH 3075)	0.3	0.4	2.6	1.0	1.1
6.	126	CSH 100	0.1	0.7	2.1	1.0	1.0
7.	127	F 2757	0.0	0.3	1.3	1.0	0.7
8.	128	RS 2921	0.0	0.9	2.7	1.0	1.2
9.	129	H 1563	0.8	1.3	2.3	1.0	1.4

Br. 06a – Initial Evaluation Trial of Compact genotypes (Irrigated)

No. of sympodia / plant

S. No.	Code No.	Entries	Faridkot	Bathinda	Hisar	Sriganganagar	Mean NZ
1.	121	F 2560	16.8	25.1	15.2	15.0	18.0
2.	122	Local Check	19.1	12.8	13.9	14.0	15.0
3.	123	PBH 78	17.9	14.0	15.8	14.0	15.4
4.	124	RS 2928	15.9	17.1	14.1	10.0	14.3
5.	125	ZC (CSH 3075)	16.8	16.3	14.3	16.0	15.8
6.	126	CSH 100	15.8	18.1	15.1	17.0	16.5
7.	127	F 2757	18.7	18.9	16.9	20.0	18.6
8.	128	RS 2921	17.5	20.0	14.9	15.0	16.8
9.	129	H 1563	16.8	19.3	17.5	12.0	16.4

Boll weight (g)

S. No.	Code No.	Entries	Faridkot	Bathinda	Hisar	Sriganganagar	Mean NZ
1.	121	F 2560	3.4	4.2	3.5	3.2	3.6
2.	122	Local Check	3.1	4.2	3.7	2.3	3.3
3.	123	PBH 78	3.6	4.1	3.5	2.3	3.4
4.	124	RS 2928	3.3	3.7	3.1	2.3	3.1
5.	125	ZC (CSH 3075)	3.8	4.2	3.3	2.7	3.5
6.	126	CSH 100	3.3	4.1	3.7	2.7	3.4
7.	127	F 2757	3.7	4.2	3.9	2.8	3.7
8.	128	RS 2921	3.4	3.7	3.8	2.3	3.3
9.	129	H 1563	3.5	3.6	3.3	2.7	3.3

Br. 22a – Initial Evaluation Trial of *G. arboreum* (Irrigated)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Sriganganagar	Faridkot	Bahtinda	Kanpur*	Hisar	Sirsa (CICR)	Mean NZ	Rank
1.	131	PBD 88	2661	3230	3413		1934	3813	3010	2
2.	132	CISA 17	1712	2111	2171		1922	2763	2136	11
3.	133	LC	2458	2481	2630		2107	3935	2722	7
4.	134	FDK 298	1979	3568	2687		1963	3046	2649	10
5.	135	RG 870	3162	2971	2637		2161	3378	2862	5
6.	136	HD 535	2182	3202	1989		2650	3281	2661	9
7.	137	CISA 41-1	1517	2897	1472		605	3070	1912	12
8.	138	ZC (FDK 124)	2568	3412	2098		2473	4015	2913	3
9.	139	FDK 304	2586	3704	2650		2436	3092	2894	4
10.	140	PBD 92	2581	3432	2978		1979	4194	3033	1
11.	141	RG 868	3151	3572	2408		506	3814	2690	8
12.	142	HD 544	2453	3156	2056		2613	3363	2728	6
		CD @ 5 %	437	617	416		44	312		
		CV %	11	11	10		13	5		
		Local Checks	**RG 542**	**LD 949**	**LD 949**	**RG 8**	**HD 432**	**CISA 310**		

*Poor Yield, data rejected

Br. 22a – Initial Evaluation Trial of *G. arboreum* (Irrigated)

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Sriganganagar	Faridkot	Bahtinda	Hisar	Sirsa (CICR)	Mean NZ
1	131	PBD 88	1036	1182	1343	701	1354	1123
2	132	CISA 17	598	764	758	680	953	751
3	133	LC	920	1001	890	843	1456	1022
4	134	FDK 298	687	1196	954	694	1066	919
5	135	RG 870	1164	1065	971	770	1182	1030
6	136	HD 535	800	1151	690	1001	1148	958
7	137	CISA 41-1	558	1086	559	221	1105	706
8	138	ZC (FDK 124)	941	1273	707	890	1445	1051
9	139	FDK 304	927	1385	998	854	1082	1049
10	140	PBD 92	897	1296	1084	736	1510	1105
11	141	RG 868	1220	1410	921	205	1373	1026
12	142	HD 544	972	1260	772	1059	1365	1086

Ginning outturn (%)

S. No.	Code No.	Entries	Sriganganagar	Faridkot	Bahtinda	Hisar	Sirsa (CICR)	Mean NZ
1	131	PBD 88	38.9	36.6	38.7	36.3	35.5	37.2
2	132	CISA 17	34.9	35.7	34.9	35.3	34.3	35.0
3	133	LC	37.4	40.5	32.5	40.0	37.0	37.5
4	134	FDK 298	34.7	33.5	35.9	35.3	35.0	34.9
5	135	RG 870	36.8	35.8	36.8	35.7	35.3	36.1
6	136	HD 535	36.7	36.0	34.6	37.7	35.0	36.0
7	137	CISA 41-1	36.8	37.5	37.9	36.6	36.0	37.0
8	138	ZC (FDK 124)	36.7	37.3	33.6	35.9	35.7	35.8
9	139	FDK 304	35.8	37.4	37.7	35.0	34.7	36.1
10	140	PBD 92	34.7	37.7	36.5	37.1	35.7	36.4
11	141	RG 868	38.7	39.5	38.3	40.5	36.2	38.6
12	142	HD 544	39.6	39.9	37.5	40.5	40.7	39.7

Br. 22a – Initial Evaluation Trial of *G. arboreum* (Irrigated)

Bolls/plant

S. No.	Code No.	Entries	Sriganganagar	Faridkot	Bahtinda	Hisar	Sirsa (CICR)	Mean NZ
1	131	PBD 88	28.0	47.9	37.8	27.8	46.0	37.5
2	132	CISA 17	18.0	48.3	50.9	49.9	46.0	42.6
3	133	LC	26.0	50.4	37.1	38.0	47.0	39.7
4	134	FDK 298	28.0	53.2	28.2	38.3	47.0	38.9
5	135	RG 870	35.0	57.3	43.4	35.8	47.0	43.7
6	136	HD 535	21.0	48.4	35.4	43.5	47.0	39.1
7	137	CISA 41-1	20.0	56.8	22.8	21.4	47.0	33.6
8	138	ZC (FDK 124)	31.0	51.1	38.4	37.2	50.0	41.5
9	139	FDK 304	27.0	45.1	39.1	34.0	46.0	38.2
10	140	PBD 92	23.0	47.3	36.9	35.6	44.0	37.4
11	141	RG 868	31.0	45.3	40.1	19.2	45.0	36.1
12	142	HD 544	21.0	47.9	40.4	39.0	47.0	39.1

Boll weight (g)

S. No.	Code No.	Entries	Sriganganagar	Faridkot	Bahtinda	Hisar	Sirsa (CICR)	Mean NZ
1	131	PBD 88	2.2	2.1	2.7	2.5	2.2	2.3
2	132	CISA 17	2.3	2.5	2.6	2.2	2.1	2.3
3	133	LC	2.1	2.2	2.5	2.7	2.1	2.3
4	134	FDK 298	1.7	2.3	2.3	2.3	1.7	2.1
5	135	RG 870	2.1	2.1	2.6	2.2	2.0	2.2
6	136	HD 535	2.6	2.5	3.1	2.2	2.4	2.6
7	137	CISA 41-1	1.9	2.1	2.6	2.3	2.0	2.2
8	138	ZC (FDK 124)	1.8	2.1	2.6	2.2	1.9	2.1
9	139	FDK 304	2.1	2.4	2.7	2.6	2.1	2.4
10	140	PBD 92	2.5	2.1	2.5	2.7	2.1	2.4
11	141	RG 868	2.4	2.2	2.7	2.6	2.3	2.4
12	142	HD 544	2.8	2.6	3.0	3.3	2.4	2.8

Br 25a/b – Preliminary Hybrid Trial of Desi Hybrid

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Sriganganagar	Bathinda	Hisar	Sirsa (CICR)	Arya Nagar (Shakti Vardhak)	Mean NZ	Rank
1.	151	KR 147	2765	2266	2992	3685	4218	3185	2
2.	152	AJAH 103	2240	230	317	1756	372	983	9
3.	153	KR 144	2809	1889	1782	2789	2675	2389	8
4.	154	CISAA 18-3	2344	1933	1757	3906	2757	2539	7
5.	155	LC	2011	2942	2156	3859	2860	2766	6
6.	156	AAH 42	2786	2373	2860	3984	2914	2983	4
7.	157	ZC (KR 64-NZ)	2688	2842	3095	3750	3521	3179	3
8.	158	CISAA 18-4	2835	2568	2078	4046	2733	2852	5
9.	159	KR 155	2847	2572	2757	3979	4414	3314	1
		CD @ 5 %	439	396	457	324	519		
		CV %	10	11	12	5	10		
		Local Checks	**RAJ DH. 9**	**FMDH 9**	**AAH 1**	**CICR-2**	**AAH 1**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Sriganganagar	Bathinda	Hisar	Sirsa (CICR)	Arya Nagar (Shakti Vardhak)	Mean NZ
1.	151	KR 147	1097	857	1240	1514	1576	1257
2.	152	AJAH 103	757	-	100	615	124	399
3.	153	KR 144	1157	734	767	1160	990	962
4.	154	CISAA 18-3	820	631	631	1379	986	889
5.	155	LC	749	1015	808	1517	1058	1029
6.	156	AAH 42	1015	798	1130	1458	1124	1105
7.	157	ZC (KR 64-NZ)	970	1030	1339	1474	1334	1229
8.	158	CISAA 18-4	1002	855	740	1388	1006	998
9.	159	KR 155	1082	921	1081	1484	1717	1257

Br 25a/b – Preliminary Hybrid Trial of Desi Hybrid

Ginning outturn (%)

S. No.	Code No.	Entries	Sriganganagar	Bathinda	Hisar	Sirsa (CICR)	Arya Nagar (Shakti Vardhak)	Mean NZ
1.	151	KR 147	39.7	37.8	41.5	38.0	37.4	38.9
2.	152	AJAH 103	33.8	-	31.6	35.0	33.4	33.5
3.	153	KR 144	41.2	38.2	43.0	41.6	37.0	40.2
4.	154	CISAA 18-3	35.0	31.6	35.9	35.3	35.7	34.7
5.	155	LC	37.3	33.9	37.5	39.3	37.0	37.0
6.	156	AAH 42	36.4	33.2	39.5	36.6	38.6	36.9
7.	157	ZC (KR 64-NZ)	36.1	35.6	43.3	39.3	37.9	38.4
8.	158	CISAA 18-4	35.4	33.0	35.6	34.3	36.8	35.0
9.	159	KR 155	38.0	35.1	39.2	37.3	38.9	37.7

Bolls/plant

S. No.	Code No.	Entries	Sriganganagar	Bathinda	Hisar	Sirsa (CICR)	Arya Nagar (Shakti Vardhak)	Mean NZ
1.	151	KR 147	52.0	36.0	52.1	46.0	70.7	51.4
2.	152	AJAH 103	45.0	23.0	20.2	45.0	28.3	32.3
3.	153	KR 144	44.0	31.0	33.5	46.0	48.9	40.7
4.	154	CISAA 18-3	48.0	42.0	34.8	46.0	47.1	43.6
5.	155	LC	41.0	32.0	47.0	45.0	51.9	43.4
6.	156	AAH 42	45.0	32.0	47.4	46.0	52.9	44.7
7.	157	ZC (KR 64-NZ)	49.0	38.0	55.3	44.0	67.1	50.7
8.	158	CISAA 18-4	51.0	38.0	47.8	46.0	49.7	46.5
9.	159	KR 155	48.0	41.0	51.7	44.0	79.9	52.9

Boll weight (g)

S. No.	Code No.	Entries	Sriganganagar	Bathinda	Hisar	Sirsa (CICR)	Arya Nagar (Shakti Vardhak)	Mean NZ
1.	151	KR 147	2.5	2.6	2.5	2.5	2.8	2.6
2.	152	AJAH 103	2.2	1.8	2.3	2.3	2.5	2.2
3.	153	KR 144	2.8	3.1	2.6	2.6	3.1	2.8
4.	154	CISAA 18-3	2.1	2.1	2.5	2.0	2.5	2.2
5.	155	LC	2.2	3.0	2.6	2.5	2.5	2.6
6.	156	AAH 42	3.0	3.0	2.9	2.7	2.8	2.9
7.	157	ZC (KR 64-NZ)	2.6	2.8	2.4	2.5	2.8	2.6
8.	158	CISAA 18-4	2.4	2.5	2.5	2.4	2.6	2.5
9.	159	KR 155	2.6	2.5	2.5	2.3	2.8	2.5

NORTH ZONE TRIALS

Br 04a – Coordinated Varietal Trial - *G. hirsutum* (North Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Sriganganagar	Abohar	Faridkot	Bathinda	Hisar	Sirsa (CCSHAU)	Mean NZ	Rank
1	9001	F 2596	1835	3014	3006	2712	3441	2647	2776	4
2	9002	ZC (F 2228)	2190	2822	2498	2716	3727	2847	2800	3
3	9003	PBH 116	2281	2991	2873	2895	3935	3187	3027	2
4	9004	LC	1904	2583	2265	2220	1975	941	1981	6
5	9005	F 2662	2281	3124	3219	2822	4244	2955	3108	1
6	9006	Quality Check (CSH 3129)	1581	2783	2392	2438	3187	2400	2464	5
		CD @ 5 %	266	217	302	292	497	179		
		CV %	9	5	6	7	9	10		
		Local Checks	**RS-2013**	**LH 2108**	**LH 2108**	**LH 2108**	**H 1236**	**H 1236**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Sriganganagar	Abohar	Faridkot	Bathinda	Hisar	Sirsa (CCSHAU)	Mean NZ
1	9001	F 2596	719	1076	1046	893	1228	903	978
2	9002	ZC (F 2228)	811	1009	788	851	1218	976	942
3	9003	PBH 116	814	1025	958	973	1307	1077	1026
4	9004	LC	701	896	787	667	685	324	677
5	9005	F 2662	864	1051	1114	988	1481	1005	1084
6	9006	Quality Check (CSH 3129)	612	928	807	760	1125	782	836

Br 04a – Coordinated Varietal Trial - *G. hirsutum* (North Zone)

Ginning outturn (%)

S. No.	Code No.	Entries	Sriganganagar	Abohar	Faridkot	Bathinda	Hisar	Sirsa (CCSHAU)	Mean NZ
1	9001	F 2596	39.2	35.7	34.6	32.9	35.7	34.1	35.4
2	9002	ZC (F 2228)	37.0	35.7	31.8	31.3	32.7	34.3	33.8
3	9003	PBH 116	35.7	34.3	33.5	33.7	33.2	33.8	34.0
4	9004	LC	36.8	34.7	34.5	30.0	34.7	34.5	34.2
5	9005	F 2662	37.9	33.7	34.4	35.0	34.9	34.0	35.0
6	9006	Quality Check (CSH 3129)	38.7	33.4	33.9	31.1	35.3	32.6	34.2

Bolls/plant

S. No.	Code No.	Entries	Sriganganagar	Abohar	Faridkot	Bathinda	Hisar	Sirsa (CCSHAU)	Mean NZ
1	9001	F 2596	16.0	39.6	46.7	39.0	35.7	64.0	40.2
2	9002	ZC (F 2228)	23.0	37.2	38.0	27.0	32.7	60.0	36.3
3	9003	PBH 116	18.0	44.5	44.1	38.0	33.2	58.0	39.3
4	9004	LC	22.0	32.2	35.7	34.0	34.7	57.0	35.9
5	9005	F 2662	18.0	42.8	51.5	37.0	34.9	63.0	41.2
6	9006	Quality Check (CSH 3129)	14.0	41.2	32.1	30.0	35.3	54.0	34.4

Boll weight (g)

S. No.	Code No.	Entries	Sriganganagar	Abohar	Faridkot	Bathinda	Hisar	Sirsa (CCSHAU)	Mean NZ
1	9001	F 2596	2.4	3.3	3.5	4.1	3.5	3.3	3.3
2	9002	ZC (F 2228)	2.3	3.3	4.1	3.9	4.5	3.4	3.6
3	9003	PBH 116	2.9	2.9	3.9	4.4	3.6	3.5	3.5
4	9004	LC	1.8	3.2	3.7	3.4	2.8	3.2	3.0
5	9005	F 2662	2.8	3.1	3.8	3.6	3.6	3.4	3.4
6	9006	Quality Check (CSH 3129)	2.9	2.8	3.8	3.7	3.7	3.5	3.4

Br 06a – CVT of Compact genotypes (North Zone) (Irrigated)

Total Seed Cotton Yield at 160 DAS (Total of 130 DAS + 160 DAS) (Kg/ha)

S. No.	Code No.	Entries	Sriganganagar	Faridkot	Bathinda	Hisar	Sirsa (CICR)	Mean NZ	Rank
1	9011	RS 2914	2432	2717	2962	3930	2997	3008	4
2	9012	PBH 115	1731	2599	3340	3816	2864	2870	6
3	9013	Zonal Check (CSH 3075)	1800	2777	2525	4074	2791	2793	7
4	9014	H 1530	2158	2977	3283	3333	3487	3048	3
5	9015	RS 2913	2214	2906	3280	3971	3398	3154	2
6	9016	Local Check	1732	3159	3499	3364	2917	2934	5
7	9017	PBH 174	2142	2986	3407	4084	3558	3235	1
		CD @ 5 %	321	331	515	572	540		
		CV %	9	6	9	9	10		
		Local Checks	**RS 875**	**F 2383**	**F 2383**	**H 1098-i**	**H 1098-i**		

Seed Cotton Yield (130 DAS) (Kg/ha)

S. No.	Code No.	Entries	Sriganganagar	Bathinda	Hisar	Sirsa (CICR)	Mean NZ
1	9011	RS 2914	1752	468	2613	1451	1571
2	9012	PBH 115	1276	341	2253	1008	1220
3	9013	Zonal Check (CSH 3075)	1443	371	2212	1158	1296
4	9014	H 1530	1831	917	1543	620	1228
5	9015	RS 2913	1746	520	2315	1208	1447
6	9016	Local Check	1074	480	1522	967	1011
7	9017	PBH 174	1871	678	2325	1063	1484

Br 06a – CVT of Compact genotypes (North Zone) (Irrigated)

Seed Cotton Yield (160 DAS) (Kg/ha)

S. No.	Code No.	Entries	Sriganganagar	Bathinda	Hisar	Sirsa (CICR)	Mean NZ
1	9011	RS 2914	680	2494	1317	1545	1509
2	9012	PBH 115	455	2999	1564	1856	1719
3	9013	Zonal Check (CSH 3075)	357	2153	1862	1633	1501
4	9014	H 1530	327	2366	1790	2866	1837
5	9015	RS 2913	468	2760	1656	2190	1769
6	9016	Local Check	658	3019	1841	1950	1867
7	9017	PBH 174	271	2729	1759	2495	1814

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Sriganganagar	Faridkot	Bathinda	Hisar	Sirsa (CICR)	Mean NZ
1	9011	RS 2914	961	978	885	1519	988	1066
2	9012	PBH 115	690	945	1121	1360	934	1010
3	9013	Zonal Check (CSH 3075)	718	1005	831	1494	912	992
4	9014	H 1530	866	1167	1226	1309	1139	1141
5	9015	RS 2913	860	1100	1089	1472	1113	1127
6	9016	Local Check	682	1080	1196	1182	933	1015
7	9017	PBH 174	811	1054	1152	1542	1171	1146

Ginning outturn (%)

S. No.	Code No.	Entries	Sriganganagar	Faridkot	Bathinda	Hisar	Sirsa (CICR)	Mean NZ
1	9011	RS 2914	39.5	36.0	29.9	38.7	33.0	35.4
2	9012	PBH 115	39.9	36.4	33.6	35.7	32.6	35.6
3	9013	Zonal Check (CSH 3075)	39.9	36.2	32.9	36.6	32.6	35.6
4	9014	H 1530	40.1	39.2	37.4	39.3	32.7	37.7
5	9015	RS 2913	38.9	37.9	33.2	37.1	32.8	36.0
6	9016	Local Check	39.4	34.2	34.2	35.2	32.0	35.0
7	9017	PBH 174	37.8	35.3	33.8	37.7	32.9	35.5

Br 06a – CVT of Compact genotypes (North Zone) (Irrigated)

No. of bolls/m^2

S. No.	Code No.	Entries	Sriganganagar	Bathinda	Hisar	Mean NZ
1	9011	RS 2914	90.5	162.0	98.2	116.9
2	9012	PBH 115	84.4	162.7	95.4	114.2
3	9013	Zonal Check (CSH 3075)	86.4	172.3	101.8	120.2
4	9014	H 1530	108.3	151.7	83.3	114.4
5	9015	RS 2913	90.5	168.3	99.3	119.4
6	9016	Local Check	72.1	172.0	84.1	109.4
7	9017	PBH 174	105.1	146.3	102.1	117.8

Plant height (cm)

S. No.	Code No.	Entries	Sriganganagar	Faridkot	Bathinda	Hisar	Sirsa (CICR)	Mean NZ
1	9011	RS 2914	176.0	124.1	179.3	173.7	143.3	159.3
2	9012	PBH 115	150.0	129.4	151.4	184.0	134.0	149.8
3	9013	Zonal Check (CSH 3075)	165.0	128.3	168.8	184.7	159.3	161.2
4	9014	H 1530	183.0	150.9	195.3	211.3	163.3	180.8
5	9015	RS 2913	155.0	135.3	168.4	176.0	157.0	158.3
6	9016	Local Check	143.0	125.8	144.7	192.0	154.0	151.9
7	9017	PBH 174	153.0	116.5	161.3	180.0	154.0	153.0

Days to 1st boll bursting

S. No.	Code No.	Entries	Bathinda	Hisar	Mean NZ
1	9011	RS 2914	112.3	90.0	101.2
2	9012	PBH 115	108.7	90.7	99.7
3	9013	Zonal Check (CSH 3075)	112.3	90.7	101.5
4	9014	H 1530	113.3	108.3	110.8
5	9015	RS 2913	107.7	90.3	99.0
6	9016	Local Check	106.7	90.3	98.5
7	9017	PBH 174	112.3	90.3	101.3

Br 06a – CVT of Compact genotypes (North Zone) (Irrigated)

No. of monopodia / plant

S. No.	Code No.	Entries	Sriganganagar	Faridkot	Bathinda	Hisar	Sirsa (CICR)	Mean NZ
1	9011	RS 2914	2.0	0.1	0.2	2.1	0.5	1.0
2	9012	PBH 115	3.0	0.0	0.6	3.5	0.1	1.4
3	9013	Zonal Check (CSH 3075)	2.0	0.2	1.3	2.4	0.8	1.3
4	9014	H 1530	1.0	0.6	0.7	2.1	0.5	1.0
5	9015	RS 2913	1.0	0.0	1.1	2.1	0.9	1.0
6	9016	Local Check	1.0	0.0	1.8	2.2	1.3	1.3
7	9017	PBH 174	1.0	0.0	0.8	2.1	0.3	0.8

No. of sympodia / plant

S. No.	Code No.	Entries	Sriganganagar	Faridkot	Bathinda	Hisar	Sirsa (CICR)	Mean NZ
1	9011	RS 2914	13.0	15.7	16.6	14.2	10.0	13.9
2	9012	PBH 115	14.0	16.3	14.1	17.9	9.0	14.3
3	9013	Zonal Check (CSH 3075)	17.0	15.8	17.8	14.5	10.3	15.1
4	9014	H 1530	19.0	15.7	13.0	18.6	10.3	15.3
5	9015	RS 2913	13.0	18.3	17.9	15.1	10.3	14.9
6	9016	Local Check	14.0	17.8	22.4	17.5	10.0	16.4
7	9017	PBH 174	11.0	16.0	14.0	18.0	9.7	13.7

Boll weight (g)

S. No.	Code No.	Entries	Sriganganagar	Faridkot	Bathinda	Hisar	Mean NZ
1	9011	RS 2914	2.8	3.6	4.1	4.1	3.7
2	9012	PBH 115	2.3	3.5	4.1	3.7	3.4
3	9013	Zonal Check (CSH 3075)	2.4	3.3	4.2	3.4	3.3
4	9014	H 1530	2.1	3.5	4.0	3.6	3.3
5	9015	RS 2913	2.8	3.6	3.9	3.7	3.5
6	9016	Local Check	2.6	2.9	4.1	3.4	3.3
7	9017	PBH 174	2.3	3.1	3.8	3.5	3.2

Br 06a – CVT of Compact genotypes (North Zone) (Irrigated)

Lint Index (g)

S. No.	Code No.	Entries	Faridkot	Bathinda	Mean NZ
1	9011	RS 2914	4.5	3.6	4.0
2	9012	PBH 115	4.7	4.5	4.6
3	9013	Zonal Check (CSH 3075)	4.5	4.4	4.5
4	9014	H 1530	5.1	4.7	4.9
5	9015	RS 2913	4.6	5.0	4.8
6	9016	Local Check	4.0	4.4	4.2
7	9017	PBH 174	4.2	4.0	4.1

Seed Index (g)

S. No.	Code No.	Entries	Sriganganagar	Faridkot	Bathinda	Hisar	Mean NZ
1	9011	RS 2914	6.6	7.9	8.4	7.6	7.6
2	9012	PBH 115	5.9	8.1	9.0	7.5	7.6
3	9013	Zonal Check (CSH 3075)	6.5	7.9	9.0	8.1	7.9
4	9014	H 1530	5.9	8.0	7.9	7.8	7.4
5	9015	RS 2913	5.7	7.5	10.0	7.4	7.7
6	9016	Local Check	6.3	7.8	8.4	8.0	7.6
7	9017	PBH 174	6.1	7.7	7.8	7.4	7.2

Br 24a – Coordinated Variety Trial - *G. arboreum* - (North Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Sriganganagar	Faridkot	Bathinda	Hisar	Sirsa (CICR)	Mean NZ	Rank
1	9021	PBD 22	2545	2778	2637	2449	3023	2686	5
2	9022	CISA 10	1797	2335	1496	1389	3611	2126	7
3	9023	FDK 124 (ZC)	2624	3486	2194	2222	3655	2836	4
4	9024	PBD 35	2848	3270	3425	2325	3178	3009	2
5	9025	FDK 281	2602	3642	2616	2624	3225	2942	3
6	9026	Local Check	2251	2309	2429	2624	3394	2601	6
7	9027	PBD 36	2606	3403	3339	2747	3449	3109	1
		CD @ 5 %	489	521	315	337	346		
		CV %	11	9	7	8	7		
		Local Checks	**RG 542**	**LD 949**	**LD 949**	**HD-432**	**CISA 310**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Sriganganagar	Faridkot	Bathinda	Hisar	Sirsa (CICR)	Mean NZ
1	9021	PBD 22	939	1035	930	845	1058	961
2	9022	CISA 10	609	841	481	525	1246	740
3	9023	FDK 124 (ZC)	987	1289	778	822	1279	1031
4	9024	PBD 35	1038	1183	1331	844	1112	1102
5	9025	FDK 281	915	1393	972	943	1097	1064
6	9026	Local Check	800	940	894	1030	1290	991
7	9027	PBD 36	998	1271	1217	1007	1276	1154

Br 24a – Coordinated Variety Trial - *G. arboreum* - (North Zone)

Ginning outturn (%)

S. No.	Code No.	Entries	Sriganganagar	Faridkot	Bathinda	Hisar	Sirsa (CICR)	Mean NZ
1	9021	PBD 22	36.9	37.4	35.3	34.5	35.0	35.8
2	9022	CISA 10	33.9	35.8	32.1	37.9	34.5	34.8
3	9023	FDK 124 (ZC)	37.6	37.0	35.7	37.0	35.0	36.5
4	9024	PBD 35	36.5	36.2	38.9	36.3	35.0	36.6
5	9025	FDK 281	35.2	38.2	37.2	35.9	34.0	36.1
6	9026	Local Check	35.5	40.7	36.9	39.3	38.0	38.1
7	9027	PBD 36	38.3	37.3	36.5	36.6	37.0	37.1

Bolls/plant

S. No.	Code No.	Entries	Sriganganagar	Faridkot	Bathinda	Hisar	Sirsa (CICR)	Mean NZ
1	9021	PBD 22	27.0	42.8	38.0	40.7	44.0	38.5
2	9022	CISA 10	22.0	38.3	30.0	32.6	45.0	33.6
3	9023	FDK 124 (ZC)	31.0	52.9	41.0	34.5	45.0	40.9
4	9024	PBD 35	28.0	45.8	36.0	40.2	46.0	39.2
5	9025	FDK 281	26.0	61.8	37.0	36.5	46.0	41.5
6	9026	Local Check	22.0	40.8	31.0	36.6	45.0	35.1
7	9027	PBD 36	29.0	51.2	39.0	45.4	45.0	41.9

Boll weight (g)

S. No.	Code No.	Entries	Sriganganagar	Faridkot	Bathinda	Hisar	Sirsa (CICR)	Mean NZ
1	9021	PBD 22	2.1	2.3	61.2	2.1	2.3	14.0
2	9022	CISA 10	2.0	2.1	54.9	2.5	2.4	12.8
3	9023	FDK 124 (ZC)	2.0	2.1	49.3	2.2	2.2	11.6
4	9024	PBD 35	2.3	2.3	54.0	2.5	2.3	12.7
5	9025	FDK 281	2.4	2.3	56.5	2.4	2.6	13.2
6	9026	Local Check	2.4	2.1	53.3	2.6	2.4	12.6
7	9027	PBD 36	2.1	2.6	63.4	3.0	2.5	14.7

Br 25a/b – Coordinated Hybrid Trial of Desi Hybrid (North Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Sriganganagar	Bathinda	Faridkot	Hisar	Sirsa (CICR)	Arya Nagar (Shakti Vardhak)	Mean NZ	Rank
1	9031	KR 139	2206	3050	3404	2801	3412	4089	3160	3
2	9032	Zonal Check (KR 64)	2893	2703	3485	2469	3287	3569	3068	4
3	9033	KR 133	3018	2441	3807	3303	2623	4344	3256	2
4	9034	CISAA 18-1	2281	2133	2705	1790	3461	3068	2573	6
5	9035	Local Check	2757	2669	3648	1346	3464	3063	2824	5
6	9036	KR 136	2852	3005	3846	3843	3024	4468	3506	1
		CD @ 5 %	410	408	675	565	399	547		
		CV %	10	10	11	14	8	10		
		Local Checks	**RAJ DH. 9**	**FMDH 9**	**FMDH 9**	**AAH 1**	**CICR-2**	**AAH 1**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Sriganganagar	Bathinda	Faridkot	Hisar	Sirsa (CICR)	Arya Nagar (Shakti Vardhak)	Mean NZ
1	9031	KR 139	894	1166	1414	1127	1285	1607	1249
2	9032	Zonal Check (KR 64)	1206	1012	1452	1015	1256	1368	1218
3	9033	KR 133	1216	944	1616	1427	998	1667	1311
4	9034	CISAA 18-1	819	733	1012	665	1217	1108	926
5	9035	Local Check	988	939	1417	510	1331	1140	1054
6	9036	KR 136	1086	1122	1548	1551	1077	1728	1352

Br 25a/b – Coordinated Hybrid Trial of Desi Hybrid (North Zone)

Ginning outturn (%)

S. No.	Code No.	Entries	Sriganganagar	Bathinda	Faridkot	Hisar	Sirsa (CICR)	Arya Nagar (Shakti Vardhak)	Mean NZ
1	9031	KR 139	40.5	38.2	41.8	40.2	37.7	39.3	39.6
2	9032	ZC (KR 64)	41.7	37.5	42.0	41.1	38.2	38.3	39.8
3	9033	KR 133	40.3	38.7	42.7	43.2	38.0	38.4	40.2
4	9034	CISAA 18-1	35.9	34.3	37.4	37.2	35.2	36.1	36.0
5	9035	Local Check	35.8	35.1	39.0	37.9	38.4	37.2	37.2
6	9036	KR 136	38.1	37.3	40.1	40.4	35.6	38.7	38.4

Bolls/plant

S. No.	Code No.	Entries	Sriganganagar	Bathinda	Faridkot	Hisar	Sirsa (CICR)	Arya Nagar (Shakti Vardhak)	Mean NZ
1	9031	KR 139	38.0	45.0	43.6	50.8	45.0	60.7	47.2
2	9032	ZC (KR 64)	47.0	57.0	44.9	44.4	45.0	68.0	51.1
3	9033	KR 133	55.0	48.0	46.2	54.2	46.0	71.4	53.5
4	9034	CISAA 18-1	50.0	52.0	42.3	41.9	44.0	51.2	46.9
5	9035	Local Check	48.0	51.0	46.2	46.0	45.0	49.3	47.6
6	9036	KR 136	53.0	36.0	46.9	61.9	45.0	80.0	53.8

Boll weight (g)

S. No.	Code No.	Entries	Sriganganagar	Bathinda	Faridkot	Hisar	Sirsa (CICR)	Arya Nagar (Shakti Vardhak)	Mean NZ
1	9031	KR 139	2.6	3.0	2.8	2.8	2.8	3.0	2.8
2	9032	ZC (KR 64)	2.7	2.6	2.7	2.7	2.6	2.8	2.7
3	9033	KR 133	2.3	2.6	2.5	3.0	2.4	3.0	2.6
4	9034	CISAA 18-1	2.0	2.3	2.1	2.7	2.2	2.5	2.3
5	9035	Local Check	2.6	2.5	2.2	2.7	2.7	2.5	2.5
6	9036	KR 136	2.4	2.6	2.3	2.8	2.5	2.9	2.6

NATIONAL TRIALS – CENTRAL ZONE

Br. 02a - Initial Evaluation Trial of *G. hirsutum* (Irrigated)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Khandwa	Banswara	Surat	Talod*	Junagadh	Rahuri	Bhawanipatna	Mean CZ	Rank
1	201	CPD 1902	1196	1956	1854		1826	1010	2963	1801	3
2	202	GISV319	977	1859	2570		1672	1137	2299	1752	5
3	203	RAH 1047	810	1863	626		1260	769	2083	1235	26
4	204	CCH 19-2	920	1948	1558		1415	1301	2207	1558	12
5	205	BS 8-19	944	1952	1603		1569	846	2130	1507	16
6	206	CPD 1901	1015	1878	928		1157	588	2392	1326	24
7	207	GJHV 557	949	1785	1794		2135	1047	2037	1625	9
8	208	Zonal Check	1145	2041	1948		1543	1151	2238	1678	7
9	209	TSH 363	892	1963	742		1055	1177	1806	1273	25
10	210	RB 614	958	2070	1496		1620	882	2114	1523	13
11	211	GTHV 15/34	941	2093	1353		1518	703	2037	1441	20
12	212	RHC 1419	1060	2007	1594		1543	971	2191	1561	11
13	213	GISV 323	1177	1989	2329		1518	1262	2469	1791	4
14	214	ARBH 1901	915	1456	1611		1389	972	2454	1466	18
15	215	Quality Check	940	1948	1036		1415	915	2485	1457	19
16	216	RAH 1046	1008	2285	837		1466	903	2623	1520	14
17	217	BGDS 1047	975	1411	960		1492	840	2716	1399	23
18	218	RB 615	985	1896	1502		2032	1195	2500	1685	6
19	219	L 1527	1059	1681	1224		1492	869	2793	1520	14
20	220	BS 7-19	935	1859	1248		1518	825	2083	1411	22
21	221	SHS 234	1019	1856	1079		1389	943	2284	1428	21
22	222	CCH 19-1	943	1563	1395		1569	1034	2407	1485	17
23	223	Local Checks	829	2033	1863		1517	1120	2284	1608	10
24	224	TSH 383	932	2226	1509		1389	1234	2485	1629	8
25	225	RHC 1409	1191	1985	2329		1852	1229	2515	1850	2
26	226	GJHV 566	1128	1674	2254		2032	1482	2809	1897	1
		CD @ 5 %	207	442	297		360	410	414		
		CV %	13	14	12.0		14	17	11		
		Zonal Check	Phule Yamuna								
		Quality Check	Suraj								
		Local Checks	**JK 4**	**WagadKalyan**	**GN.Cot. 32**	**GN.Cot. 32**	**GN.Cot. 32**	**Phule 688**	**Surabhi**		

*Vitiated

Br. 02a - Initial Evaluation Trial of *G. hirsutum* (Irrigated)

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Khandwa	Banswara	Surat	Junagadh	Rahuri	Bhawanipatna	Mean CZ
1	201	CPD 1902	457	642	650	683	362	1019	636
2	202	GISV319	268	615	926	619	416	784	605
3	203	RAH 1047	203	499	183	420	231	642	363
4	204	CCH 19-2	240	497	471	471	413	741	472
5	205	BS 8-19	249	546	532	583	283	713	484
6	206	CPD 1901	300	660	325	445	221	926	480
7	207	GJHV 557	285	523	579	775	353	701	536
8	208	Zonal Check	300	590	620	512	394	790	534
9	209	TSH 363	232	596	253	365	421	639	418
10	210	RB 614	282	708	506	577	348	812	539
11	211	GTHV 15/34	245	675	461	566	239	722	485
12	212	RHC 1419	304	617	515	544	352	756	515
13	213	GISV 323	431	703	812	538	790	966	707
14	214	ARBH 1901	230	516	505	508	358	840	493
15	215	Quality Check	270	603	342	501	346	960	504
16	216	RAH 1046	304	743	272	523	345	929	519
17	217	BGDS 1047	273	468	316	545	308	966	479
18	218	RB 615	289	652	510	723	443	960	596
19	219	L 1527	294	582	439	585	544	988	572
20	220	BS 7-19	282	497	356	543	558	664	483
21	221	SHS 234	304	593	345	488	330	750	468
22	222	CCH 19-1	263	476	444	556	370	926	506
23	223	LC	265	618	704	538	372	778	546
24	224	TSH 383	250	728	503	541	461	840	554
25	225	RHC 1409	449	685	830	715	465	861	668
26	226	GJHV 566	406	561	791	745	562	1071	689

Br. 02a - Initial Evaluation Trial of *G. hirsutum* (Irrigated)

Ginning outturn (%)

S. No.	Code No.	Entries	Khandwa	Banswara	Surat	Junagadh	Rahuri	Bhawanipatna	Mean CZ
1	201	CPD 1902	38.2	32.8	35.1	37.4	35.9	34.3	35.6
2	202	GISV319	27.4	33.0	36.0	37.0	36.5	34.1	34.0
3	203	RAH 1047	25.0	26.8	29.3	33.2	30.0	30.8	29.2
4	204	CCH 19-2	26.1	20.1	30.1	33.2	31.7	33.5	29.1
5	205	BS 8-19	26.4	28.0	33.2	37.2	33.4	33.5	32.0
6	206	CPD 1901	29.5	35.1	34.8	38.4	37.7	38.7	35.7
7	207	GJHV 557	30.0	29.4	32.4	36.3	33.8	34.3	32.7
8	208	Zonal Check	26.2	28.9	31.9	33.1	34.2	35.3	31.6
9	209	TSH 363	26.0	30.4	34.2	34.6	35.7	35.4	32.7
10	210	RB 614	29.4	34.2	33.9	35.6	39.5	38.4	35.2
11	211	GTHV 15/34	26.0	32.3	34.2	37.3	34.0	35.5	33.2
12	212	RHC 1419	28.7	30.7	32.1	35.3	36.2	34.5	32.9
13	213	GISV 323	36.6	35.4	34.8	35.5	-	39.1	36.3
14	214	ARBH 1901	25.1	35.5	31.5	36.5	36.8	34.2	33.3
15	215	Quality Check	28.7	31.0	33.1	35.4	37.8	38.6	34.1
16	216	RAH 1046	30.2	32.5	32.6	35.8	38.2	35.4	34.1
17	217	BGDS 1047	28.0	33.1	33.2	36.6	36.7	35.5	33.9
18	218	RB 615	29.4	34.3	34.1	35.6	37.1	38.4	34.8
19	219	L 1527	27.8	34.6	36.0	39.3	-	35.3	34.6
20	220	BS 7-19	30.2	26.7	29.0	35.7	-	31.9	30.7
21	221	SHS 234	29.8	31.9	32.0	35.2	35.0	32.8	32.8
22	222	CCH 19-1	27.9	30.5	32.0	35.4	35.8	38.5	33.4
23	223	LC	32.0	30.5	38.0	35.6	33.3	34.0	33.9
24	224	TSH 383	26.8	32.7	33.4	38.9	37.3	33.8	33.8
25	225	RHC 1409	37.7	34.5	35.7	38.7	37.8	34.3	36.5
26	226	GJHV 566	36.0	33.5	35.2	36.7	37.9	38.1	36.2

Br. 02a - Initial Evaluation Trial of *G. hirsutum* (Irrigated)

Bolls/plant

S. No.	Code No.	Entries	Khandwa	Banswara	Surat	Junagadh	Rahuri	Bhawanipatna	Mean CZ
1	201	CPD 1902	30.5	22.9	32.0	28.6	16.4	37.8	28.0
2	202	GISV319	23.8	20.0	44.4	26.8	18.8	36.3	28.4
3	203	RAH 1047	10.9	21.0	13.7	19.8	19.7	32.5	19.6
4	204	CCH 19-2	12.7	18.9	26.2	22.5	19.4	28.9	21.4
5	205	BS 8-19	19.7	31.2	30.3	24.1	19.0	30.5	25.8
6	206	CPD 1901	17.9	20.3	22.4	20.4	19.6	38.3	23.2
7	207	GJHV 557	18.6	23.2	29.9	32.1	21.4	29.9	25.9
8	208	Zonal Check	27.3	21.4	34.4	22.9	18.2	34.8	26.5
9	209	TSH 363	18.4	23.0	17.7	16.2	20.3	28.9	20.8
10	210	RB 614	15.1	22.4	26.8	29.4	23.9	32.3	25.0
11	211	GTHV 15/34	23.3	22.3	24.7	28.7	19.9	30.2	24.9
12	212	RHC 1419	18.2	26.1	27.2	26.5	19.6	30.1	24.6
13	213	GISV 323	25.1	18.2	36.4	23.5	17.8	30.5	25.3
14	214	ARBH 1901	9.7	19.1	29.3	27.1	22.1	34.7	23.7
15	215	Quality Check	17.4	17.0	21.1	21.0	18.7	32.9	21.4
16	216	RAH 1046	18.3	18.8	16.7	28.3	21.8	31.1	22.5
17	217	BGDS 1047	15.0	20.4	21.0	21.5	20.0	39.9	23.0
18	218	RB 615	17.1	20.1	30.1	34.3	19.9	32.8	25.7
19	219	L 1527	21.0	20.0	18.8	23.4	18.3	43.3	24.1
20	220	BS 7-19	14.3	31.2	20.2	21.7	17.7	32.1	22.9
21	221	SHS 234	21.6	20.0	19.5	25.1	18.7	31.0	22.7
22	222	CCH 19-1	16.9	16.7	25.4	22.9	19.8	31.9	22.3
23	223	LC	14.3	17.9	27.5	18.2	17.9	36.1	22.0
24	224	TSH 383	16.9	18.8	31.1	20.4	19.0	28.3	22.4
25	225	RHC 1409	29.3	18.6	37.3	26.1	19.2	35.1	27.6
26	226	GJHV 566	28.3	20.2	40.4	34.5	20.8	40.1	30.7

Br. 02a - Initial Evaluation Trial of *G. hirsutum* (Irrigated)

Boll weight (g)

S. No.	Code No.	Entries	Khandwa	Banswara	Surat	Junagadh	Rahuri	Bhawanipatna	Mean CZ
1	201	CPD 1902	2.8	3.7	4.0	3.9	3.4	5.4	3.9
2	202	GISV319	2.2	3.2	3.9	3.9	3.6	4.7	3.6
3	203	RAH 1047	2.2	3.2	3.5	4.2	3.4	5.1	3.6
4	204	CCH 19-2	2.1	3.3	4.2	3.9	3.4	4.4	3.6
5	205	BS 8-19	2.7	3.7	3.7	4.1	3.5	5.0	3.8
6	206	CPD 1901	2.5	3.5	3.0	3.8	3.5	4.0	3.4
7	207	GJHV 557	2.2	3.9	4.2	4.1	3.5	5.2	3.9
8	208	Zonal Check	2.3	3.8	3.9	4.3	3.4	4.8	3.8
9	209	TSH 363	2.3	3.2	3.1	4.5	3.4	4.6	3.5
10	210	RB 614	2.3	3.1	3.9	3.5	3.4	4.4	3.4
11	211	GTHV 15/34	2.3	4.0	3.8	3.4	3.4	4.5	3.6
12	212	RHC 1419	2.5	3.8	4.1	3.7	3.5	4.6	3.7
13	213	GISV 323	2.4	4.1	4.4	4.1	3.3	4.9	3.9
14	214	ARBH 1901	2.0	3.5	3.8	3.3	3.6	5.0	3.5
15	215	Quality Check	2.3	3.2	3.5	4.4	3.3	5.1	3.6
16	216	RAH 1046	2.6	3.4	3.7	3.3	3.4	5.6	3.7
17	217	BGDS 1047	2.5	4.0	3.3	4.5	3.4	4.5	3.7
18	218	RB 615	2.3	3.4	3.5	3.6	3.5	5.3	3.6
19	219	L 1527	2.5	3.8	4.7	4.1	3.4	4.3	3.8
20	220	BS 7-19	2.6	3.5	4.4	4.4	3.4	5.3	3.9
21	221	SHS 234	2.4	3.3	4.0	3.5	3.5	5.8	3.8
22	222	CCH 19-1	2.2	3.5	3.9	4.3	3.4	5.6	3.8
23	223	LC	1.9	3.2	4.7	5.3	3.5	4.5	3.9
24	224	TSH 383	2.4	2.9	3.3	4.3	3.4	5.2	3.6
25	225	RHC 1409	2.5	3.2	4.3	4.4	3.5	4.4	3.7
26	226	GJHV 566	2.4	3.7	3.8	3.6	3.4	4.7	3.6

Br 02b - Initial Evaluation Trial of *G. hirsutum* (Rainfed)
Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Banswara	Bharuch	Akola	Nanded	Nagpur (CICR)	Mean CZ	Rank
1	231	TSH 375	1185	1706	1425	1302	1543	1432	13
2	232	GBHV 206	1344	1986	1137	1089	1450	1401	16
3	233	NH 702	1407	2598	1188	1906	2390	1898	1
4	234	ARBH 1951	1204	2237	957	1348	1650	1479	10
5	235	**Zonal Check**	1615	1790	962	1646	1525	1508	9
6	236	NDLH 2051-3	1348	2187	1260	1534	1515	1569	7
7	237	BS 8-19	1237	2036	1096	1290	1273	1386	18
8	238	RHC 1419	1411	1858	1096	1643	1035	1409	14
9	239	TVH 007	1422	1935	1224	1522	1599	1540	8
10	240	CNDTS 283	1007	1829	772	802	1140	1110	32
11	241	RB 610	1319	1664	1204	1244	1598	1406	15
12	242	CCH 19-3	1185	1956	1003	1037	1393	1315	25
13	243	RAH 1046	804	1393	638	1000	1496	1066	33
14	244	NH 703	1507	2515	1065	1562	1894	1709	3
15	245	AKH 2013-2	1381	2124	1636	1574	1798	1703	4
16	246	CPD 1951	1359	1653	849	1530	1462	1371	20
17	247	CNH 09-119	1296	972	1106	1354	2125	1371	20
18	248	BGDS 1047	1241	1606	895	969	1419	1226	29
19	249	CNH 2077	1315	1432	1013	965	1237	1192	30
20	250	RB 603	1456	1729	998	1346	1642	1434	12
21	251	TSH 356	1352	631	463	900	578	785	34
22	252	GTHV 15/36	915	1341	782	1140	1724	1180	31
23	253	RHC 1409	1485	1857	1240	1954	1646	1636	6
24	254	CPD 1952	1248	1842	736	1488	1588	1380	19
25	255	CCH 19-2	1267	2054	1101	1058	1330	1362	24
26	256	CNH 17393	1237	1895	725	932	1388	1235	28
27	257	**Local Checks**	1426	1752	808	1088	1445	1304	26
28	258	GBHV 209	1319	1719	962	1200	1626	1365	22
29	259	RAH 1045	1211	1477	1224	1604	1489	1401	16
30	260	NDLH 2056-4	1304	1981	1101	1203	1646	1447	11
31	261	NH 701	1422	2756	1368	1927	1999	1894	2
32	262	BS 7-19	1244	1543	916	1172	1371	1249	27
33	263	CNH 1134	1415	2110	1373	1688	1880	1693	5
34	264	**QC (Suraj)**	1296	1889	988	1579	1064	1363	23
		CD @ 5 %	277	537	179	327	676		
		CV %	16	17	16	15	19		
		Zonal Check	NH 615						
		Local Checks	**Wagad Kalyan**	**GN.Cot.26**	**AKH 8828**	**NH 545**	**AKH 8828**		

Br 02b - Initial Evaluation Trial of *G. hirsutum* (Rainfed)

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Banswara	Bharuch	Akola	Nanded	Nagpur (CICR)	Mean CZ
1	231	TSH 375	405	593	516	439	546	500
2	232	GBHV 206	435	658	394	356	489	466
3	233	NH 702	494	994	419	710	913	706
4	234	ARBH 1951	410	799	334	476	574	519
5	235	**Zonal Check**	544	639	341	617	560	540
6	236	NDLH 2051-3	490	831	452	559	511	569
7	237	BS 8-19	375	682	381	421	414	455
8	238	RHC 1419	437	621	394	523	326	460
9	239	TVH 007	541	715	436	599	590	576
10	240	CNDTS 283	339	678	269	271	384	388
11	241	RB 610	471	584	430	449	572	501
12	242	CCH 19-3	331	616	352	343	430	414
13	243	RAH 1046	276	495	227	371	522	378
14	244	NH 703	521	928	376	575	718	624
15	245	AKH 2013-2	398	643	552	523	645	552
16	246	CPD 1951	498	599	288	569	526	496
17	247	CNH 09-119	401	334	401	452	706	459
18	248	BGDS 1047	421	553	324	343	481	424
19	249	CNH 2077	425	438	359	299	404	385
20	250	RB 603	467	596	339	451	589	488
21	251	TSH 356	487	223	161	313	167	270
22	252	GTHV 15/36	297	518	279	434	667	439
23	253	RHC 1409	494	697	449	704	591	587
24	254	CPD 1952	444	678	269	550	592	507
25	255	CCH 19-2	370	631	398	332	412	429
26	256	CNH 17393	412	660	253	323	500	430
27	257	**Local Checks**	452	584	287	402	501	445
28	258	GBHV 209	409	567	336	409	550	454
29	259	RAH 1045	391	493	452	561	512	482
30	260	NDLH 2056-4	395	675	400	377	527	475
31	261	NH 701	499	1075	503	713	796	717
32	262	BS 7-19	337	458	328	371	413	381
33	263	CNH 1134	425	700	492	555	630	560
34	264	**QC (Suraj)**	437	662	354	568	359	476

Br 02b - Initial Evaluation Trial of *G. hirsutum* (Rainfed)

Ginning outturn (%)

S. No.	Code No.	Entries	Banswara	Bharuch	Akola	Nanded	Nagpur (CICR)	Mean CZ
1	231	TSH 375	34.2	34.8	36.2	33.7	35.4	34.9
2	232	GBHV 206	32.4	33.1	34.5	32.6	33.7	33.3
3	233	NH 702	35.1	38.2	35.3	37.3	38.2	36.8
4	234	ARBH 1951	34.1	35.7	34.8	35.4	34.8	35.0
5	235	**Zonal Check**	33.7	35.7	35.3	37.5	36.7	35.8
6	236	NDLH 2051-3	36.3	38.0	35.9	36.5	33.7	36.1
7	237	BS 8-19	30.3	33.5	34.8	32.7	32.5	32.8
8	238	RHC 1419	31.0	33.4	36.0	31.8	31.5	32.7
9	239	TVH 007	38.0	37.0	35.6	39.4	36.9	37.4
10	240	CNDTS 283	33.6	37.1	34.8	33.8	33.7	34.6
11	241	RB 610	35.7	35.1	35.7	36.1	35.8	35.7
12	242	CCH 19-3	28.0	31.5	35.1	33.2	30.9	31.7
13	243	RAH 1046	34.3	35.5	35.7	37.0	34.9	35.5
14	244	NH 703	34.6	36.9	35.3	36.9	37.9	36.3
15	245	AKH 2013-2	28.8	30.3	33.7	33.2	35.9	32.4
16	246	CPD 1951	36.6	36.2	33.9	37.2	36.0	36.0
17	247	CNH 09-119	30.9	34.4	36.2	33.5	33.2	33.6
18	248	BGDS 1047	33.9	34.4	36.2	35.5	33.9	34.8
19	249	CNH 2077	32.4	30.6	35.5	31.0	32.7	32.4
20	250	RB 603	32.0	34.5	33.9	33.4	35.9	33.9
21	251	TSH 356	36.0	35.4	34.8	34.9	34.0	35.0
22	252	GTHV 15/36	32.5	38.6	35.5	38.0	38.7	36.7
23	253	RHC 1409	33.3	37.5	36.2	36.1	35.9	35.8
24	254	CPD 1952	35.6	36.8	36.5	37.0	37.3	36.6
25	255	CCH 19-2	29.2	30.7	36.3	31.3	31.0	31.7
26	256	CNH 17393	33.4	34.9	34.8	34.7	36.0	34.8
27	257	**Local Checks**	31.7	33.3	35.6	36.9	34.7	34.4
28	258	GBHV 209	31.0	33.0	35.0	34.1	33.8	33.4
29	259	RAH 1045	32.3	33.4	36.9	34.9	34.4	34.4
30	260	NDLH 2056-4	30.3	34.1	36.2	31.4	32.0	32.8
31	261	NH 701	35.1	39.0	36.7	37.0	39.8	37.5
32	262	BS 7-19	27.0	29.7	35.8	31.7	30.1	30.9
33	263	CNH 1134	30.0	33.2	35.9	32.9	33.5	33.1
34	264	**QC (Suraj)**	33.7	35.1	35.8	36.1	33.7	34.9

Br 02b - Initial Evaluation Trial of *G. hirsutum* (Rainfed)

Bolls/plant

S. No.	Code No.	Entries	Banswara	Bharuch	Akola	Nanded	Nagpur (CICR)	Mean CZ
1	231	TSH 375	18.7	26.2	16.3	10.8	22.1	18.8
2	232	GBHV 206	15.3	28.8	15.9	11.5	20.5	18.4
3	233	NH 702	17.2	44.4	22.1	20.9	29.0	26.7
4	234	ARBH 1951	16.7	38.6	18.3	14.7	23.9	22.4
5	235	**Zonal Check**	16.8	29.7	17.9	15.2	23.7	20.7
6	236	NDLH 2051-3	22.2	32.4	14.9	12.5	21.5	20.7
7	237	BS 8-19	16.8	31.0	18.3	10.3	18.6	19.0
8	238	RHC 1419	22.1	27.8	14.1	15.8	23.2	20.6
9	239	TVH 007	21.0	27.1	23.0	13.3	20.7	21.0
10	240	CNDTS 283	17.9	33.4	17.2	9.2	22.2	20.0
11	241	RB 610	22.4	27.0	19.0	13.7	23.4	21.1
12	242	CCH 19-3	17.6	27.8	19.1	9.1	19.7	18.7
13	243	RAH 1046	24.2	19.4	12.8	10.9	20.2	17.5
14	244	NH 703	21.9	42.3	17.1	16.3	25.5	24.6
15	245	AKH 2013-2	21.8	27.7	21.8	15.2	23.8	22.1
16	246	CPD 1951	18.4	27.3	16.7	17.1	20.0	19.9
17	247	CNH 09-119	20.2	13.6	20.1	13.5	19.5	17.4
18	248	BGDS 1047	22.4	23.5	14.4	9.9	23.0	18.6
19	249	CNH 2077	17.9	20.3	14.7	8.8	17.1	15.8
20	250	RB 603	21.4	25.0	15.8	11.0	21.9	19.0
21	251	TSH 356	21.9	10.0	11.3	10.2	18.9	14.5
22	252	GTHV 15/36	20.7	20.4	16.0	12.1	22.9	18.4
23	253	RHC 1409	20.7	29.5	13.8	17.9	20.7	20.5
24	254	CPD 1952	21.6	25.2	12.9	11.9	23.6	19.0
25	255	CCH 19-2	22.0	28.6	14.8	9.0	20.1	18.9
26	256	CNH 17393	20.9	28.5	15.4	9.8	19.5	18.8
27	257	**Local Checks**	21.7	27.5	18.9	10.6	27.5	21.2
28	258	GBHV 209	15.1	25.0	13.8	11.1	18.0	16.6
29	259	RAH 1045	16.1	17.2	14.1	10.3	20.6	15.7
30	260	NDLH 2056-4	15.8	29.6	16.9	10.1	25.8	19.6
31	261	NH 701	19.9	46.5	19.8	18.8	32.2	27.4
32	262	BS 7-19	13.3	23.2	14.2	10.4	21.4	16.5
33	263	CNH 1134	20.7	30.4	19.8	13.3	22.1	21.3
34	264	**QC (Suraj)**	16.3	25.5	14.8	12.6	17.7	17.4

Br 02b - Initial Evaluation Trial of *G. hirsutum* (Rainfed)

Boll weight (g)

S. No.	Code No.	Entries	Banswara	Bharuch	Akola	Nanded	Nagpur (CICR)	Mean CZ
1	231	TSH 375	3.7	3.5	3.9	4.9	4.8	4.2
2	232	GBHV 206	3.6	3.7	3.1	3.3	3.3	3.4
3	233	NH 702	3.3	3.2	2.8	3.4	3.1	3.2
4	234	ARBH 1951	3.2	3.1	3.4	3.3	3.7	3.3
5	235	**Zonal Check**	4.2	3.3	3.5	3.9	3.5	3.7
6	236	NDLH 2051-3	3.1	3.6	3.6	4.7	3.9	3.8
7	237	BS 8-19	2.9	3.5	3.9	4.6	4.0	3.8
8	238	RHC 1419	3.2	3.6	3.7	3.9	3.8	3.6
9	239	TVH 007	3.1	3.9	3.7	4.3	3.9	3.8
10	240	CNDTS 283	2.9	3.0	3.1	3.6	3.7	3.3
11	241	RB 610	2.2	3.3	3.4	3.4	3.5	3.2
12	242	CCH 19-3	3.2	3.8	3.1	4.2	3.6	3.6
13	243	RAH 1046	4.3	3.9	3.5	4.6	3.8	4.0
14	244	NH 703	3.4	3.2	2.3	3.5	3.4	3.2
15	245	AKH 2013-2	3.7	4.1	3.8	3.9	4.4	4.0
16	246	CPD 1951	3.5	3.3	2.8	3.0	3.3	3.2
17	247	CNH 09-119	3.1	3.9	3.5	3.8	4.0	3.7
18	248	BGDS 1047	2.8	3.7	3.4	4.0	3.7	3.5
19	249	CNH 2077	2.7	3.8	3.3	4.0	4.0	3.6
20	250	RB 603	3.0	3.7	3.5	4.2	4.5	3.8
21	251	TSH 356	3.2	3.4	3.7	4.2	3.5	3.6
22	252	GTHV 15/36	3.5	3.5	3.5	3.5	3.9	3.6
23	253	RHC 1409	3.5	3.4	3.4	3.8	4.0	3.6
24	254	CPD 1952	3.8	3.9	3.5	4.0	4.0	3.8
25	255	CCH 19-2	2.6	3.9	3.8	4.3	3.9	3.7
26	256	CNH 17393	2.9	3.6	2.6	4.3	4.2	3.5
27	257	**Local Checks**	3.1	3.4	3.1	3.6	3.1	3.3
28	258	GBHV 209	3.1	3.7	3.8	4.0	3.4	3.6
29	259	RAH 1045	2.9	4.6	3.9	4.6	4.5	4.1
30	260	NDLH 2056-4	2.8	3.6	3.1	4.0	3.9	3.5
31	261	NH 701	3.2	3.2	2.8	3.5	3.5	3.2
32	262	BS 7-19	3.3	3.6	3.4	4.0	3.9	3.6
33	263	CNH 1134	3.2	3.7	3.6	4.5	3.7	3.7
34	264	**QC (Suraj)**	2.9	4.0	3.5	4.3	3.9	3.7

Br 02a/b - Initial Evaluation Trial of Naturally Coloured *G. hirsutum*

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Khandwa	Surat	Nagpur	Mean CZ	Rank
1	271	CCHC 19-2	798	683	1215	899	7
2	272	CNH 18529	781	776	1221	926	5
3	273	Zonal Check	761	1224	1956	1314	1
4	274	DHCC 1901	738	791	1386	972	3
5	275	CCHC 19-1	738	834	1171	914	6
6	276	CNH 18528	721	851	1312	961	4
7	277	Local Check	630	1020	1475	1042	2
8	278	DHCC 1902	599	679	1055	778	8
		CD @ 5 %	174	209			
		CV %	15	14			
		Zonal Check	Phule Yamuna				
		Local Checks	**JK 4**	**G.Cot. 16**	**AKH 8828**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Khandwa	Surat	Nagpur	Mean CZ
1	271	CCHC 19-2	256	218	370	281
2	272	CNH 18529	289	290	458	346
3	273	Zonal Check	249	415	673	446
4	274	DHCC 1901	242	268	477	329
5	275	CCHC 19-1	250	217	406	291
6	276	CNH 18528	244	301	483	343
7	277	Local Check	205	336	531	357
8	278	DHCC 1902		187	362	275

Ginning outturn (%)

S. No.	Code No.	Entries	Khandwa	Surat	Nagpur	Mean CZ
1	271	CCHC 19-2	32.1	32.0	30.5	31.5
2	272	CNH 18529	37.0	37.3	37.5	37.3
3	273	Zonal Check	32.7	33.9	34.4	33.7
4	274	DHCC 1901	32.8	34.1	34.4	33.8
5	275	CCHC 19-1	33.9	26.0	34.7	31.5
6	276	CNH 18528	33.8	35.4	36.8	35.3
7	277	Local Check	32.5	32.8	36.0	33.8
8	278	DHCC 1902		27.7	34.3	31.0

Br 02a/b - Initial Evaluation Trial of Naturally Coloured *G. hirsutum*

Bolls/plant

S. No.	Code No.	Entries	Khandwa	Surat	Nagpur	Mean CZ
1	271	CCHC 19-2	23.8	13.7	16.3	17.9
2	272	CNH 18529	31.6	18.7	19.9	23.4
3	273	Zonal Check	26.4	26.0	19.0	23.8
4	274	DHCC 1901	17.6	20.7	17.5	18.6
5	275	CCHC 19-1	20.3	19.3	18.5	19.4
6	276	CNH 18528	21.8	18.3	18.3	19.5
7	277	Local Check	18.3	21.7	21.1	20.4
8	278	DHCC 1902	8.2	18.0	14.5	13.6

Boll weight (g)

S. No.	Code No.	Entries	Khandwa	Surat	Nagpur	Mean CZ
1	271	CCHC 19-2	2.2	3.5	4.3	3.3
2	272	CNH 18529	2.3	3.0	2.9	2.7
3	273	Zonal Check	2.4	3.6	3.3	3.1
4	274	DHCC 1901	2.4	2.9	3.7	3.0
5	275	CCHC 19-1	2.6	3.2	3.4	3.1
6	276	CNH 18528	2.8	3.4	3.5	3.2
7	277	Local Check	2.2	3.3	3.1	2.9
8	278	DHCC 1902	2.6	2.8	3.4	2.9

Br. 06a – Initial Evaluation Trial of Compact genotypes (Irrigated)

Total Seed Cotton Yield at 160 DAS (Total of 130 DAS + 160 DAS) (Kg/ha)

S. No.	Code No.	Entries	Talod*	Junagadh	Khandwa	Bhawanipatna	Rahuri	Mean CZ	Rank
1	281	CCH 19-4		1098	919	2963	2291	1818	9
2	282	BS 9-19		1920	395	2052	2702	1767	10
3	283	RHC-HD 1405		1852	1367	2272	3617	2277	1
4	284	DSC 1902		1509	508	2762	2185	1741	11
5	285	GTHV 18/17		1372	988	2840	2864	2016	3
6	286	Local Check		960	547	2654	3226	1847	7
7	287	CCH 15-1		720	441	2457	2852	1618	12
8	288	GJHV 584		1749	586	2315	2752	1851	6
9	289	RAHC 1902		1440	1086	2799	2267	1898	4
10	290	CCH 19-2		617	493	2006	2607	1431	14
11	291	TCH 1875		1132	789	2500	2019	1610	13
12	292	Common Check (Suraj)		1166	1113	2778	2382	1860	5
13	293	DSC 1901		2160	733	2299	2148	1835	8
14	294	RAHC 1901		1612	644	1651	1561	1367	15
15	295	RHC-HD 1312		1886	1012	2673	3486	2264	2
		CD @ 5 %		274	188	496	417		
		CV %		12	15	12	9		
		Zonal Check	Suraj						
		Local Checks	**G. Cot. 20**	**G. Cot. 20**	**Suraj**	**Suraj**	**Phule 688**		

***Vitiated**

Br. 06a – Initial Evaluation Trial of Compact genotypes (Irrigated)

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Junagadh	Khandwa	Bhawanipatna	Rahuri	Mean CZ
1	281	CCH 19-4	384	304	1043	779	628
2	282	BS 9-19	634	127	682	845	572
3	283	RHC-HD 1405	623	454	796	1171	761
4	284	DSC 1902	526	182	1015	827	638
5	285	GTHV 18/17	493	333	1077	1092	749
6	286	Local Check	320	191	870	1063	611
7	287	CCH 15-1	253	154	843	1001	563
8	288	GJHV 584	576	199	762	798	584
9	289	RAHC 1902	482	366	951	800	650
10	290	CCH 19-2	208	168	685	825	472
11	291	TCH 1875	398	249	889	740	569
12	292	Common Check (Suraj)	399	376	932	849	639
13	293	DSC 1901	773	247	772	771	641
14	294	RAHC 1901	545	220	552	484	450
15	295	RHC-HD 1312	670	324	892	1269	789

Ginning outturn (%)

S. No.	Code No.	Entries	Junagadh	Khandwa	Bhawanipatna	Rahuri	Mean CZ
1	281	CCH 19-4	34.9	33.1	35.3	34.0	34.3
2	282	BS 9-19	33	32.1	33.3	31.3	32.4
3	283	RHC-HD 1405	33.6	33.2	35.1	32.4	33.6
4	284	DSC 1902	34.9	35.8	36.7	37.8	36.3
5	285	GTHV 18/17	35.9	33.7	37.9	38.1	36.4
6	286	Local Check	33.3	34.9	32.8	32.9	33.5
7	287	CCH 15-1	35.1	35.0	34.3	35.1	34.9
8	288	GJHV 584	32.9	33.9	33.0	29.0	32.2
9	289	RAHC 1902	33.5	33.7	33.9	35.3	34.1
10	290	CCH 19-2	33.5	34.1	34.2	31.6	33.3
11	291	TCH 1875	35.2	31.6	35.6	36.7	34.8
12	292	Common Check (Suraj)	34.2	33.8	33.6	35.6	34.3
13	293	DSC 1901	35.8	33.7	33.6	35.9	34.7
14	294	RAHC 1901	33.9	34.2	33.4	31.0	33.1
15	295	RHC-HD 1312	35.5	32.0	33.4	36.4	34.3

Br. 06a – Initial Evaluation Trial of Compact genotypes (Irrigated)

No. of bolls/m^2

S. No.	Code No.	Entries	Junagadh	Khandwa	Bhawanipatna	Mean CZ
1	281	CCH 19-4	76.0	143.0	210.0	143.0
2	282	BS 9-19	136.0	95.8	177.7	136.5
3	283	RHC-HD 1405	100.0	163.0	150.7	137.9
4	284	DSC 1902	88.0	119.8	198.0	135.3
5	285	GTHV 18/17	76.0	183.0	191.0	150.0
6	286	Local Check	64.0	153.4	157.7	125.0
7	287	CCH 15-1	87.2	142.2	168.0	132.5
8	288	GJHV 584	136.0	146.2	183.0	155.1
9	289	RAHC 1902	88.8	208.6	202.3	166.6
10	290	CCH 19-2	76.0	99.0	128.3	101.1
11	291	TCH 1875	64.0	131.8	144.0	113.3
12	292	Common Check (Suraj)	77.6	177.4	188.0	147.7
13	293	DSC 1901	116.0	123.0	175.0	138.0
14	294	RAHC 1901	123.2	194.2	182.0	166.5
15	295	RHC-HD 1312	138.4	159.8	177.3	158.5

Plant height (cm)

S. No.	Code No.	Entries	Khandwa	Bhawanipatna	Rahuri	Mean CZ
1	281	CCH 19-4	113.1	124.3	155.1	130.8
2	282	BS 9-19	108.5	121.3	110.4	113.4
3	283	RHC-HD 1405	106.7	125.8	127.7	120.0
4	284	DSC 1902	88.5	102.8	109.4	100.3
5	285	GTHV 18/17	104.9	104.3	118.9	109.3
6	286	Local Check	112.5	117.2	127.0	118.9
7	287	CCH 15-1	119.7	119.9	136.4	125.3
8	288	GJHV 584	108.8	128.7	137.7	125.0
9	289	RAHC 1902	115.1	119.3	127.4	120.6
10	290	CCH 19-2	100.3	125.7	127.9	118.0
11	291	TCH 1875	113.4	103.3	128.3	115.0
12	292	Common Check (Suraj)	121.0	110.6	126.9	119.5
13	293	DSC 1901	99.9	109.7	117.7	109.1
14	294	RAHC 1901	111.9	107.6	100.0	106.5
15	295	RHC-HD 1312	117.9	117.3	139.2	124.8

Br. 06a – Initial Evaluation Trial of Compact genotypes (Irrigated)

No. of monopodia / plant

S. No.	Code No.	Entries	Khandwa	Bhawanipatna	Rahuri	Mean CZ
1	281	CCH 19-4	0.0	1.9	1.3	1.1
2	282	BS 9-19	0.0	3.1	0.9	1.3
3	283	RHC-HD 1405	0.0	2.2	1.0	1.1
4	284	DSC 1902	0.0	1.8	0.8	0.9
5	285	GTHV 18/17	0.0	2.7	1.1	1.3
6	286	Local Check	0.0	2.5	0.9	1.1
7	287	CCH 15-1	0.1	3.2	0.8	1.3
8	288	GJHV 584	0.1	3.5	0.7	1.4
9	289	RAHC 1902	0.0	2.0	1.3	1.1
10	290	CCH 19-2	0.1	3.1	1.3	1.5
11	291	TCH 1875	0.0	2.0	0.7	0.9
12	292	Common Check (Suraj)	0.1	2.7	0.9	1.2
13	293	DSC 1901	0.0	2.3	0.7	1.0
14	294	RAHC 1901	0.0	1.7	0.7	0.8
15	295	RHC-HD 1312	0.0	1.9	0.7	0.9

No. of sympodia / plant

S. No.	Code No.	Entries	Khandwa	Bhawanipatna	Rahuri	Mean CZ
1	281	CCH 19-4	15.1	12.4	9.6	12.4
2	282	BS 9-19	13.9	12.4	7.8	11.4
3	283	RHC-HD 1405	14.5	11.9	8.2	11.5
4	284	DSC 1902	13.3	13.0	7.3	11.2
5	285	GTHV 18/17	15.3	13.3	8.4	12.4
6	286	Local Check	16.0	13.2	7.2	12.1
7	287	CCH 15-1	15.9	13.5	8.8	12.7
8	288	GJHV 584	14.1	12.8	8.7	11.9
9	289	RAHC 1902	16.7	12.6	9.2	12.8
10	290	CCH 19-2	13.1	11.9	8.0	11.0
11	291	TCH 1875	15.3	12.0	8.7	12.0
12	292	Common Check (Suraj)	18.3	12.8	8.1	13.1
13	293	DSC 1901	13.5	11.9	8.2	11.2
14	294	RAHC 1901	16.0	12.2	6.9	11.7
15	295	RHC-HD 1312	13.9	12.2	8.0	11.4

Br. 06a – Initial Evaluation Trial of Compact genotypes (Irrigated)

Boll weight (g)

S. No.	Code No.	Entries	Junagadh	Khandwa	Bhawanipatna	Rahuri	Mean CZ
1	281	CCH 19-4	3.0	2.4	4.6	3.5	3.3
2	282	BS 9-19	2.4	2.2	4.0	3.4	3.0
3	283	RHC-HD 1405	3.2	2.3	4.9	3.4	3.5
4	284	DSC 1902	3.0	2.3	4.2	3.5	3.3
5	285	GTHV 18/17	3.5	2.3	5.0	3.2	3.5
6	286	Local Check	3.5	2.3	5.0	3.4	3.5
7	287	CCH 15-1	2.3	2.1	4.5	3.6	3.1
8	288	GJHV 584	2.2	2.2	4.0	3.4	3.0
9	289	RAHC 1902	2.9	2.1	4.7	3.4	3.3
10	290	CCH 19-2	2.5	2.2	5.4	3.4	3.4
11	291	TCH 1875	3.6	2.5	5.3	3.4	3.7
12	292	Common Check (Suraj)	3.0	2.3	4.9	3.4	3.4
13	293	DSC 1901	3.0	2.6	4.2	3.6	3.4
14	294	RAHC 1901	2.3	2.8	4.1	3.4	3.1
15	295	RHC-HD 1312	2.3	2.5	4.7	3.5	3.2

Lint Index (g)

S. No.	Code No.	Entries	Junagadh	Khandwa	Bhawanipatna	Rahuri	Mean CZ
1	281	CCH 19-4	5.5	3.9	4.7	5.8	5.0
2	282	BS 9-19	4.8	3.5	4.2	4.0	4.1
3	283	RHC-HD 1405	4.9	3.8	5.1	4.5	4.6
4	284	DSC 1902	6.0	5.1	4.4	5.0	5.1
5	285	GTHV 18/17	5.4	4.2	4.4	5.4	4.9
6	286	Local Check	5.1	4.7	5.1	5.4	5.1
7	287	CCH 15-1	5.0	4.7	3.9	6.8	5.1
8	288	GJHV 584	4.8	4.5	3.6	3.8	4.2
9	289	RAHC 1902	4.6	4.2	3.7	5.0	4.4
10	290	CCH 19-2	4.8	4.0	4.6	4.8	4.6
11	291	TCH 1875	5.1	3.9	4.9	5.3	4.8
12	292	Common Check (Suraj)	5.4	4.0	4.7	5.9	5.0
13	293	DSC 1901	5.3	4.6	4.3	4.2	4.6
14	294	RAHC 1901	4.1	4.3	3.8	3.6	4.0
15	295	RHC-HD 1312	5.3	4.5	4.7	5.5	5.0

Br. 06a – Initial Evaluation Trial of Compact genotypes (Irrigated)
Seed Index (g)

S. No.	Code No.	Entries	Junagadh	Khandwa	Bhawanipatna	Rahuri	Mean CZ
1	281	CCH 19-4	10.2	7.8	8.6	11.2	9.4
2	282	BS 9-19	9.7	7.3	8.5	8.8	8.6
3	283	RHC-HD 1405	9.7	7.7	9.4	9.4	9.1
4	284	DSC 1902	11.1	9.1	7.6	8.2	9.0
5	285	GTHV 18/17	9.6	8.2	7.3	8.8	8.5
6	286	Local Check	10.2	8.7	10.4	10.9	10.1
7	287	CCH 15-1	9.4	8.7	7.6	12.5	9.5
8	288	GJHV 584	9.9	8.8	7.4	9.3	8.8
9	289	RAHC 1902	9.0	8.3	7.3	9.2	8.5
10	290	CCH 19-2	9.5	7.8	8.8	10.4	9.1
11	291	TCH 1875	9.3	8.5	8.8	9.2	9.0
12	292	Common Check (Suraj)	10.3	7.9	9.4	10.7	9.6
13	293	DSC 1901	9.4	9.0	8.4	7.5	8.6
14	294	RAHC 1901	8.0	8.3	7.6	8.0	8.0
15	295	RHC-HD 1312	9.7	9.5	9.4	9.6	9.5

Br. 06b – Initial Evaluation Trial of Compact genotypes (Rainfed)

Total Seed Cotton Yield at 160 DAS (Total of 130 DAS + 160 DAS) (Kg/ha)

S. No.	Code No.	Entries	Bharuch	Akola	Nagpur (CICR)	Nanded	Mean CZ	Rank
1	301	RAHC 1901	1101	1520	962	1879	1366	2
2	302	TCH 002	630	1098	1187	1342	1064	8
3	303	GBHV 187	1263	1128	498	1289	1045	9
4	304	CNH 09-77	798	1323	951	1107	1045	9
5	305	RHC-HD 1312	1149	1514	1253	1546	1366	2
6	306	CCH 15-1	504	1042	793	1121	865	16
7	307	DSC 1951	910	988	994	1440	1083	7
8	308	Common Check (Suraj)	675	1047	952	1362	1009	13
9	309	CNH 1133	569	1499	1486	1260	1204	5
10	310	CCH 19-4	451	1144	735	1027	839	18
11	311	CNH 2046	724	1203	964	1171	1016	12
12	312	RHC-HD 1405	1569	1118	928	1844	1365	4
13	313	GTHV 18/19	1499	1718	1075	1975	1567	1
14	314	CNH 1132	646	827	708	1230	853	17
15	315	Local Check	995	892	626	1524	1009	13
16	316	CNDTS 44	546	658	722	1271	799	19
17	317	DSC 1952	1104	840	916	1244	1026	11
18	318	CNH 09-45	548	661	423	1193	706	20
19	319	RAHC 1902	740	1048	915	1754	1114	6
20	320	CCH 19-5	710	1044	722	1353	957	15
		CD @ 5 %		238	288	323		
		CV %		17	20	14		
		Local Checks	**Suraj**	**AKH 8828**	**NH 615**	**NH 615**		

Br. 06b – Initial Evaluation Trial of Compact genotypes (Rainfed)

Seed Cotton Yield (130 DAS) (Kg/ha)

S. No.	Code No.	Entries	Bharuch	Akola	Nagpur (CICR)	Nanded	Mean CZ
1	301	RAHC 1901	485	931	481	564	615
2	302	TCH 002	365	888	730	363	587
3	303	GBHV 187	263	715	93	454	381
4	304	CNH 09-77	276	1148	282	370	519
5	305	RHC-HD 1312	494	1235	415	441	646
6	306	CCH 15-1	217	801	137	402	389
7	307	DSC 1951	562	823	421	429	559
8	308	Common Check (Suraj)	363	888	460	453	541
9	309	CNH 1133	284	1191	620	557	663
10	310	CCH 19-4	176	888	177	338	395
11	311	CNH 2046	312	975	365	455	527
12	312	RHC-HD 1405	534	866	211	578	547
13	313	GTHV 18/19	574	1430	343	537	721
14	314	CNH 1132	253	615	159	339	342
15	315	Local Check	315	758	176	518	442
16	316	CNDTS 44	203	477	145	433	315
17	317	DSC 1952	614	715	292	350	493
18	318	CNH 09-45	176	498	122	348	286
19	319	RAHC 1902	451	758	368	508	521
20	320	CCH 19-5	375	801	260	515	488

Br. 06b – Initial Evaluation Trial of Compact genotypes (Rainfed)

Seed Cotton Yield (160 DAS) (Kg/ha)

S. No.	Code No.	Entries	Bharuch	Akola	Nagpur (CICR)	Nanded	Mean CZ
1	301	RAHC 1901	615	578	480	1315	747
2	302	TCH 002	265	210	457	979	478
3	303	GBHV 187	1000	412	405	835	663
4	304	CNH 09-77	523	277	669	737	552
5	305	RHC-HD 1312	655	279	839	1105	720
6	306	CCH 15-1	287	240	655	719	475
7	307	DSC 1951	349	165	573	1010	524
8	308	Common Check (Suraj)	312	157	493	909	468
9	309	CNH 1133	285	312	866	703	542
10	310	CCH 19-4	275	256	558	689	445
11	311	CNH 2046	412	237	598	716	491
12	312	RHC-HD 1405	1035	251	717	1266	817
13	313	GTHV 18/19	924	292	532	1438	797
14	314	CNH 1132	392	213	550	891	512
15	315	Local Check	680	131	450	1006	567
16	316	CNDTS 44	343	212	577	839	493
17	317	DSC 1952	490	238	625	894	562
18	318	CNH 09-45	372	167	301	845	421
19	319	RAHC 1902	289	290	547	1245	593
20	320	CCH 19-5	335	243	462	838	470

Br. 06b – Initial Evaluation Trial of Compact genotypes (Rainfed)

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Bharuch	Akola	Nagpur (CICR)	Nanded	Mean CZ
1	301	RAHC 1901	373	531	323	674	475
2	302	TCH 002	181	379	356	417	333
3	303	GBHV 187	410	412	161	445	357
4	304	CNH 09-77	243	467	308	370	347
5	305	RHC-HD 1312	378	552	402	566	475
6	306	CCH 15-1	173	380	256	408	304
7	307	DSC 1951	279	348	323	521	368
8	308	Common Check (Suraj)	232	379	308	507	357
9	309	CNH 1133	197	529	520	454	425
10	310	CCH 19-4	148	410	230	349	284
11	311	CNH 2046	266	423	359	434	371
12	312	RHC-HD 1405	487	388	283	623	445
13	313	GTHV 18/19	464	637	330	720	538
14	314	CNH 1132	213	286	243	439	295
15	315	Local Check	299	314	217	579	352
16	316	CNDTS 44	182	232	227	431	268
17	317	DSC 1952	374	307	289	459	357
18	318	CNH 09-45	172	239	136	407	239
19	319	RAHC 1902	260	387	312	623	396
20	320	CCH 19-5	241	378	239	505	341

Br. 06b – Initial Evaluation Trial of Compact genotypes (Rainfed)

Ginning outturn (%)

S. No.	Code No.	Entries	Bharuch	Akola	Nagpur (CICR)	Nanded	Mean CZ
1	301	RAHC 1901	33.9	34.9	33.6	35.9	34.6
2	302	TCH 002	28.7	34.1	30.0	31.3	31.0
3	303	GBHV 187	32.5	36.6	32.4	34.8	34.1
4	304	CNH 09-77	30.5	35.3	32.4	33.4	32.9
5	305	RHC-HD 1312	32.9	36.4	32.1	36.6	34.5
6	306	CCH 15-1	34.4	36.5	32.3	36.4	34.9
7	307	DSC 1951	30.6	35.5	32.5	36.0	33.7
8	308	Common Check (Suraj)	34.3	36.2	32.4	37.3	35.1
9	309	CNH 1133	34.7	35.3	35.0	36.0	35.3
10	310	CCH 19-4	32.8	35.8	31.3	34.0	33.5
11	311	CNH 2046	36.8	35.2	37.2	37.0	36.6
12	312	RHC-HD 1405	31.0	34.7	30.5	33.9	32.5
13	313	GTHV 18/19	31.0	37.1	30.7	36.6	33.9
14	314	CNH 1132	33.0	34.6	34.3	35.8	34.4
15	315	Local Check	30.1	35.1	34.7	37.9	34.5
16	316	CNDTS 44	33.3	35.1	31.5	33.8	33.4
17	317	DSC 1952	33.8	36.6	31.6	36.9	34.7
18	318	CNH 09-45	31.4	36.0	32.1	34.2	33.4
19	319	RAHC 1902	35.1	36.9	34.1	35.5	35.4
20	320	CCH 19-5	33.9	36.2	33.1	37.3	35.1

Br. 06b – Initial Evaluation Trial of Compact genotypes (Rainfed)

No. of bolls/m^2

S. No.	Code No.	Entries	Bharuch	Akola	Nagpur (CICR)	Nanded	Mean CZ
1	301	RAHC 1901	349	144.7	97.7	60.9	163.1
2	302	TCH 002	149	105.2	85.3	48.7	97.0
3	303	GBHV 187	198	179.2	121.7	55.3	138.5
4	304	CNH 09-77	160	143.1	80.7	55.8	109.9
5	305	RHC-HD 1312	216	129.9	107.3	56.1	127.2
6	306	CCH 15-1	147	136.5	66.7	50.4	100.1
7	307	DSC 1951	167	113.5	90.3	52.3	105.7
8	308	Common Check (Suraj)	167	118.4	93.3	48.9	106.8
9	309	CNH 1133	182	136.5	111.0	52.7	120.6
10	310	CCH 19-4	193	98.7	101.0	46.2	109.8
11	311	CNH 2046	178	141.4	122.3	44.6	121.5
12	312	RHC-HD 1405	160	120.0	92.3	66.0	109.6
13	313	GTHV 18/19	280	156.2	85.0	69.2	147.6
14	314	CNH 1132	193	161.2	109.7	54.3	129.6
15	315	Local Check	160	134.8	136.3	60.0	122.8
16	316	CNDTS 44	189	111.8	110.0	49.7	115.1
17	317	DSC 1952	180	106.9	80.3	45.6	103.2
18	318	CNH 09-45	98	143.1	112.3	39.4	98.1
19	319	RAHC 1902	160	123.3	129.3	59.3	118.0
20	320	CCH 19-5	178	138.1	106.0	46.0	117.0

Br. 06b – Initial Evaluation Trial of Compact genotypes (Rainfed)

Plant height (cm)

S. No.	Code No.	Entries	Bharuch	Akola	Nagpur (CICR)	Nanded	Mean CZ
1	301	RAHC 1901	125.8	83.3	82.5	107.5	99.8
2	302	TCH 002	112.2	86.1	109.5	108.0	104.0
3	303	GBHV 187	171.2	118.3	120.7	134.3	136.1
4	304	CNH 09-77	180.2	121.7	113.5	133.2	137.1
5	305	RHC-HD 1312	171.2	117.2	110.2	123.0	130.4
6	306	CCH 15-1	147.4	120.0	111.0	131.1	127.4
7	307	DSC 1951	112.2	93.3	109.1	99.0	103.4
8	308	Common Check (Suraj)	115.2	97.8	101.9	112.5	106.8
9	309	CNH 1133	104.4	96.1	104.3	106.7	102.9
10	310	CCH 19-4	106.6	124.4	113.5	136.9	120.4
11	311	CNH 2046	92.4	100.6	90.4	104.5	97.0
12	312	RHC-HD 1405	132.4	94.4	108.1	103.3	109.6
13	313	GTHV 18/19	148.4	109.4	98.3	108.7	116.2
14	314	CNH 1132	144.4	105.6	85.4	101.7	109.3
15	315	Local Check	152.2	114.4	113.6	111.0	122.8
16	316	CNDTS 44	147.0	103.3	114.4	124.1	122.2
17	317	DSC 1952	140.4	97.8	97.1	117.1	113.1
18	318	CNH 09-45	142.2	102.2	123.3	115.7	120.8
19	319	RAHC 1902	125.0	84.4	117.3	117.7	111.1
20	320	CCH 19-5	120.4	106.1	118.7	117.6	115.7

Br. 06b – Initial Evaluation Trial of Compact genotypes (Rainfed)

No. of monopodia / plant

S. No.	Code No.	Entries	Bharuch	Akola	Nagpur (CICR)	Nanded	Mean CZ
1	301	RAHC 1901	0.2	0.7	0.5	0.5	0.5
2	302	TCH 002	0.2	0.2	0.1	0.4	0.2
3	303	GBHV 187	0.4	0.9	1.1	0.9	0.8
4	304	CNH 09-77	0.2	0.2	0.8	0.5	0.4
5	305	RHC-HD 1312	0.2	0.3	0.4	0.6	0.4
6	306	CCH 15-1	0.2	0.9	0.4	0.9	0.6
7	307	DSC 1951	0.4	0.9	0.1	0.6	0.5
8	308	Common Check (Suraj)	0.2	0.2	0.2	1.0	0.4
9	309	CNH 1133	0.2	0.8	0.1	0.8	0.5
10	310	CCH 19-4	0.2	0.4	0.6	0.5	0.4
11	311	CNH 2046	0.2	1.1	0.4	0.6	0.6
12	312	RHC-HD 1405	0.2	0.1	0.1	0.1	0.1
13	313	GTHV 18/19	0.8	0.9	0.2	0.9	0.7
14	314	CNH 1132	0.8	1.2	0.7	1.0	0.9
15	315	Local Check	0.2	0.7	0.4	0.9	0.6
16	316	CNDTS 44	1.6	1.3	0.7	1.3	1.2
17	317	DSC 1952	0.6	0.4	0.2	0.4	0.4
18	318	CNH 09-45	0.6	0.7	1.1	1.1	0.9
19	319	RAHC 1902	0.2	0.6	0.2	0.7	0.4
20	320	CCH 19-5	0.2	1.3	0.4	0.8	0.7

Br. 06b – Initial Evaluation Trial of Compact genotypes (Rainfed)

No. of sympodia / plant

S. No.	Code No.	Entries	Bharuch	Akola	Nagpur (CICR)	Nanded	Mean CZ
1	301	RAHC 1901	20.6	15.1	15.3	13.9	16.2
2	302	TCH 002	19.2	14.2	18.4	13.8	16.4
3	303	GBHV 187	18.6	18.0	18.5	16.3	17.9
4	304	CNH 09-77	18.2	15.6	15.4	12.7	15.5
5	305	RHC-HD 1312	20.4	18.2	16.4	14.6	17.4
6	306	CCH 15-1	16.2	17.8	16.6	14.1	16.2
7	307	DSC 1951	16.4	14.7	15.9	12.5	14.9
8	308	Common Check (Suraj)	15.6	14.8	17.5	13.9	15.4
9	309	CNH 1133	11.4	12.9	14.3	14.0	13.2
10	310	CCH 19-4	15.8	13.3	17.0	11.9	14.5
11	311	CNH 2046	15.6	17.7	15.5	14.9	15.9
12	312	RHC-HD 1405	13.8	13.8	15.5	12.5	13.9
13	313	GTHV 18/19	19.6	16.2	15.3	13.9	16.3
14	314	CNH 1132	17.6	16.0	16.7	14.1	16.1
15	315	Local Check	16.4	16.4	17.7	13.5	16.0
16	316	CNDTS 44	18.6	15.1	18.8	15.7	17.0
17	317	DSC 1952	16.0	14.4	15.4	13.3	14.8
18	318	CNH 09-45	19.4	15.9	17.5	15.0	16.9
19	319	RAHC 1902	17.8	16.1	19.0	16.1	17.2
20	320	CCH 19-5	17.0	15.8	15.2	12.7	15.2

Br. 06b – Initial Evaluation Trial of Compact genotypes (Rainfed)

Boll weight (g)

S. No.	Code No.	Entries	Bharuch	Akola	Nagpur (CICR)	Nanded	Mean CZ
1	301	RAHC 1901	2.7	4.1	3.7	3.7	3.5
2	302	TCH 002	3.1	3.9	4.1	4.3	3.8
3	303	GBHV 187	3.2	3.5	3.0	3.7	3.3
4	304	CNH 09-77	2.5	4.2	3.9	4.4	3.8
5	305	RHC-HD 1312	3.4	3.9	3.9	4.5	3.9
6	306	CCH 15-1	2.8	3.8	3.0	4.1	3.4
7	307	DSC 1951	2.9	3.5	3.7	3.9	3.5
8	308	Common Check (Suraj)	3.3	4.1	4.0	4.2	3.9
9	309	CNH 1133	3.1	3.3	3.7	4.0	3.5
10	310	CCH 19-4	3.4	3.5	3.8	4.1	3.7
11	311	CNH 2046	2.8	2.8	3.2	3.9	3.2
12	312	RHC-HD 1405	3.3	2.9	3.8	3.8	3.4
13	313	GTHV 18/19	3.7	3.5	4.1	4.0	3.8
14	314	CNH 1132	2.8	3.1	3.8	3.8	3.4
15	315	Local Check	2.4	3.6	3.0	3.8	3.2
16	316	CNDTS 44	2.7	2.8	3.3	3.8	3.2
17	317	DSC 1952	3.1	3.0	3.9	4.0	3.5
18	318	CNH 09-45	3.0	3.4	3.3	3.8	3.4
19	319	RAHC 1902	4.0	3.3	4.1	3.7	3.8
20	320	CCH 19-5	3.0	3.1	3.8	4.0	3.5

Br. 06b – Initial Evaluation Trial of Compact genotypes (Rainfed)

Lint Index (g)

S. No.	Code No.	Entries	Bharuch	Akola	Nanded	Mean CZ
1	301	RAHC 1901	4.4	4.0	4.8	4.4
2	302	TCH 002	4.0	4.3	4.2	4.2
3	303	GBHV 187	3.8	4.6	4.9	4.4
4	304	CNH 09-77	5.5	4.6	5.1	5.0
5	305	RHC-HD 1312	4.4	5.1	5.5	5.0
6	306	CCH 15-1	5.1	4.8	5.9	5.3
7	307	DSC 1951	4.3	3.9	4.2	4.1
8	308	Common Check (Suraj)	5.1	4.7	5.5	5.1
9	309	CNH 1133	4.1	4.3	5.1	4.5
10	310	CCH 19-4	5.9	4.7	5.0	5.2
11	311	CNH 2046	3.6	3.5	4.8	4.0
12	312	RHC-HD 1405	6.2	4.0	4.3	4.8
13	313	GTHV 18/19	4.9	4.2	5.0	4.7
14	314	CNH 1132	4.5	3.4	4.7	4.2
15	315	Local Check	5.5	3.5	4.7	4.6
16	316	CNDTS 44	5.2	3.7	4.2	4.4
17	317	DSC 1952	4.5	3.7	4.5	4.3
18	318	CNH 09-45	5.2	5.0	5.2	5.1
19	319	RAHC 1902	5.1	4.4	4.6	4.7
20	320	CCH 19-5	6.0	4.0	5.3	5.1

Br. 06b – Initial Evaluation Trial of Compact genotypes (Rainfed)

Seed Index (g)

S. No.	Code No.	Entries	Bharuch	Akola	Nanded	Mean CZ
1	301	RAHC 1901	9.5	7.5	8.5	8.5
2	302	TCH 002	8.0	8.3	9.3	8.5
3	303	GBHV 187	8.5	8.0	9.2	8.6
4	304	CNH 09-77	9.5	8.3	10.1	9.3
5	305	RHC-HD 1312	8.0	8.8	9.5	8.8
6	306	CCH 15-1	10.0	8.3	10.3	9.6
7	307	DSC 1951	8.5	7.0	7.5	7.7
8	308	Common Check (Suraj)	10.5	8.3	9.3	9.4
9	309	CNH 1133	9.0	7.8	9.1	8.6
10	310	CCH 19-4	10.5	8.5	9.7	9.6
11	311	CNH 2046	8.0	6.5	8.1	7.5
12	312	RHC-HD 1405	9.5	7.5	8.4	8.5
13	313	GTHV 18/19	9.5	7.2	8.7	8.4
14	314	CNH 1132	9.5	6.5	8.5	8.2
15	315	Local Check	9.5	6.5	7.6	7.9
16	316	CNDTS 44	9.0	6.8	8.2	8.0
17	317	DSC 1952	9.0	6.5	7.8	7.8
18	318	CNH 09-45	10.0	8.8	10.0	9.6
19	319	RAHC 1902	10.5	7.5	8.4	8.8
20	320	CCH 19-5	11.0	7.0	9.3	9.1

Br 12a - Initial Evaluation Trial of *G. barbadense*

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Surat*	Rahuri	Mean CZ	Rank
1	321	SBSD 5-6		456	456	5
2	322	CCB 64B		524	524	3
3	323	DB 1901		471	471	4
4	324	Zonal Check		656	656	1
5	325	CCB 142		399	399	6
6	326	CCB 141		570	570	2
		CD @ 5 %		95		
		CV %		13		
		Zonal Check	Phule Rukmai			

*Vitiated

Other characters at Rahuri

S. No.	Code No.	Entries	Lint Yield (kg/ha)	Ginning outturn (%)	Bolls/plant	Boll weight (g)
1	321	SBSD 5-6	145	31.8	31.0	2.8
2	322	CCB 64B	173	33.1	30.2	3.0
3	323	DB 1901	148	31.5	31.5	2.8
4	324	Zonal Check	222	33.8	29.7	2.9
5	325	CCB 142	131	32.9	31.0	3.1
6	326	CCB 141	167	29.3	34.8	2.7

Br 15a –Preliminary Hybrid Trial of Interspecific Hybrid (H X B)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Banswara	Anand	Rahuri	Mean CZ	Rank
1	331	DHB 1902	1618	2163	456	1412	3
2	332	RHB 1401	1237	2095	524	1285	4
3	333	Local Checks	1569	2244	471	1428	1
4	334	DHB 1901	1171	1126	656	984	6
5	335	Phule Dhara (CC)	1470	2388	399	1419	2
6	336	LAHB 2	1532	1544	570	1215	5
		CD @ 5 %	220	257	137		
		CV %	10	9	12		
		Local Checks	**DCH 32**	**G.Cot.Hy.102**	**PhulePrabha**		

Br 15a –Preliminary Hybrid Trial of Interspecific Hybrid (H X B)

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Banswara	Anand	Rahuri	Mean CZ
1	331	DHB 1902	423	619	145	396
2	332	RHB 1401	326	689	173	396
3	333	LC	399	688	148	412
4	334	DHB 1901	285	332	222	280
5	335	Phule Dhara (CC)	360	677	131	389
6	336	LAHB 2	398	412	167	326

Ginning outturn (%)

S. No.	Code No.	Entries	Banswara	Anand	Rahuri	Mean CZ
1	331	DHB 1902	26.1	28.6	31.8	29
2	332	RHB 1401	26.3	33.1	33.1	31
3	333	LC	25.4	30.7	31.5	29
4	334	DHB 1901	24.4	29.4	33.8	29
5	335	Phule Dhara (CC)	24.5	28.4	32.9	29
6	336	LAHB 2	26.0	26.7	29.3	27

Bolls/plant

S. No.	Code No.	Entries	Banswara	Anand	Rahuri	Mean CZ
1	331	DHB 1902	42.1	34.9	31.0	36
2	332	RHB 1401	27.7	35.8	30.2	31
3	333	LC	29.2	47.8	31.5	36
4	334	DHB 1901	24.2	31.1	29.7	28
5	335	Phule Dhara (CC)	28.1	54.3	31.0	38
6	336	LAHB 2	27.7	32.1	34.8	32

Boll weight (g)

S. No.	Code No.	Entries	Banswara	Anand	Rahuri	Mean CZ
1	331	DHB 1902	2.5	3.7	2.8	3
2	332	RHB 1401	2.8	3.7	3.0	3
3	333	LC	3.0	2.8	2.8	3
4	334	DHB 1901	2.6	3.6	2.9	3
5	335	Phule Dhara (CC)	3.4	2.6	3.1	3
6	336	LAHB 2	3.2	3.0	2.7	3

Br. 22b – Initial Evaluation Trial of *G. arboreum*

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Khandwa	Amreli	Akola	Parbhani	Jalgaon	Nagpur (CICR)	Mean CZ	Rank
1	341	DWDA 1902	863	1712	1178	1223	1668	984	1271	16
2	342	CNA 2036	935	1906	1608	1740	2065	1407	1610	5
3	343	CNA 2037	915	1861	1398	1367	1798	1354	1449	11
4	344	NDLA 3116-3	926	2550	2032	1995	2279	1300	1847	1
5	345	JLA 1102	923	2330	1396	1892	1627	1278	1574	7
6	346	Zonal Check	894	1833	891	1488	1449	757	1219	18
7	347	PA 863	892	1680	1634	1825	1640	1443	1519	9
8	348	MDL 2689	909	1582	1143	1097	1273	966	1162	19
9	349	GAM 267	938	2138	1305	1370	1386	1543	1447	12
10	350	CNA 1042	886	1727	968	1274	1947	1782	1431	13
11	351	NDLA 3104-4	934	2237	1715	1910	2708	1211	1786	2
12	352	LC	880	2260	1393	1438	1864	1810	1608	6
13	353	JLA 1313	898	2337	1447	1522	1820	1236	1543	8
14	354	GAM 273	861	1877	1151	1867	1117	1515	1398	15
15	355	PA 860	863	1969	1601	1487	1545	1524	1498	10
16	356	MDL 2679	904	1804	1122	1152	1227	1273	1247	17
17	357	AKA 2013-8	934	2081	1788	1785	2356	1623	1761	3
18	358	CNA 2035	977	1929	1411	1605	2209	1802	1656	4
19	359	DWDA 1901	971	1834	1778	1386	1248	1344	1427	14
		CD @ 5 %	147	527	260	265	469	491		
		CV %	12	16	16	10	16	22		
		Zonal Check	AKA 7							
		Local Checks	**JK 5**	**G. Cot. 19**	**AKA. 8**	**PA 402**	**JLA 505**	**AKA. 8**		

Br. 22b – Initial Evaluation Trial of *G. arboreum*

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Khandwa	Amreli	Akola	Parbhani	Jalgaon	Nagpur (CICR)	Mean CZ
1	341	DWDA 1902	274	675	417	533	662	361	487
2	342	CNA 2036	300	689	582	651	723	491	573
3	343	CNA 2037	317	670	516	517	640	353	502
4	344	NDLA 3116-3	318	1012	728	881	870	536	724
5	345	JLA 1102	257	779	499	711	566	414	538
6	346	Zonal Check	258	737	326	649	574	285	472
7	347	PA 863	268	567	593	711	543	469	525
8	348	MDL 2689	285	622	401	483	514	371	446
9	349	GAM 267	312	783	442	511	492	537	513
10	350	CNA 1042	267	591	330	477	645	624	489
11	351	NDLA 3104-4	289	812	606	738	943	432	637
12	352	LC	268	772	482	544	615	668	558
13	353	JLA 1313	303	821	512	576	595	446	542
14	354	GAM 273	277	668	399	708	366	520	490
15	355	PA 860	285	667	585	563	520	501	520
16	356	MDL 2679	314	736	394	501	497	476	486
17	357	AKA 2013-8	316	737	640	674	849	584	633
18	358	CNA 2035	290	670	500	668	485	613	538
19	359	DWDA 1901	328	661	627	535	419	473	507

Br. 22b – Initial Evaluation Trial of *G. arboreum*

Ginning outturn (%)

S. No.	Code No.	Entries	Khandwa	Amreli	Akola	Parbhani	Jalgaon	Nagpur (CICR)	Mean CZ
1	341	DWDA 1902	31.8	39.5	35.4	43.7	39.7	36.7	37.8
2	342	CNA 2036	32.1	36.2	36.2	37.4	35.0	34.9	35.3
3	343	CNA 2037	34.6	36.0	36.9	37.8	35.1	36.1	36.1
4	344	NDLA 3116-3	34.3	39.6	35.8	44.3	38.2	41.2	38.9
5	345	JLA 1102	27.8	33.5	35.8	37.6	34.8	32.4	33.7
6	346	Zonal Check	28.9	40.2	36.6	43.6	39.1	37.7	37.7
7	347	PA 863	30.1	33.7	36.3	38.9	33.1	32.5	34.1
8	348	MDL 2689	31.4	39.4	34.8	44.0	40.4	38.4	38.1
9	349	GAM 267	33.3	36.6	33.8	37.3	35.5	34.8	35.2
10	350	CNA 1042	30.1	34.3	34.6	37.4	33.1	35.0	34.1
11	351	NDLA 3104-4	31.0	36.4	35.3	38.7	34.8	35.7	35.3
12	352	LC	30.5	34.2	34.6	37.9	33.0	36.9	34.5
13	353	JLA 1313	33.7	35.2	35.4	37.9	32.7	36.1	35.2
14	354	GAM 273	32.2	35.7	34.6	37.9	32.8	34.3	34.6
15	355	PA 860	33.0	33.8	36.5	37.9	33.7	32.9	34.6
16	356	MDL 2679	34.7	40.8	35.1	43.5	40.5	37.4	38.7
17	357	AKA 2013-8	33.8	35.4	35.8	37.8	36.1	36.0	35.8
18	358	CNA 2035	29.7	34.7	35.5	41.5	35.6	34.0	35.2
19	359	DWDA 1901	33.8	36.0	35.4	38.6	33.6	35.2	35.4

Br. 22b – Initial Evaluation Trial of *G. arboreum*

Bolls/plant

S. No.	Code No.	Entries	Khandwa	Amreli	Akola	Parbhani	Jalgaon	Nagpur (CICR)	Mean CZ
1	341	DWDA 1902	43.1	23.0	16.8	13.8	27.8	25.7	25.0
2	342	CNA 2036	55.3	36.6	17.1	19.7	27.0	30.1	31.0
3	343	CNA 2037	57.6	28.1	16.3	15.8	29.0	26.3	28.9
4	344	NDLA 3116-3	54.1	29.3	17.3	22.9	30.6	27.9	30.4
5	345	JLA 1102	66.1	30.0	16.0	20.9	20.0	27.9	30.2
6	346	Zonal Check	48.0	29.3	10.3	16.6	17.6	20.6	23.7
7	347	PA 863	48.7	24.7	15.4	20.2	21.4	36.1	27.8
8	348	MDL 2689	51.9	26.2	15.2	12.5	18.6	22.3	24.5
9	349	GAM 267	51.9	27.4	17.7	15.1	19.8	28.9	26.8
10	350	CNA 1042	43.7	22.4	16.9	14.1	25.0	36.7	26.5
11	351	NDLA 3104-4	65.1	25.9	17.0	21.0	26.0	26.7	30.3
12	352	LC	57.6	30.7	14.1	15.9	23.8	33.5	29.3
13	353	JLA 1313	53.1	25.3	18.2	17.1	27.8	39.4	30.2
14	354	GAM 273	56.8	25.1	14.7	19.8	24.8	33.1	29.1
15	355	PA 860	54.8	25.6	18.6	16.8	20.2	31.0	27.8
16	356	MDL 2679	42.6	27.1	13.9	13.4	18.0	30.7	24.3
17	357	AKA 2013-8	60.3	26.9	22.0	19.3	29.6	30.7	31.5
18	358	CNA 2035	54.4	28.2	20.7	17.5	23.0	34.6	29.7
19	359	DWDA 1901	53.3	26.9	19.3	15.3	14.8	29.3	26.5

Br. 22b – Initial Evaluation Trial of *G. arboreum*

Boll weight (g)

S. No.	Code No.	Entries	Khandwa	Amreli	Akola	Parbhani	Jalgaon	Nagpur (CICR)	Mean CZ
1	341	DWDA 1902	2.4	2.7	3.5	2.7	2.1	3.0	2.7
2	342	CNA 2036	2.0	2.1	2.6	2.5	2.2	2.7	2.4
3	343	CNA 2037	2.0	2.3	2.5	2.7	2.2	2.4	2.4
4	344	NDLA 3116-3	2.1	2.4	2.9	2.7	2.2	2.9	2.5
5	345	JLA 1102	2.0	1.9	2.7	2.7	2.2	2.6	2.4
6	346	Zonal Check	2.0	2.3	2.9	2.7	2.0	2.8	2.5
7	347	PA 863	2.4	2.3	3.5	2.8	2.1	2.9	2.7
8	348	MDL 2689	1.9	2.2	3.2	2.9	3.0	3.3	2.8
9	349	GAM 267	2.0	2.3	3.3	2.6	2.3	2.9	2.6
10	350	CNA 1042	2.1	2.2	2.6	2.5	2.1	2.7	2.4
11	351	NDLA 3104-4	2.1	2.3	2.3	2.7	2.2	2.7	2.4
12	352	LC	1.9	2.1	2.9	2.9	2.3	3.1	2.5
13	353	JLA 1313	2.0	2.4	2.9	2.8	2.2	3.0	2.6
14	354	GAM 273	1.9	2.6	3.0	2.9	2.6	2.8	2.6
15	355	PA 860	2.0	2.0	3.1	2.7	2.4	2.5	2.5
16	356	MDL 2679	2.2	2.5	3.1	2.9	2.4	3.2	2.7
17	357	AKA 2013-8	2.2	2.4	2.8	2.7	2.2	3.0	2.6
18	358	CNA 2035	1.9	2.1	2.5	2.7	2.4	2.5	2.4
19	359	DWDA 1901	2.2	2.1	2.4	2.6	2.6	2.8	2.5

Br. 22b – Initial Evaluation Trial of long linted *G. arboreum*

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Amreli	Bharuch	Akola	Parbhani	Nagpur (CICR)	Mean CZ	Rank
1	361	PAIG 396	1345	310	1301	1311	1880	1229	8
2	362	PA 880	1411	379	1048	1227	2125	1238	7
3	363	CINA 1067	2099	379	1374	1287	2381	1504	3
4	364	PA 869	1717	531	1272	1029	2025	1315	5
5	365	PA 873	1785	287	980	1488	1992	1306	6
6	366	CINA 1068	1790	417	1418	1174	2867	1533	2
7	367	Quality Check	1673	455	1166	1133	2167	1319	4
8	368	PA 864	1464	338	814	1126	1848	1118	10
9	369	PAIG 394	1665	408	955	1326	1769	1225	9
10	370	CINA 1069	1864	531	1106	1364	2817	1536	1
		CD @ 5 %	326	126	250	222			
		CV %	11	17	19	10			
		Quality Check	PA 255						

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Amreli	Bharuch	Akola	Parbhani	Nagpur (CICR)	Mean CZ
1	361	PAIG 396	464	105	457	479	615	424
2	362	PA 880	491	129	355	458	684	423
3	363	CINA 1067	709	131	484	481	769	515
4	364	PA 869	599	185	435	391	695	461
5	365	PA 873	608	98	338	578	681	461
6	366	CINA 1068	628	153	494	454	969	540
7	367	Quality Check	594	155	403	410	704	453
8	368	PA 864	517	121	293	409	541	376
9	369	PAIG 394	598	161	336	488	532	423
10	370	CINA 1069	629	180	391	514	868	516

Br. 22b – Initial Evaluation Trial of long linted *G. arboreum*

Ginning outturn (%)

S. No.	Code No.	Entries	Amreli	Bharuch	Akola	Parbhani	Nagpur (CICR)	Mean CZ
1	361	PAIG 396	34.5	34.0	35.2	36.5	32.7	34.6
2	362	PA 880	34.7	33.9	33.8	37.2	32.2	34.4
3	363	CINA 1067	33.7	34.7	35.3	37.4	32.3	34.7
4	364	PA 869	34.9	34.8	34.2	38.1	34.3	35.3
5	365	PA 873	34.2	34.2	34.7	38.8	34.2	35.2
6	366	CINA 1068	35.1	36.6	34.8	38.8	33.8	35.8
7	367	Quality Check	35.4	34.1	34.5	36.2	32.5	34.5
8	368	PA 864	35.3	35.9	36.1	36.5	29.3	34.6
9	369	PAIG 394	35.9	39.5	35.1	36.8	30.1	35.5
10	370	CINA 1069	33.7	33.9	35.2	37.7	30.8	34.3

Bolls/plant

S. No.	Code No.	Entries	Amreli	Bharuch	Akola	Parbhani	Nagpur (CICR)	Mean CZ
1	361	PAIG 396	27.1	8.7	13.9	15.5	31.3	19.3
2	362	PA 880	32.6	10.7	11.2	14.4	32.9	20.4
3	363	CINA 1067	33.3	10.9	17.7	15.0	29.2	21.2
4	364	PA 869	31.3	12.5	15.6	11.6	37.3	21.7
5	365	PA 873	35.9	7.1	12.4	16.3	31.6	20.7
6	366	CINA 1068	30.3	11.6	11.8	13.3	39.5	21.3
7	367	Quality Check	33.7	11.2	11.6	13.2	35.3	21.0
8	368	PA 864	30.1	7.6	11.9	12.8	28.4	18.2
9	369	PAIG 394	32.5	10.0	12.7	14.7	32.3	20.4
10	370	CINA 1069	31.3	13.9	11.6	14.9	35.5	21.4

Boll weight (g)

S. No.	Code No.	Entries	Amreli	Bharuch	Akola	Parbhani	Nagpur (CICR)	Mean CZ
1	361	PAIG 396	2.1	1.9	2.7	2.7	2.6	2.4
2	362	PA 880	2.3	1.9	2.7	2.5	2.8	2.4
3	363	CINA 1067	2.2	1.9	2.8	2.6	2.6	2.4
4	364	PA 869	2.2	2.3	2.6	2.7	2.8	2.5
5	365	PA 873	2.1	2.2	2.8	2.7	2.5	2.5
6	366	CINA 1068	1.8	1.9	2.5	2.7	2.8	2.3
7	367	Quality Check	2.0	2.2	2.4	2.6	2.4	2.3
8	368	PA 864	2.1	2.4	2.6	2.8	2.8	2.5
9	369	PAIG 394	2.2	2.2	2.7	2.8	2.3	2.4
10	370	CINA 1069	2.2	2.1	2.5	2.7	2.7	2.4

Br. 22b – Initial Evaluation Trial of Naturally Coloured *G. arboreum*

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Khandwa	Surat	Nanded	Nagpur (CICR)	Mean CZ	Rank
1	381	DDCC 1902	559	721	1347	1251	970	3
2	382	Zonal Check	429	561	1037	886	728	7
3	383	CNA 18562	429	601	835	1630	874	4
4	384	DDCC 1 (CC)	812	796	1391	1239	1060	2
5	385	DDCC 1901	546	686	911	1019	791	6
6	386	Local Check	478	745	1892	1950	1266	1
7	387	CNA 18563	434	499	857	1594	846	5
		CD @ 5 %	165	132	288	543		
		CV %	19	11	14	22		
		Zonal Check	AKA 7					
		Local Checks	**JK 5**	**G. Cot. 19**	**PA 255**	**AKA. 8**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Khandwa	Surat	Nanded	Nagpur (CICR)	Mean CZ
1	381	DDCC 1902	179	239	373	403	299
2	382	Zonal Check	105	212	380	354	263
3	383	CNA 18562	97	206	261	592	289
4	384	DDCC 1 (CC)	265	268	395	383	328
5	385	DDCC 1901	178	234	267	302	245
6	386	Local Check	133	251	616	761	440
7	387	CNA 18563	126	170	258	575	282

Ginning outturn (%)

S. No.	Code No.	Entries	Khandwa	Surat	Nanded	Nagpur (CICR)	Mean CZ
1	381	DDCC 1902	32.0	33.2	27.7	32.2	31.3
2	382	Zonal Check	24.5	37.9	36.7	39.9	34.8
3	383	CNA 18562	22.7	34.3	31.3	36.3	31.2
4	384	DDCC 1 (CC)	32.7	33.8	28.4	30.9	31.5
5	385	DDCC 1901	32.5	34.1	29.3	29.6	31.4
6	386	Local Check	27.8	33.7	32.4	39.0	33.2
7	387	CNA 18563	29.0	34.2	30.0	36.1	32.3

Br. 22b – Initial Evaluation Trial of Naturally Coloured *G. arboreum*

Bolls/plant

S. No.	Code No.	Entries	Khandwa	Surat	Nanded	Nagpur (CICR)	Mean CZ
1	381	DDCC 1902	56.2	22.0	11.7	32.6	30.6
2	382	Zonal Check	57.9	13.2	9.3	23.7	26.0
3	383	CNA 18562	61.1	19.2	7.8	30.1	29.6
4	384	DDCC 1 (CC)	62.9	21.7	12.7	28.7	31.5
5	385	DDCC 1901	60.9	19.3	5.8	27.3	28.3
6	386	Local Check	59.6	22.4	15.3	37.1	33.6
7	387	CNA 18563	57.1	19.7	7.0	37.0	30.2

Boll weight (g)

S. No.	Code No.	Entries	Khandwa	Surat	Nanded	Nagpur (CICR)	Mean CZ
1	381	DDCC 1902	2.4	1.8	2.0	2.4	2.2
2	382	Zonal Check	2.4	2.3	2.5	2.6	2.5
3	383	CNA 18562	2.2	1.7	2.7	2.6	2.3
4	384	DDCC 1 (CC)	2.4	2.0	2.2	2.6	2.3
5	385	DDCC 1901	2.3	1.9	1.9	2.3	2.1
6	386	Local Check	2.2	1.8	2.6	2.9	2.4
7	387	CNA 18563	2.6	1.8	2.4	2.6	2.4

Br 25b – Preliminary Hybrid Trial of Desi Hybrid

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Amreli	Akola	Parbhani	Pachora (Nirmal)	Mean CZ	Rank
1	401	KR 147	1659	906	1008	1713	1321	6
2	402	ZC (NACH 12)	1364	766	1130	2258	1379	3
3	403	KR 155	2141	979	892	1902	1478	2
4	404	AJAH 103	1654	971	888	1808	1330	5
5	405	LC	2189	1424	1112	1556	1570	1
6	406	KR 144	1223	1435	1199	1571	1357	4
7	407	AKDH 103	1311	938	1150	1822	1305	7
		CD @ 5 %	353	193	221	236		
		CV %	12	17	12	7		
		Local Checks	**G.Cot.MDH-11**	**PDKVDH 1**	**PDKVDH 1**	**PDKVDH 1**		

Br 25b – Preliminary Hybrid Trial of Desi Hybrid

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Amreli	Akola	Parbhani	Pachora (Nirmal)	Mean CZ
1	401	KR 147	723	321	457	754	564
2	402	ZC (NACH 12)	604	277	508	1048	609
3	403	KR 155	889	332	408	799	607
4	404	AJAH 103	578	350	336	741	501
5	405	LC	829	491	460	638	605
6	406	KR 144	576	516	547	748	597
7	407	AKDH 103	515	328	474	769	522

Ginning outturn (%)

S. No.	Code No.	Entries	Amreli	Akola	Parbhani	Pachora (Nirmal)	Mean CZ
1	401	KR 147	43.8	35.4	45.3	43.5	42.0
2	402	ZC (NACH 12)	44.4	36.2	44.9	45.6	42.8
3	403	KR 155	41.7	34.0	45.8	41.5	40.8
4	404	AJAH 103	35.0	36.1	37.9	41.1	37.5
5	405	LC	37.9	34.4	41.4	40.8	38.6
6	406	KR 144	47.0	35.9	45.6	46.4	43.7
7	407	AKDH 103	39.3	35.2	41.2	41.6	39.3

Bolls/plant

S. No.	Code No.	Entries	Amreli	Akola	Parbhani	Pachora (Nirmal)	Mean CZ
1	401	KR 147	15.1	18.3	12.3	37.2	20.7
2	402	ZC (NACH 12)	20.2	14.8	13.1	36.6	21.2
3	403	KR 155	23.1	21.1	11.0	47.4	25.7
4	404	AJAH 103	23.1	21.6	11.2	40.4	24.1
5	405	LC	21.3	28.7	13.1	37.3	25.1
6	406	KR 144	16.9	16.6	13.8	38.4	21.4
7	407	AKDH 103	21.6	21.4	13.0	41.0	24.3

Boll weight (g)

S. No.	Code No.	Entries	Amreli	Akola	Parbhani	Pachora (Nirmal)	Mean CZ
1	401	KR 147	2.2	2.6	2.6	3.5	2.7
2	402	ZC (NACH 12)	2.7	3.1	3.0	3.9	3.2
3	403	KR 155	2.1	2.5	2.6	2.7	2.5
4	404	AJAH 103	2.2	2.9	2.7	2.8	2.7
5	405	LC	2.1	2.4	2.7	3.8	2.8
6	406	KR 144	2.7	3.9	3.0	4.2	3.5
7	407	AKDH 103	2.0	3.0	2.7	4.4	3.0

Br 32b – Initial Evaluation Trial of *G. herbaceum*

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Surat	Bharuch	Viramgam	Mean CZ	Rank
1	421	GBhv 312	991	889	1407	1096	1
2	422	DDhc 1901	803	520	867	730	11
3	423	ZC (G Cot 23/DDhc 11)	870	876	890	879	8
4	424	GShv 780/16	906	958	1033	966	6
5	425	GShv 797/16	1060	918	1059	1012	4
6	426	GVhv 845	1171	544	1323	1013	3
7	427	GShv 829/16	828	987	1155	990	5
8	428	GBhv 313	763	828	1033	875	9
9	429	GShv 329/15	812	755	1256	941	7
10	430	LC	716	507	1069	764	10
11	431	GVhv 936	944	767	1405	1039	2
		CD @ 5 %	181	223	303		
		CV %	12	16	16		
		Zonal Check	G Cot 23				
		Local Checks	**GN.Cot.25**	**GN.Cot.25**	**GADC 2**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Surat	Bharuch	Viramgam	Mean CZ
1	421	GBhv 312	323	303	375	334
2	422	DDhc 1901	272	175	224	224
3	423	ZC (G Cot 23/DDhc 11)	292	313	244	283
4	424	GShv 780/16	295	311	264	290
5	425	GShv 797/16	346	318	298	321
6	426	GVhv 845	425	200	366	330
7	427	GShv 829/16	277	313	287	292
8	428	GBhv 313	262	296	306	288
9	429	GShv 329/15	265	245	312	274
10	430	LC	244	181	310	245
11	431	GVhv 936	324	256	392	324

Br 32b – Initial Evaluation Trial of *G. herbaceum*

Ginning outturn (%)

S. No.	Code No.	Entries	Surat	Bharuch	Viramgam	Mean CZ
1	421	GBhv 312	32.6	34.1	26.7	31.1
2	422	DDhc 1901	33.9	33.7	25.8	31.1
3	423	ZC (G Cot 23/DDhc 11)	33.6	35.7	27.3	32.2
4	424	GShv 780/16	32.6	32.4	25.5	30.2
5	425	GShv 797/16	32.6	34.7	28.1	31.8
6	426	GVhv 845	36.3	36.7	27.6	33.5
7	427	GShv 829/16	33.5	31.7	24.5	29.9
8	428	GBhv 313	34.4	35.7	29.5	33.2
9	429	GShv 329/15	32.7	32.4	25.0	30.0
10	430	LC	34.1	35.7	29.0	32.9
11	431	GVhv 936	34.3	33.4	27.9	31.9

Bolls/plant

S. No.	Code No.	Entries	Surat	Bharuch	Viramgam	Mean CZ
1	421	GBhv 312	19.5	15.7	31.2	22.1
2	422	DDhc 1901	16.1	16.8	29.2	20.7
3	423	ZC (G Cot 23/DDhc 11)	15.6	17.7	27.1	20.1
4	424	GShv 780/16	17.8	22.2	31.1	23.7
5	425	GShv 797/16	21.0	18.4	31.0	23.5
6	426	GVhv 845	19.0	14.8	37.9	23.9
7	427	GShv 829/16	14.9	23.2	30.8	23.0
8	428	GBhv 313	16.5	17.3	34.1	22.6
9	429	GShv 329/15	14.9	20.5	30.9	22.1
10	430	LC	14.4	11.7	29.9	18.7
11	431	GVhv 936	17.0	19.8	33.9	23.6

Boll weight (g)

S. No.	Code No.	Entries	Surat	Bharuch	Viramgam	Mean CZ
1	421	GBhv 312	2.3	3.1	2.9	2.8
2	422	DDhc 1901	2.2	1.7	2.3	2.1
3	423	ZC (G Cot 23/DDhc 11)	2.4	2.7	2.5	2.5
4	424	GShv 780/16	2.4	2.3	2.3	2.3
5	425	GShv 797/16	2.2	2.7	2.2	2.4
6	426	GVhv 845	2.4	2.0	2.3	2.2
7	427	GShv 829/16	2.7	2.3	2.6	2.5
8	428	GBhv 313	2.2	2.6	2.5	2.4
9	429	GShv 329/15	2.4	2.0	2.4	2.3
10	430	LC	2.3	2.3	2.4	2.3
11	431	GVhv 936	2.6	2.1	2.7	2.5

CENTRAL ZONE TRIALS

Br 03a – Preliminary Varietal Trial - *G. hirsutum* (Central Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Surat	Talod#	Junagadh	Rahuri	Khandwa	Bhawanipatna	Mean CZ	Rank
1	9101	TSH 367	1900		2186	3157	723	2901	2173	4
2	9102	SHS 113	2634		2212	2443	767	2986	2208	3
3	9103	ZC (Phule Yamuna)	1825		2135	2296	861	2253	1874	6
4	9104	GJHV-522	2335		2109	2733	830	3241	2250	2
5	9105	LC	1974		1260	2040	723	2940	1787	8
6	9106	F 2662	1464		2315	1641	735	3110	1853	7
7	9107	RAH 1076	1636		2186	2193	693	2978	1937	5
8	9108	GJHV-554	2140		2649	3157	836	2508	2258	1
9	9109	Quality Check (Suraj)	1189		2238	1936	693	2847	1781	9
		CD @ 5 %	383		524	406	169	546		
		CV %	12		14	10	13	11		
		Local Checks	**GN. Cot 32**	**GN. Cot 32**	**GN. Cot 32**	**Phule 688**	**JK 4**	**Surabhi**		

#Poor yield- data rejected

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Surat	Junagadh	Rahuri	Khandwa	Bhawanipatna	Mean CZ
1	9101	TSH 367	680	793	1286	252	1042	811
2	9102	SHS 113	821	742	840	260	1059	744
3	9103	ZC (Phule Yamuna)	575	687	812	294	765	627
4	9104	GJHV-522	926	821	1121	330	1199	880
5	9105	LC	762	493	690	226	1116	657
6	9106	F 2662	473	811	608	248	1043	637
7	9107	RAH 1076	549	799	872	200	957	675
8	9108	GJHV-554	695	839	1129	201	869	747
9	9109	Quality Check (Suraj)	398	756		239	1012	601

Br 03a – Preliminary Varietal Trial - *G. hirsutum* (Central Zone)

Ginning outturn (%)

S. No.	Code No.	Entries	Surat	Junagadh	Rahuri	Khandwa	Bhawanipatna	Mean CZ
1	9101	TSH 367	35.7	36.3	40.7	34.9	36.0	36.7
2	9102	SHS 113	31.2	33.5	34.4	33.9	35.4	33.7
3	9103	ZC (Phule Yamuna)	31.5	32.2	35.4	34.1	34.0	33.4
4	9104	GJHV-522	39.5	38.9	41.0	39.8	37.0	39.3
5	9105	LC	38.6	39.1	33.8	31.2	37.9	36.1
6	9106	F 2662	32.3	35.0	37.0	33.7	33.5	34.3
7	9107	RAH 1076	33.6	36.5	39.8	28.8	32.1	34.2
8	9108	GJHV-554	32.4	31.6	35.8	24.0	34.6	31.7
9	9109	Quality Check (Suraj)	33.3	33.9		34.5	35.6	34.3

Bolls/plant

S. No.	Code No.	Entries	Surat	Junagadh	Rahuri	Khandwa	Bhawanipatna	Mean CZ
1	9101	TSH 367	31.0	41.2	30.0	28.7	45.7	35.3
2	9102	SHS 113	32.6	31.1	18.0	21.0	38.8	28.3
3	9103	ZC (Phule Yamuna)	31.7	33.9	21.0	29.9	35.5	30.4
4	9104	GJHV-522	32.7	28.3	21.0	21.5	44.7	29.6
5	9105	LC	29.0	19.5	22.0	24.6	37.4	26.5
6	9106	F 2662	21.0	31.4	27.0	21.1	45.1	29.1
7	9107	RAH 1076	20.3	31.5	26.0	14.7	41.3	26.8
8	9108	GJHV-554	28.2	36.1	24.0	35.5	40.3	32.8
9	9109	Quality Check (Suraj)	17.9	34.7	24.0	21.3	38.0	27.2

Br 03a – Preliminary Varietal Trial - *G. hirsutum* (Central Zone)

Boll weight (g)

S. No.	Code No.	Entries	Surat	Junagadh	Rahuri	Khandwa	Bhawanipatna	Mean CZ
1	9101	TSH 367	3.5	3.2	3.4	2.5	4.2	3.4
2	9102	SHS 113	4.3	4.3	3.4	2.4	5.1	3.9
3	9103	ZC (Phule Yamuna)	3.2	3.8	3.6	2.5	4.9	3.6
4	9104	GJHV-522	3.9	4.5	3.2	2.5	4.9	3.8
5	9105	LC	4.1	4.1	3.4	2.4	5.1	3.8
6	9106	F 2662	4.1	4.3	3.4	2.5	4.4	3.7
7	9107	RAH 1076	4.3	4.2	3.6	2.3	4.8	3.8
8	9108	GJHV-554	4.1	4.3	3.4	2.5	4.4	3.7
9	9109	Quality Check (Suraj)	4.1	3.9	3.3	2.8	4.9	3.8

Br 04a – Coordinated Varietal Trial - G. hirsutum (Central Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Surat	Junagarh	Rahuri	Bhawanipatna	Mean CZ	Rank
1	9111	TCH 1828	1114	1595	4346	2407	2366	4
2	9112	Quality Check (Suraj)	1119	1792	3381	2620	2228	6
3	9113	RAH 1071	858	1997	2744	2330	1982	7
4	9114	ZC (Phule Yamuna)	2028	2135	3921	1690	2444	3
5	9115	CPD-1501	1903	2092	2977	2353	2331	5
6	9116	LC	1897	1672	4713	2813	2774	1
7	9117	SIMA 5	1490	1895	4180	2581	2537	2
		CD @ 5 %	313	303	1492	430		
		CV %	12	9	22	10		
		Local Checks	**GN. Cot 32**	**GN. Cot 32**	**Phule 688**	**Surabhi**		

Br 04a – Coordinated Varietal Trial - G. hirsutum (Central Zone)

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Surat	Junagarh	Rahuri	Bhawanipatna	Mean CZ
1	9111	TCH 1828	341	486	1485	849	790
2	9112	Quality Check (Suraj)	371	621	1339	929	815
3	9113	RAH 1071	270	653	929	771	656
4	9114	ZC (Phule Yamuna)	642	700	1310	557	802
5	9115	CPD-1501	596	715	1109	821	810
6	9116	LC	756	644	1475	975	962
7	9117	SIMA 5	466	611	1523	898	874

Ginning outturn (%)

S. No.	Code No.	Entries	Surat	Junagarh	Rahuri	Bhawanipatna	Mean CZ
1	9111	TCH 1828	30.6	30.4	34.2	35.3	32.6
2	9112	Quality Check (Suraj)	33.1	34.6	39.6	35.5	35.7
3	9113	RAH 1071	31.2	32.6	33.9	33.2	32.7
4	9114	ZC (Phule Yamuna)	31.7	32.8	33.4	33.0	32.7
5	9115	CPD-1501	31.2	34.1	37.3	34.8	34.3
6	9116	LC	39.8	38.5	31.3	34.7	36.1
7	9117	SIMA 5	31.3	32.2	36.4	34.8	33.7

Bolls/plant

S. No.	Code No.	Entries	Surat	Junagarh	Rahuri	Bhawanipatna	Mean CZ
1	9111	TCH 1828	18.3	21.5	26.0	36.7	25.6
2	9112	Quality Check (Suraj)	17.3	29.1	20.0	39.9	26.6
3	9113	RAH 1071	16.3	27.1	19.0	34.9	24.3
4	9114	ZC (Phule Yamuna)	33.7	34.7	26.0	39.5	33.5
5	9115	CPD-1501	30.7	42.1	32.0	43.9	37.2
6	9116	LC	26.0	20.2	29.0	46.1	30.3
7	9117	SIMA 5	22.3	33.3	25.0	40.1	30.2

Br 04a – Coordinated Varietal Trial - G. hirsutum (Central Zone)

Boll weight (g)

S. No.	Code No.	Entries	Surat	Junagarh	Rahuri	Bhawanipatna	Mean CZ
1	9111	TCH 1828	4.2	4.5	3.4	5.3	4.3
2	9112	Quality Check (Suraj)	4.1	3.7	3.4	5.2	4.1
3	9113	RAH 1071	4.1	4.3	3.4	5.4	4.3
4	9114	ZC (Phule Yamuna)	3.7	3.6	3.4	3.7	3.6
5	9115	CPD-1501	3.7	2.9	3.4	4.3	3.6
6	9116	LC	4.4	5.1	3.4	4.8	4.4
7	9117	SIMA 5	4.2	3.4	3.4	4.9	4.0

Br 05a – Coordinated Hybrid Trial - Intra *hirsutum* (Central Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Banswara	Surat	Talod#	Junagadh	Rahuri	Mean CZ	Rank
1	9121	ZC (Phule Asmita)	1775	2948		2392	2192	2327	3
2	9122	GSHH 15032	2192	2974		2562	1948	2419	1
3	9123	LC	2154	2982		2500	1898	2383	2
4	9124	GJHH 13	1646	2921		1821	2035	2106	4
		CD @ 5 %	208	NS		438	685		
		CV %	7	14		14	13		
		Local Checks	**G. Cot. Hy. 14**	**G. Cot. Hy. 14**	**G. Cot. Hy. 14**	**G. Cot. Hy. 14**	**Phule Suman**		

#Poor yield- data rejected

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Banswara	Surat	Junagadh	Rahuri	Mean CZ
1	9121	ZC (Phule Asmita)	552	988	856	804	800
2	9122	GSHH 15032	728	1020	941	1189	970
3	9123	LC	758	1023	910	1167	965
4	9124	GJHH 13	544	885	617	709	689

Br 05a – Coordinated Hybrid Trial - Intra *hirsutum* (Central Zone)

Ginning outturn (%)

S. No.	Code No.	Entries	Banswara	Surat	Junagadh	Rahuri	Mean CZ
1	9121	ZC (Phule Asmita)	31.1	33.5	35.8	36.7	34.3
2	9122	GSHH 15032	33.2	34.3	36.8	-	34.8
3	9123	LC	35.2	34.3	36.3	-	35.3
4	9124	GJHH 13	33.1	30.3	33.9	34.8	33.0

Bolls/plant

S. No.	Code No.	Entries	Banswara	Surat	Junagadh	Rahuri	Mean CZ
1	9121	ZC (Phule Asmita)	46.7	38.0	35.5	23.0	35.8
2	9122	GSHH 15032	52.4	45.0	45.2	22.0	41.2
3	9123	LC	44.8	43.0	33.8	23.0	36.2
4	9124	GJHH 13	57.4	36.0	27.7	23.0	36.0

Boll weight (g)

S. No.	Code No.	Entries	Banswara	Surat	Junagadh	Rahuri	Mean CZ
1	9121	ZC (Phule Asmita)	4.3	4.3	3.8	3.0	3.9
2	9122	GSHH 15032	4.2	3.6	3.2	3.0	3.5
3	9123	LC	3.2	3.9	4.2	3.0	3.6
4	9124	GJHH 13	4.4	4.4	3.8	3.0	3.9

Br 06a – CVT of Compact genotypes (Central Zone) (Irrigated)

Total Seed Cotton Yield at 160 DAS (Total of 130 DAS + 160 DAS) (Kg/ha)

S. No.	Code No.	Entries	Banswara	Talod#	Junagadh	Rahuri	Khandwa	Bhawanipatna	Mean CZ	Rank
1	9131	GJHV 534	2162		1955	2055	756	1690	1724	8
2	9132	RHC-HD 1438	2295		2160	2255	860	2010	1916	3
3	9133	Local Check	2278		1183	2598	571	2205	1767	6
4	9134	SHC 374	1942		1938	2471	628	2043	1804	4
5	9135	DS C 1801	1794		1612	1982	597	2525	1702	9
6	9136	RHC HD 1420	2081		2023	2584	534	1748	1794	5
7	9137	Zonal check (Suraj)	1950		1458	2449	509	2392	1752	7
8	9138	RHC HD 1406	2172		2486	2644	793	1815	1982	2
9	9139	TCH 1897	2212		2881	2326	683	2237	2068	1
		CD @ 5 %	282		330	430	129	363		
		CV %	8		10	10	12	10		
		Local Checks	**Wagad Kalyan**	**G.Cot.20**	**G.Cot.20**	**Phule 688**	**NH 615**	**Suraj**		

#Poor yield- data rejected

Seed Cotton Yield (130 DAS) (Kg/ha)

S. No.	Code No.	Entries	Banswara	Bhawanipatna	Mean CZ
1	9131	GJHV 534	854	1227	1041
2	9132	RHC-HD 1438	966	1154	1060
3	9133	Local Check	840	1412	1126
4	9134	SHC 374	814	1325	1070
5	9135	DS C 1801	792	1843	1318
6	9136	RHC HD 1420	928	1030	979
7	9137	Zonal check (Suraj)	1024	1684	1354
8	9138	RHC HD 1406	832	1082	957
9	9139	TCH 1897	885	1462	1174

Br 06a – CVT of Compact genotypes (Central Zone) (Irrigated)
Seed Cotton Yield (160 DAS) (Kg/ha)

S. No.	Code No.	Entries	Banswara	Bhawanipatna	Mean CZ
1	9131	GJHV 534	1308	463	886
2	9132	RHC-HD 1438	1329	856	1093
3	9133	Local Check	1437	793	1115
4	9134	SHC 374	1128	718	923
5	9135	DS C 1801	1002	683	843
6	9136	RHC HD 1420	1153	718	936
7	9137	Zonal check (Suraj)	926	708	817
8	9138	RHC HD 1406	1340	733	1037
9	9139	TCH 1897	1326	775	1051

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Banswara	Junagadh	Rahuri	Khandwa	Bhawanipatna	Mean CZ
1	9131	GJHV 534	659	637	668	253	635	570
2	9132	RHC-HD 1438	726	761	829	295	729	668
3	9133	Local Check	703	402	827	216	764	582
4	9134	SHC 374	624	676	850	229	719	620
5	9135	DS C 1801	665	560	711	227	850	603
6	9136	RHC HD 1420	658	742	971	197	640	642
7	9137	Zonal check (Suraj)	609	505	894	141	803	590
8	9138	RHC HD 1406	687	878	920	282	615	676
9	9139	TCH 1897	688	1022	1553	232	816	862

Ginning outturn (%)

S. No.	Code No.	Entries	Banswara	Junagadh	Rahuri	Khandwa	Bhawanipatna	Mean CZ
1	9131	GJHV 534	30.5	32.6	32.5	33.5	37.5	33.3
2	9132	RHC-HD 1438	31.6	35.2	36.7	34.3	36.3	34.8
3	9133	Local Check	30.9	33.9	31.8	37.9	34.7	33.8
4	9134	SHC 374	32.1	34.9	34.4	36.5	35.2	34.6
5	9135	DS C 1801	37.1	34.6	35.8	38.0	33.7	35.8
6	9136	RHC HD 1420	31.7	36.7	37.6	37.0	36.6	35.9
7	9137	Zonal check (Suraj)	31.2	34.7	36.5	27.8	33.6	32.8
8	9138	RHC HD 1406	31.7	35.3	34.8	35.6	33.9	34.3
9	9139	TCH 1897	31.1	35.4	-	34.0	36.4	34.2

Br 06a – CVT of Compact genotypes (Central Zone) (Irrigated)

No. of bolls/m^2

S. No.	Code No.	Entries	Banswara	Junagadh	Khandwa	Bhawanipatna	Mean CZ
1	9131	GJHV 534	214.0	104.0	144.0	138.3	150.1
2	9132	RHC-HD 1438	180.0	99.2	198.4	160.3	159.5
3	9133	Local Check	217.7	75.2	210.4	156.3	164.9
4	9134	SHC 374	182.0	99.2	176.0	164.0	155.3
5	9135	DS C 1801	197.0	124.8	170.4	173.0	166.3
6	9136	RHC HD 1420	199.7	100.0	189.6	155.3	161.1
7	9137	ZC (Suraj)	219.0	99.2	157.6	181.3	164.3
8	9138	RHC HD 1406	214.3	135.2	198.4	162.7	177.7
9	9139	TCH 1897	207.7	124.8	207.2	177.7	179.3

Plant height (cm)

S. No.	Code No.	Entries	Banswara	Rahuri	Khandwa	Bhawanipatna	Mean CZ
1	9131	GJHV 534	146.1	156.1	132.5	119.3	138.5
2	9132	RHC-HD 1438	160.0	105.9	117.9	117.9	125.4
3	9133	Local Check	171.1	120.0	123.9	130.3	136.3
4	9134	SHC 374	150.3	103.7	112.9	124.4	122.8
5	9135	DS C 1801	116.3	97.7	119.3	123.7	114.2
6	9136	RHC HD 1420	125.6	136.2	117.6	123.3	125.7
7	9137	Zonal check (Suraj)	136.7	117.1	126.7	126.9	126.9
8	9138	RHC HD 1406	126.7	122.8	117.9	129.3	124.2
9	9139	TCH 1897	150.6	135.1	126.6	111.5	130.9

No. of monopodia / plant

S. No.	Code No.	Entries	Banswara	Rahuri	Khandwa	Bhawanipatna	Mean CZ
1	9131	GJHV 534	2.2	0.7	0.1	3.1	1.5
2	9132	RHC-HD 1438	1.9	0.5	0.1	2.1	1.1
3	9133	Local Check	1.9	0.5	0.0	2.8	1.3
4	9134	SHC 374	2.4	0.6	0.0	2.7	1.4
5	9135	DS C 1801	2.1	0.4	0.1	2.1	1.2
6	9136	RHC HD 1420	1.9	0.5	0.2	2.3	1.2
7	9137	Zonal check (Suraj)	0.9	0.3	0.0	2.5	0.9
8	9138	RHC HD 1406	0.8	0.3	0.1	1.9	0.8
9	9139	TCH 1897	2.1	0.3	0.1	2.0	1.1

Br 06a – CVT of Compact genotypes (Central Zone) (Irrigated)

No. of sympodia / plant

S. No.	Code No.	Entries	Banswara#	Rahuri	Khandwa	Bhawanipatna	Mean CZ
1	9131	GJHV 534	19.0	12.7	17.8	13.3	15.7
2	9132	RHC-HD 1438	22.9	8.5	16.3	13.9	15.4
3	9133	Local Check	27.8	13.9	15.7	13.5	17.7
4	9134	SHC 374	18.2	13.3	17.1	12.9	15.4
5	9135	DS C 1801	17.7	9.7	18.1	13.5	14.7
6	9136	RHC HD 1420	20.3	16.5	18.6	14.5	17.5
7	9137	Zonal check (Suraj)	20.4	14.5	16.7	13.7	16.3
8	9138	RHC HD 1406	17.8	9.7	17.2	13.5	14.5
9	9139	TCH 1897	21.4	16.7	19.0	13.3	17.6

Boll weight (g)

S. No.	Code No.	Entries	Banswara#	Junagadh	Rahuri	Khandwa	Bhawanipatna	Mean CZ
1	9131	GJHV 534	3.7	3.0	3.6	2.8	5.1	3.6
2	9132	RHC-HD 1438	3.8	3.3	3.3	2.8	4.4	3.5
3	9133	Local Check	4.2	3.0	3.4	2.5	4.8	3.6
4	9134	SHC 374	3.1	3.1	3.5	2.5	4.3	3.3
5	9135	DS C 1801	3.8	2.3	3.5	2.7	4.9	3.4
6	9136	RHC HD 1420	4.2	3.3	3.4	2.5	4.5	3.6
7	9137	Zonal check (Suraj)	4.1	2.6	3.3	2.6	4.3	3.4
8	9138	RHC HD 1406	4.4	2.7	3.3	2.6	4.3	3.5
9	9139	TCH 1897	4.1	3.3	3.3	3.1	4.3	3.6

Br 06a – CVT of Compact genotypes (Central Zone) (Irrigated)

Lint Index (g)

S. No.	Code No.	Entries	Banswara#	Junagadh	Rahuri	Khandwa	Bhawanipatna	Mean CZ
1	9131	GJHV 534	5.7	4.8	4.6	3.5	4.7	4.6
2	9132	RHC-HD 1438	4.8	5.1	5.2	3.6	5.8	4.9
3	9133	Local Check	4.3	6.0	4.5	3.9	5.1	4.8
4	9134	SHC 374	5.0	5.0	5.1	3.4	5.2	4.7
5	9135	DS C 1801	5.1	4.2	4.0	3.7	4.5	4.3
6	9136	RHC HD 1420	3.9	5.4	5.4	4.2	5.0	4.8
7	9137	Zonal check (Suraj)	4.3	5.1	5.3	2.8	5.3	4.6
8	9138	RHC HD 1406	4.3	5.2	4.9	3.8	4.3	4.5
9	9139	TCH 1897	5.2	5.6		3.9	5.9	5.1

Seed Index (g)

S. No.	Code No.	Entries	Banswara#	Junagadh	Rahuri	Khandwa	Bhawanipatna	Mean CZ
1	9131	GJHV 534	9.0	9.9	9.6	6.9	7.7	8.6
2	9132	RHC-HD 1438	9.1	9.4	9.0	6.8	10.1	8.9
3	9133	Local Check	10.2	11.6	9.6	6.4	9.6	9.5
4	9134	SHC 374	8.4	9.2	9.7	5.9	9.5	8.5
5	9135	DS C 1801	8.0	8.0	7.2	6.0	8.7	7.6
6	9136	RHC HD 1420	8.4	9.3	9.0	7.1	8.7	8.5
7	9137	Zonal check (Suraj)	8.4	9.6	9.3	7.4	10.5	9.0
8	9138	RHC HD 1406	10.0	9.6	9.2	6.8	8.4	8.8
9	9139	TCH 1897	8.1	10.2	9.7	7.5	10.2	9.1

Br 13a – Preliminary Varietal Trial - *G. barbadense* (Central Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Anand	Rahuri	Mean CZ	Rank
1	9151	CCB 64	732	628	680	6
2	9152	DB-1701	717	606	662	7
3	9153	CCB 26	481	544	513	8
4	9154	DB 1801	913	723	818	2
5	9155	ZC (Phule Rukmai)	862	707	785	4
6	9156	DB-1601	770	710	740	5
7	9157	CCB 143B	949	625	787	3
8	9158	CCB 51-2	861	819	840	1
		CD @ 5 %	173	361		
		CV %	13	13		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Anand	Rahuri	Mean CZ
1	9151	CCB 64	215	208	212
2	9152	DB-1701	235	212	224
3	9153	CCB 26	155	172	163
4	9154	DB 1801	251	222	236
5	9155	ZC (Phule Rukmai)	261	233	247
6	9156	DB-1601	253	231	242
7	9157	CCB 143B	297	197	247
8	9158	CCB 51-2	272	263	267

Ginning outturn (%)

S. No.	Code No.	Entries	Anand	Rahuri	Mean CZ
1	9151	CCB 64	29.4	33.2	31.3
2	9152	DB-1701	32.6	35.0	33.8
3	9153	CCB 26	32.3	31.6	31.9
4	9154	DB 1801	27.5	30.7	29.1
5	9155	ZC (Phule Rukmai)	30.2	33.0	31.6
6	9156	DB-1601	32.8	32.6	32.7
7	9157	CCB 143B	31.2	31.4	31.3
8	9158	CCB 51-2	31.7	32.0	31.9

Br 13a – Preliminary Varietal Trial - *G. barbadense* (Central Zone)

Bolls/plant

S. No.	Code No.	Entries	Anand	Rahuri	Mean CZ
1	9151	CCB 64	28.8	29.0	28.9
2	9152	DB-1701	29.7	31.0	30.3
3	9153	CCB 26	27.8	25.0	26.4
4	9154	DB 1801	39.3	28.0	33.6
5	9155	ZC (Phule Rukmai)	27.7	22.0	24.8
6	9156	DB-1601	30.2	30.0	30.1
7	9157	CCB 143B	34.1	27.0	30.6
8	9158	CCB 51-2	31.7	31.0	31.4

Boll weight (g)

S. No.	Code No.	Entries	Anand	Rahuri	Mean CZ
1	9151	CCB 64	2.5	2.0	2.3
2	9152	DB-1701	2.0	2.2	2.1
3	9153	CCB 26	2.0	2.0	2.0
4	9154	DB 1801	2.0	2.3	2.1
5	9155	ZC (Phule Rukmai)	2.6	2.4	2.5
6	9156	DB-1601	2.4	2.5	2.4
7	9157	CCB 143B	2.6	2.5	2.6
8	9158	CCB 51-2	2.3	2.5	2.4

Br 15a - CHT - Interspecific Hybrid (*hirsutum* x *barbadense*) (Central Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Banswara	Anand	Rahuri	Mean CZ	Rank
1	9161	RHB 1002	1836	1362	1253	1484	5
2	9162	ZC (Phule Dhara)	1672	1977	1355	1668	2
3	9163	RHB 1623	1730	1827	1459	1672	1
4	9164	LC	1684	1687	1409	1593	4
5	9165	RHB 1624	1939	1527	1332	1599	3
		CD @ 5 %	176	304	1854		
		CV %	8	12	91		
		Local Checks	**DCH 32**	**G COT HB 102**	**Phule 388**		

Br 15a - CHT - Interspecific Hybrid (*hirsutum* x *barbadense*) (Central Zone)

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Banswara	Anand	Rahuri	Mean CZ
1	9161	RHB 1002	394	384	360	379
2	9162	ZC (Phule Dhara)	405	568	431	468
3	9163	RHB 1623	412	547	456	472
4	9164	LC	412	549	462	474
5	9165	RHB 1624	458	408	393	420

Ginning outturn (%)

S. No.	Code No.	Entries	Banswara	Anand	Rahuri	Mean CZ
1	9161	RHB 1002	21.5	28.1	28.7	26.1
2	9162	ZC (Phule Dhara)	24.2	28.7	31.8	28.2
3	9163	RHB 1623	23.8	30.0	31.3	28.3
4	9164	LC	24.5	32.6	32.8	29.9
5	9165	RHB 1624	23.6	26.6	29.5	26.6

Bolls/plant

S. No.	Code No.	Entries	Banswara	Anand	Rahuri	Mean CZ
1	9161	RHB 1002	36.7	26.6	38.0	33.8
2	9162	ZC (Phule Dhara)	43.8	40.1	42.0	42.0
3	9163	RHB 1623	37.4	32.4	44.0	37.9
4	9164	LC	38.9	34.6	38.0	37.2
5	9165	RHB 1624	38.5	31.9	45.0	38.5

Boll weight (g)

S. No.	Code No.	Entries	Banswara	Anand	Rahuri	Mean CZ
1	9161	RHB 1002	2.9	3.2	2.8	3.0
2	9162	ZC (Phule Dhara)	2.8	3.5	2.9	3.0
3	9163	RHB 1623	3.0	3.1	2.7	2.9
4	9164	LC	2.6	2.7	2.5	2.6
5	9165	RHB 1624	3.6	3.1	2.7	3.1

Br 03b – Preliminary Variety Trial - *G. hirsutum* (Central Zone) (Rainfed)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Banswara	Bharuch	Akola	Nagpur	Nanded	Mean CZ	Rank
1	9171	BS 3-17	1698	1331	1307	1484	1817	1527	2
2	9172	RAH 1075	1241	939	1222	1581	842	1165	12
3	9173	CPD-1751	1326	1250	1355	1440	1055	1285	8
4	9174	LC	1543	1370	1273	1572	982	1348	6
5	9175	NH 704	1646	1199	1903	1915	2087	1750	1
6	9176	NDLH – 2035-5	1489	1391	1723	1625	1084	1462	3
7	9177	CPD-1752	1278	1057	1201	1499	949	1197	11
8	9178	Quality Check (Suraj)	1343	857	1499	1456	862	1203	10
9	9179	AKH 10-3	1411	1105	1358	1715	998	1317	7
10	9180	NDLH – 2057-1	1491	1117	1443	1676	1088	1363	5
11	9181	ZC (NH 615)	1670	1065	1132	1661	1313	1368	4
12	9182	RHC 1307	1417	1006	1453	1137	1272	1257	9
		CD @ 5 %	225	283	379		191		
		CV %	11	14	12		9		
		Local Checks	**WagadKalyan**	**G Cot 26**	**AKH 8828**	**AKH 8828**	**NH 545**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Banswara	Bharuch	Akola	Nagpur	Nanded	Mean CZ
1	9171	BS 3-17	597	460	465	533	612	533
2	9172	RAH 1075	430	351	414	598	303	419
3	9173	CPD-1751	430	419	491	503	417	452
4	9174	LC	505	492	459	561	341	472
5	9175	NH 704	580	433	689	755	749	641
6	9176	NDLH – 2035-5	494	432	608	585	355	495
7	9177	CPD-1752	390	372	431	559	348	420
8	9178	Quality Check (Suraj)	443	289	538	511	309	418
9	9179	AKH 10-3	459	367	490	609	329	451
10	9180	NDLH – 2057-1	511	379	521	612	363	477
11	9181	ZC (NH 615)	542	396	390	659	512	500
12	9182	RHC 1307	459	350	525	389	450	435

Br 03b – Preliminary Variety Trial - *G. hirsutum* (Central Zone) (Rainfed)

Ginning outturn (%)

S. No.	Code No.	Entries	Banswara	Bharuch	Akola	Nagpur	Nanded	Mean CZ
1	9171	BS 3-17	35.2	34.6	35.5	35.9	33.7	35.0
2	9172	RAH 1075	34.6	37.4	33.9	37.8	36.0	35.9
3	9173	CPD-1751	32.4	33.5	36.3	34.9	39.5	35.3
4	9174	LC	32.7	35.9	36.1	35.7	34.8	35.0
5	9175	NH 704	35.2	36.1	36.1	39.4	35.9	36.5
6	9176	NDLH – 2035-5	33.1	31.0	35.1	36.0	32.7	33.6
7	9177	CPD-1752	30.6	35.2	35.9	37.3	36.7	35.1
8	9178	Quality Check (Suraj)	33.0	33.7	35.9	35.1	36.0	34.8
9	9179	AKH 10-3	32.5	33.2	36.0	35.5	33.0	34.0
10	9180	NDLH – 2057-1	34.2	34.0	36.1	36.5	33.4	34.8
11	9181	ZC (NH 615)	32.4	37.2	34.4	39.7	39.0	36.5
12	9182	RHC 1307	32.4	34.8	36.2	34.2	35.4	34.6

Bolls/plant

S. No.	Code No.	Entries	Banswara	Bharuch	Akola	Nagpur	Nanded	Mean CZ
1	9171	BS 3-17	17.2	19.7	15.6	18.4	17.7	17.7
2	9172	RAH 1075	21.0	14.2	14.5	19.9	12.9	16.5
3	9173	CPD-1751	23.0	23.7	14.3	20.1	12.1	18.6
4	9174	LC	21.9	24.0	16.6	21.3	14.2	19.6
5	9175	NH 704	18.8	21.8	19.8	21.7	14.3	19.3
6	9176	NDLH – 2035-5	24.6	21.8	15.5	23.1	12.9	19.6
7	9177	CPD-1752	19.2	17.5	17.4	21.4	15.1	18.1
8	9178	Quality Check (Suraj)	21.9	12.8	12.3	19.5	13.7	16.0
9	9179	AKH 10-3	27.3	16.3	15.6	21.9	17.6	19.7
10	9180	NDLH – 2057-1	23.2	16.3	19.6	19.8	12.8	18.3
11	9181	ZC (NH 615)	23.1	17.5	15.8	21.9	13.5	18.4
12	9182	RHC 1307	21.4	18.9	20.2	22.1	15.2	19.6

Br 03b – Preliminary Variety Trial - *G. hirsutum* (Central Zone) (Rainfed)

Boll weight (g)

S. No.	Code No.	Entries	Banswara	Bharuch	Akola	Nagpur	Nanded	Mean CZ
1	9171	BS 3-17	4.2	3.6	3.5	4.3	3.7	3.9
2	9172	RAH 1075	3.8	3.6	3.5	4.2	3.6	3.7
3	9173	CPD-1751	3.1	2.9	3.0	3.7	3.6	3.3
4	9174	LC	3.3	3.1	3.3	3.6	3.4	3.3
5	9175	NH 704	4.0	3.0	3.4	3.4	3.7	3.5
6	9176	NDLH – 2035-5	2.8	3.5	4.1	3.8	4.1	3.6
7	9177	CPD-1752	3.1	3.3	3.3	3.9	3.1	3.3
8	9178	Quality Check (Suraj)	3.7	3.6	3.7	4.2	3.7	3.8
9	9179	AKH 10-3	3.3	3.7	3.7	4.2	4.5	3.9
10	9180	NDLH – 2057-1	3.4	3.7	2.9	3.6	4.1	3.5
11	9181	ZC (NH 615)	3.7	3.3	3.5	3.7	3.9	3.6
12	9182	RHC 1307	3.0	2.9	3.4	3.7	4.0	3.4

Br 04b – Coordinated Varietal Trial - *G. hirsutum* (Central Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Banswara	Bharuch	Akola	Nanded	Mean CZ	Rank
1	9191	ZC (NH 615)	1440	1828	1071	1567	1476	2
2	9192	NDLH 20511	1204	2145	1409	1042	1450	3
3	9193	Local Check	1344	2012	1717	1066	1535	1
4	9194	CNH 11-11	1291	1391	1367	1237	1321	4
5	9195	Quality Check (Suraj)	1206	1120	1322	1214	1215	5
		CD @ 5 %	137	1364	998	238		
		CV %	7	17	18	13		
		Local Checks	**Wagad Kalyan**	**G Cot 26**	**AKH 8828**	**NH 545**		

Br 04b – Coordinated Varietal Trial - *G. hirsutum* (Central Zone)

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Banswara	Bharuch	Akola	Nanded	Mean CZ
1	9191	ZC (NH 615)	380	670	386	606	510.4
2	9192	NDLH 20511	326	782	504	366	494.5
3	9193	Local Check	343	694	617	412	516.4
4	9194	CNH 11-11	332	490	486	439	436.8
5	9195	Quality Check (Suraj)	325	378	458	439	400.0

Ginning outturn (%)

S. No.	Code No.	Entries	Banswara	Bharuch	Akola	Nanded	Mean CZ
1	9191	ZC (NH 615)	26.4	36.7	36.0	38.6	34.4
2	9192	NDLH 20511	27.1	36.5	35.9	35.1	33.7
3	9193	Local Check	25.5	34.5	36.0	38.6	33.7
4	9194	CNH 11-11	25.7	35.2	35.5	35.5	33.0
5	9195	Quality Check (Suraj)	27.0	33.8	34.7	36.2	32.9

Bolls/plant

S. No.	Code No.	Entries	Banswara	Bharuch	Akola	Nanded	Mean CZ
1	9191	ZC (NH 615)	23.8	45.3	17.9	14.1	25.3
2	9192	NDLH 20511	26.1	46.0	14.8	11.3	24.5
3	9193	Local Check	24.3	55.5	16.1	15.8	27.9
4	9194	CNH 11-11	20.3	66.5	17.2	17.0	30.2
5	9195	Quality Check (Suraj)	18.7	39.3	14.5	12.6	21.3

Boll weight (g)

S. No.	Code No.	Entries	Banswara	Bharuch	Akola	Nanded	Mean CZ
1	9191	ZC (NH 615)	3.3	3.3	3.0	3.8	3.3
2	9192	NDLH 20511	2.9	3.8	3.2	4.3	3.5
3	9193	Local Check	3.0	3.0	3.0	3.1	3.0
4	9194	CNH 11-11	2.8	3.1	2.9	3.6	3.1
5	9195	Quality Check (Suraj)	3.3	4.0	3.8	4.2	3.8

Br 06b – CVT of Compact genotypes - (Central Zone) (Rainfed)

Total Seed Cotton Yield at 160 DAS (Total of 130 DAS + 160 DAS) (Kg/ha)

S. No.	Code No.	Entries	Surat	Akola	Nanded	Mean CZ	Rank
1	9201	AKH 1302	1901	820	1450	1390	6
2	9202	DSC 1851	2485	881	1669	1678	4
3	9203	RHC HD 1433	3108	1293	1950	2117	1
4	9204	Local Check	2447	773	1662	1627	5
5	9205	RAHC 1029	2373	470	1179	1341	7
6	9206	AKH 1301	1726	744	1347	1272	9
7	9207	GISV 312	2808	945	1933	1895	3
8	9208	ZC (Suraj)	1480	832	1551	1288	8
9	9209	RHC HD 1406	2894	1058	1995	1982	2
		CD @ 5 %	330	412	289		
		CV %	8	13	10		
		Local Checks	**G.Cot.20**	**AKH 8828**	**NH 615**		

Seed Cotton Yield (130 DAS) (Kg/ha)

S. No.	Code No.	Entries	Surat	Akola	Nanded	Mean CZ
1	9201	AKH 1302	1188	580	527	765
2	9202	DSC 1851	1608	670	484	921
3	9203	RHC HD 1433	2287	897	505	1230
4	9204	Local Check	1567	511	494	857
5	9205	RAHC 1029	1244	269	382	632
6	9206	AKH 1301	962	439	528	643
7	9207	GISV 312	1702	683	482	956
8	9208	ZC (Suraj)	743	608	557	636
9	9209	RHC HD 1406	2148	759	477	1128

Seed Cotton Yield (160 DAS) (Kg/ha)

S. No.	Code No.	Entries	Surat	Akola	Nanded	Mean CZ
1	9201	AKH 1302	713	240	922	625
2	9202	DSC 1851	877	212	1185	758
3	9203	RHC HD 1433	821	396	1446	888
4	9204	Local Check	881	262	1168	770
5	9205	RAHC 1029	1129	201	841	724
6	9206	AKH 1301	764	305	819	629
7	9207	GISV 312	1106	261	1451	939
8	9208	ZC (Suraj)	736	224	994	651
9	9209	RHC HD 1406	746	298	1517	854

Br 06b – CVT of Compact genotypes - (Central Zone) (Rainfed)

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Surat	Akola	Nanded	Mean CZ
1	9201	AKH 1302	675	279	502	485
2	9202	DSC 1851	900	319	591	603
3	9203	RHC HD 1433	1162	465	696	774
4	9204	Local Check	817	261	632	570
5	9205	RAHC 1029	759	165	391	438
6	9206	AKH 1301	606	257	507	457
7	9207	GISV 312	1188	340	787	772
8	9208	ZC (Suraj)	517	294	550	454
9	9209	RHC HD 1406	987	370	692	683

Ginning outturn (%)

S. No.	Code No.	Entries	Surat	Akola	Nanded	Mean CZ
1	9201	AKH 1302	35.5	34.1	34.6	34.7
2	9202	DSC 1851	36.2	36.3	35.5	36.0
3	9203	RHC HD 1433	37.4	35.9	35.7	36.3
4	9204	Local Check	33.4	33.7	37.9	35.0
5	9205	RAHC 1029	32.0	35.1	33.0	33.4
6	9206	AKH 1301	35.1	34.6	37.7	35.8
7	9207	GISV 312	42.3	35.9	40.8	39.7
8	9208	ZC (Suraj)	34.9	35.3	35.4	35.2
9	9209	RHC HD 1406	34.1	35.1	34.8	34.7

No. of bolls/m^2

S. No.	Code No.	Entries	Surat	Akola	Nanded	Mean CZ
1	9201	AKH 1302	58.0	88.1	108.6	84.9
2	9202	DSC 1851	71.9	111.8	89.4	91.1
3	9203	RHC HD 1433	80.8	132.9	99.9	104.5
4	9204	Local Check	77.9	103.6	90.1	90.5
5	9205	RAHC 1029	65.7	161.2	90.9	105.9
6	9206	AKH 1301	46.7	111.8	84.0	80.9
7	9207	GISV 312	85.0	127.9	88.7	100.5
8	9208	ZC (Suraj)	33.7	114.6	77.7	75.3
9	9209	RHC HD 1406	77.1	115.1	93.1	95.1

Br 06b – CVT of Compact genotypes - (Central Zone) (Rainfed)

Plant height (cm)

S. No.	Code No.	Entries	Surat	Akola	Nanded	Mean CZ
1	9201	AKH 1302	126.5	91.1	133.3	117.0
2	9202	DSC 1851	103.0	77.2	141.7	107.3
3	9203	RHC HD 1433	102.7	82.2	111.7	98.8
4	9204	Local Check	109.0	98.3	115.7	107.7
5	9205	RAHC 1029	96.7	85.0	98.7	93.5
6	9206	AKH 1301	132.2	96.1	143.0	123.8
7	9207	GISV 312	98.9	75.0	121.5	98.5
8	9208	ZC (Suraj)	102.6	81.1	121.7	101.8
9	9209	RHC HD 1406	113.5	88.3	123.7	108.5

Days to 1st boll bursting

S. No.	Code No.	Entries	Surat	Nanded	Mean CZ
1	9201	AKH 1302	116.0	105.0	110.5
2	9202	DSC 1851	111.0	104.0	107.5
3	9203	RHC HD 1433	105.0	103.3	104.2
4	9204	Local Check	113.0	105.3	109.2
5	9205	RAHC 1029	114.0	107.7	110.8
6	9206	AKH 1301	120.0	106.0	113.0
7	9207	GISV 312	109.0	102.3	105.7
8	9208	ZC (Suraj)	120.0	107.0	113.5
9	9209	RHC HD 1406	108.0	103.0	105.5

No. of monopodia / plant

S. No.	Code No.	Entries	Surat	Akola	Nanded	Mean CZ
1	9201	AKH 1302	0.5	0.6	0.7	0.6
2	9202	DSC 1851	0.5	0.3	0.6	0.5
3	9203	RHC HD 1433	0.7	1.0	0.7	0.8
4	9204	Local Check	0.5	0.6	0.9	0.7
5	9205	RAHC 1029	0.5	0.9	1.1	0.8
6	9206	AKH 1301	0.5	0.6	1.0	0.7
7	9207	GISV 312	0.4	0.3	0.5	0.4
8	9208	ZC (Suraj)	0.3	0.4	0.7	0.5
9	9209	RHC HD 1406	0.4	0.2	0.6	0.4

No. of sympodia / plant

S. No.	Code No.	Entries	Surat	Akola	Nanded	Mean CZ
1	9201	AKH 1302	18.3	13.8	17.7	16.6
2	9202	DSC 1851	16.3	12.3	16.5	15.0
3	9203	RHC HD 1433	18.3	13.9	14.1	15.4
4	9204	Local Check	16.3	13.0	14.3	14.5
5	9205	RAHC 1029	20.5	14.2	14.2	16.3
6	9206	AKH 1301	18.5	13.8	14.2	15.5
7	9207	GISV 312	16.0	12.1	13.9	14.0
8	9208	ZC (Suraj)	19.0	12.6	14.3	15.3
9	9209	RHC HD 1406	17.7	13.7	15.3	15.6

Br 06b – CVT of Compact genotypes - (Central Zone) (Rainfed)

Boll weight (g)

S. No.	Code No.	Entries	Surat	Akola	Nanded	Mean CZ
1	9201	AKH 1302	3.48	2.83	3.62	3.3
2	9202	DSC 1851	3.67	3.00	3.82	3.5
3	9203	RHC HD 1433	4.08	3.17	3.99	3.7
4	9204	Local Check	3.32	3.27	4.39	3.7
5	9205	RAHC 1029	3.83	3.23	3.85	3.6
6	9206	AKH 1301	3.89	3.30	4.34	3.8
7	9207	GISV 312	3.49	3.57	4.21	3.8
8	9208	ZC (Suraj)	4.67	2.87	4.28	3.9
9	9209	RHC HD 1406	4.00	3.20	4.33	3.8

Lint Index (g)

S. No.	Code No.	Entries	Surat	Akola	Nanded	Mean CZ
1	9201	AKH 1302	4.1	3.9	4.2	4.1
2	9202	DSC 1851	4.8	4.0	4.9	4.6
3	9203	RHC HD 1433	5.7	4.5	5.1	5.1
4	9204	Local Check	4.0	3.7	4.7	4.1
5	9205	RAHC 1029	4.5	4.0	3.9	4.1
6	9206	AKH 1301	5.1	4.2	5.8	5.1
7	9207	GISV 312	5.9	3.9	5.3	5.0
8	9208	ZC (Suraj)	5.1	4.4	5.6	5.0
9	9209	RHC HD 1406	4.7	4.1	4.7	4.5

Seed Index (g)

S. No.	Code No.	Entries	Surat	Akola	Nanded	Mean CZ
1	9201	AKH 1302	7.5	7.5	8.0	7.7
2	9202	DSC 1851	8.5	7.0	8.9	8.1
3	9203	RHC HD 1433	9.5	8.0	9.1	8.9
4	9204	Local Check	8.0	7.3	7.7	7.7
5	9205	RAHC 1029	9.5	7.3	8.0	8.3
6	9206	AKH 1301	9.5	8.0	9.6	9.0
7	9207	GISV 312	8.0	7.0	7.7	7.6
8	9208	ZC (Suraj)	9.5	8.0	10.1	9.2
9	9209	RHC HD 1406	9.0	7.5	8.8	8.4

Br 24b – Coordinated Variety Trial - *G. arboreum* - (Central Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Amreli	Khandwa	Nagpur	Akola	Jalgaon	Parbhani	Mean CZ	Rank
1	9221	CNA 1054	1893	779	2108	1462	2282	1336	1643	1
2	9222	AKA 14-51	1798	650	1737	1474	1650	929	1373	8
3	9223	MDL 2667	1697	583	1502	1511	1655	1179	1355	10
4	9224	MDL 2663	1902	794	1329	1788	1414	1317	1424	6
5	9225	LC	2145	578	1593	1059	2198	946	1420	7
6	9226	JLA-1207	2156	769	1921	1535	1983	1098	1577	4
7	9227	GAM 259	2052	687	1458	1500	1952	1489	1523	5
8	9228	ZC (AKA 7)	2179	643	760	1352	2111	1134	1363	9
9	9229	DWDa 1802	2128	773	1517	1474	2441	1458	1632	3
10	9230	CNA 1031	2170	736	2103	1645	1847	1335	1639	2
		CD @ 5 %	218	169	372	485	518	202		
		CV %	6	15	14	14	15	10		
		Local Checks	**G Cot 19**	**JK 5**	**AKA 8**	**AKA 8**	**JLA 794**	**PA 402**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Amreli	Khandwa	Nagpur	Akola	Jalgaon	Parbhani	Mean CZ
1	9221	CNA 1054	614	259	685	530	776	498	560
2	9222	AKA 14-51	667	202	636	523	611	397	506
3	9223	MDL 2667	612	166	578	531	579	472	490
4	9224	MDL 2663	660	262	470	641	500	502	506
5	9225	LC	700	162	620	374	777	377	502
6	9226	JLA-1207	740	246	647	517	714	425	548
7	9227	GAM 259	705	198	494	511	683	591	530
8	9228	ZC (AKA 7)	852	211	292	477	851	495	530
9	9229	DWDa 1802	749	258	539	531	871	558	584
10	9230	CNA 1031	768	250	780	585	671	508	594

Br 24b – Coordinated Variety Trial - *G. arboreum* - (Central Zone)

Ginning outturn (%)

S. No.	Code No.	Entries	Amreli	Khandwa	Nagpur	Akola	Jalgaon	Parbhani	Mean CZ
1	9221	CNA 1054	32.5	33.2	32.5	36.3	34.0	37.3	34.3
2	9222	AKA 14-51	37.2	31.0	36.6	35.5	37.0	42.7	36.7
3	9223	MDL 2667	36.0	28.4	38.5	35.3	35.0	40.0	35.5
4	9224	MDL 2663	34.6	33.0	35.4	35.8	35.3	38.1	35.4
5	9225	LC	32.7	28.0	38.9	35.3	35.3	39.8	35.0
6	9226	JLA-1207	34.3	32.0	33.7	33.7	36.0	38.8	34.8
7	9227	GAM 259	34.3	28.9	33.9	34.1	35.0	39.7	34.3
8	9228	ZC (AKA 7)	39.0	32.9	38.4	35.2	40.3	43.6	38.2
9	9229	DWDa 1802	35.2	33.4	35.5	36.1	35.7	38.4	35.7
10	9230	CNA 1031	35.4	33.9	37.1	35.6	36.3	38.1	36.1

Bolls/plant

S. No.	Code No.	Entries	Amreli	Khandwa	Nagpur	Akola	Jalgaon	Parbhani	Mean CZ
1	9221	CNA 1054	25.0	56.6	31.9	19.4	26.0	15.8	29.1
2	9222	AKA 14-51	29.0	50.7	27.5	16.3	26.4	11.1	26.8
3	9223	MDL 2667	28.0	38.1	28.5	17.8	26.8	14.1	25.5
4	9224	MDL 2663	22.0	56.1	23.3	19.8	24.6	15.0	26.8
5	9225	LC	35.0	34.0	34.1	18.3	25.0	11.6	26.3
6	9226	JLA-1207	27.0	59.8	39.9	14.8	25.8	12.3	29.9
7	9227	GAM 259	30.0	53.9	30.5	18.2	26.2	16.3	29.2
8	9228	ZC (AKA 7)	23.0	46.6	22.5	18.0	23.2	13.0	24.4
9	9229	DWDa 1802	33.0	66.7	40.5	17.6	28.8	16.1	33.8
10	9230	CNA 1031	32.0	54.3	36.3	18.4	25.4	14.5	30.1

Boll weight (g)

S. No.	Code No.	Entries	Amreli	Khandwa	Nagpur	Akola	Jalgaon	Parbhani	Mean CZ
1	9221	CNA 1054	2.3	2.1	2.8	2.7	2.7	2.5	2.5
2	9222	AKA 14-51	2.4	2.2	3.1	2.7	2.7	2.5	2.6
3	9223	MDL 2667	2.9	2.4	3.4	3.5	2.5	2.7	2.9
4	9224	MDL 2663	2.7	2.2	2.9	2.9	2.6	2.7	2.7
5	9225	LC	2.0	2.1	3.0	2.4	2.6	2.7	2.5
6	9226	JLA-1207	2.4	2.3	2.5	2.6	2.8	2.5	2.5
7	9227	GAM 259	2.2	2.3	2.4	2.8	2.5	2.4	2.4
8	9228	ZC (AKA 7)	2.7	2.6	2.3	2.6	2.7	2.5	2.6
9	9229	DWDa 1802	2.3	2.5	2.6	2.6	2.3	2.6	2.5
10	9230	CNA 1031	2.4	2.2	2.9	3.0	2.9	2.7	2.7

Br 24b (LL) – CVT- Long Linted *G. arboreum* - (CZ) (Rainfed)
Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Amreli	Khandwa	Nagpur	Akola	Jalgaon	Parbhani	Mean CZ	Rank
1	9231	PA 809	1584	680	1780	1038	1516	1249	1308	9
2	9232	PA 842	1855	699	1740	923	1725	1182	1354	7
3	9233	PAIG 379	1706	669	2072	1123	2252	1479	1550	3
4	9234	PAIG 380	1496	697	1972	1092	2237	1520	1502	4
5	9235	PAIG 384	1358	714	1652	1048	1418	1372	1260	10
6	9236	PA 806	1373	722	1291	755	1566	1218	1154	12
7	9237	PAIG 377	1313	734	1735	939	1868	942	1255	11
8	9238	PA 839	1736	700	1536	980	1897	1088	1323	8
9	9239	PA 837	1887	735	1595	1192	1829	1504	1457	5
10	9240	PAIG 373	1612	664	2037	1196	2236	1563	1551	1
11	9241	QC (PA 255)	1659	692	1684	1218	1767	1454	1412	6
12	9242	CNA 1065	1681	695	2413	1615	1564	1339	1551	1
		CD @ 5 %	351	159	477	319	311	175		
		CV %	13	14	16	13	14	8		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Amreli	Khandwa	Nagpur	Akola	Jalgaon	Parbhani	Mean CZ
1	9231	PA 809	531	197	618	372	485	449	442
2	9232	PA 842	662	212	550	328	581	434	461
3	9233	PAIG 379	603	193	700	380	781	569	538
4	9234	PAIG 380	538	220	670	397	768	549	524
5	9235	PAIG 384	475	229	524	367	468	502	428
6	9236	PA 806	465	238	403	270	491	435	384
7	9237	PAIG 377	449	205	571	345	592	345	418
8	9238	PA 839	639	207	521	355	658	407	465
9	9239	PA 837	675	222	544	429	604	552	504
10	9240	PAIG 373	559	198	680	435	745	589	534
11	9241	QC (PA 255)	580	219	603	428	642	547	503
12	9242	CNA 1065	588	193	861	571	527	483	537

Br 24b (LL) – CVT- Long Linted *G. arboreum* - (CZ) (Rainfed)

Ginning outturn (%)

S. No.	Code No.	Entries	Amreli	Khandwa	Nagpur	Akola	Jalgaon	Parbhani	Mean CZ
1	9231	PA 809	33.6	29.0	34.7	35.9	32.0	36.0	33.5
2	9232	PA 842	35.7	30.3	31.6	35.4	33.7	36.7	33.9
3	9233	PAIG 379	35.4	28.9	33.8	33.9	34.7	38.5	34.2
4	9234	PAIG 380	35.9	31.6	34.0	36.4	34.3	36.1	34.7
5	9235	PAIG 384	35.1	32.0	31.7	35.0	33.0	36.6	33.9
6	9236	PA 806	33.8	33.0	31.2	35.7	31.3	35.8	33.5
7	9237	PAIG 377	34.2	27.9	32.9	36.7	31.7	36.6	33.3
8	9238	PA 839	36.8	29.5	33.9	36.2	34.7	37.4	34.7
9	9239	PA 837	35.8	30.2	34.1	35.9	33.0	36.7	34.3
10	9240	PAIG 373	34.7	29.8	33.4	36.4	33.3	37.6	34.2
11	9241	QC (PA 255)	34.9	31.6	35.8	35.1	36.3	37.6	35.2
12	9242	CNA 1065	35.0	27.8	35.7	35.3	33.7	36.1	33.9

Bolls/plant

S. No.	Code No.	Entries	Amreli	Khandwa	Nagpur	Akola	Jalgaon	Parbhani	Mean CZ
1	9231	PA 809	28.0	61.2	39.0	13.6	19.8	14.2	29.3
2	9232	PA 842	31.0	62.1	39.4	9.9	20.2	13.5	29.4
3	9233	PAIG 379	25.0	53.4	32.9	15.8	27.2	16.6	28.5
4	9234	PAIG 380	30.0	53.6	39.6	12.4	26.4	16.9	29.8
5	9235	PAIG 384	25.0	61.6	47.1	12.6	20.2	15.5	30.3
6	9236	PA 806	27.0	62.2	40.7	12.7	22.2	14.3	29.9
7	9237	PAIG 377	26.0	61.2	35.9	11.9	22.0	11.1	28.0
8	9238	PA 839	26.0	64.5	40.0	10.4	25.0	12.5	29.7
9	9239	PA 837	28.0	65.9	41.5	12.9	24.4	17.1	31.6
10	9240	PAIG 373	31.0	50.4	39.0	12.4	28.4	17.4	29.8
11	9241	QC (PA 255)	27.0	69.3	38.7	13.8	25.6	16.2	31.8
12	9242	CNA 1065	31.0	64.7	44.0	16.3	25.2	15.3	32.8

Br 24b (LL) – CVT- Long Linted *G. arboreum* - (CZ) (Rainfed)

Boll weight (g)

S. No.	Code No.	Entries	Amreli	Khandwa	Nagpur	Akola	Jalgaon	Parbhani	Mean CZ
1	9231	PA 809	2.3	2.1	2.8	2.2	3.0	2.7	2.5
2	9232	PA 842	2.1	2.1	2.5	1.9	2.9	2.7	2.4
3	9233	PAIG 379	2.4	2.5	2.8	2.7	2.8	2.6	2.6
4	9234	PAIG 380	2.3	2.4	3.0	2.6	2.9	2.8	2.7
5	9235	PAIG 384	2.1	2.4	3.0	2.5	2.6	2.8	2.6
6	9236	PA 806	2.4	2.2	3.0	2.5	2.8	2.7	2.6
7	9237	PAIG 377	2.3	2.2	2.8	2.5	3.1	2.6	2.6
8	9238	PA 839	2.1	2.5	3.0	2.8	2.9	2.7	2.7
9	9239	PA 837	2.3	2.5	2.9	2.5	2.7	2.8	2.6
10	9240	PAIG 373	2.3	2.6	3.2	2.4	2.7	2.7	2.6
11	9241	QC (PA 255)	2.2	2.2	2.7	2.6	2.4	2.6	2.4
12	9242	CNA 1065	2.2	2.1	3.0	2.3	2.3	2.7	2.4

Br 25b – Coordinated Hybrid Trial of Desi Hybrid (Central Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Amreli	Akola	Jalgaon	Parbhani	Gangapur (Ajeet)	Pachora (Nirmal)	Mean CZ	Rank
1	9251	AJCH 102	2207	1305	1968	1393	2127	1279	1713	3
2	9252	NACH 560	2728	1534	2228	1578	1458	1656	1864	1
3	9253	LC	1871	1296	1492	1265	1161	1458	1424	5
4	9254	NACH 556	1986	1596	1703	1612	1660	1997	1759	2
5	9255	PKV DH 1 (ZC)	2024	1096	1429	1194	1686	1463	1482	4
		CD @ 5 %	353	398	315	172	246	259		
		CV %	11	16	12	8	10	11		
		Local Checks	G Cot MDH 11	PKV Suvarna	JLA 794	PKV Suvarna	PKV Suvarna	PKV Suvarna		

Br 25b – Coordinated Hybrid Trial of Desi Hybrid (Central Zone)

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Amreli	Akola	Jalgaon	Parbhani	Gangapur (Ajeet)	Pachora (Nirmal)	Mean CZ
1	9251	AJCH 102	798	474	722	552	801	530	646
2	9252	NACH 560	998	549	852	630	526	671	704
3	9253	LC	627	457	548	521	429	682	544
4	9254	NACH 556	814	580	700	708	627	815	707
5	9255	PKV DH 1 (ZC)	757	398	567	476	591	613	567

Ginning outturn (%)

S. No.	Code No.	Entries	Amreli	Akola	Jalgaon	Parbhani	Gangapur (Ajeet)	Pachora (Nirmal)	Mean CZ
1	9251	AJCH 102	36.2	36.3	36.7	39.6	38.0	40.8	37.9
2	9252	NACH 560	36.6	35.8	38.2	39.9	36.0	38.7	37.5
3	9253	LC	33.4	35.2	36.7	41.3	37.0	41.6	37.5
4	9254	NACH 556	41.0	36.3	41.1	44.0	38.0	40.4	40.1
5	9255	PKV DH 1 (ZC)	37.4	36.3	39.7	39.8	35.0	39.2	37.9

Bolls/plant

S. No.	Code No.	Entries	Amreli	Akola	Jalgaon	Parbhani	Gangapur (Ajeet)	Pachora (Nirmal)	Mean CZ
1	9251	AJCH 102	36.0	22.8	34.6	15.3	31.0	39.0	29.8
2	9252	NACH 560	28.0	21.5	38.4	16.7	23.0	41.0	28.1
3	9253	LC	25.0	24.8	28.4	14.3	20.0	38.0	25.1
4	9254	NACH 556	22.0	14.9	31.2	18.0	24.0	47.0	26.2
5	9255	PKV DH 1 (ZC)	33.0	23.9	24.2	13.8	27.0	41.0	27.2

Boll weight (g)

S. No.	Code No.	Entries	Amreli	Akola	Jalgaon	Parbhani	Gangapur (Ajeet)	Pachora (Nirmal)	Mean CZ
1	9251	AJCH 102	2.4	2.3	1.9	2.6	3.1	3.2	2.6
2	9252	NACH 560	3.0	2.9	1.9	2.8	2.5	3.6	2.8
3	9253	LC	2.3	2.3	1.7	2.7	2.4	2.8	2.4
4	9254	NACH 556	3.9	3.6	2.2	3.1	2.8	4.6	3.4
5	9255	PKV DH 1 (ZC)	2.2	2.5	2.1	2.6	3.0	4.4	2.8

Coordinated Varietal Trial of Naturally Coloured *G. hirsutum*

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Surat (I)	Nagpur (R)	Khandwa (I)	Mean CZ	Rank
1	9261	Phule Yamuna (ZC)	1874	1307	637	1273	1
2	9262	LHCC 4	741	1013	480	745	5
3	9263	Local Check	1277	1538	622	1146	2
4	9264	DHCC 1801	640	1342	503	828	4
5	9265	CNH 17395	1082	1428	458	989	3
		CD @ 5 %	182	319	126		
		CV %	11	16	16		
		Local Checks	**GN Cot 22**	**AKH 8828**	**JK 4**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Surat (I)	Nagpur (R)	Khandwa (I)	Mean CZ
1	9261	Phule Yamuna (ZC)	627	405	207	413
2	9262	LHCC 4	171	260	148	193
3	9263	Local Check	429	555	195	393
4	9264	DHCC 1801	195	448	151	265
5	9265	CNH 17395	376	510	124	337

Ginning outturn (%)

S. No.	Code No.	Entries	Surat (I)	Nagpur (R)	Khandwa (I)	Mean CZ
1	9261	Phule Yamuna (ZC)	33.5	31.0	32.5	32.3
2	9262	LHCC 4	23.1	25.7	30.9	26.6
3	9263	Local Check	33.6	36.1	31.3	33.7
4	9264	DHCC 1801	30.5	33.4	29.9	31.3
5	9265	CNH 17395	34.7	35.7	27.1	32.5

Bolls/plant

S. No.	Code No.	Entries	Surat (I)	Nagpur (R)	Khandwa (I)	Mean CZ
1	9261	Phule Yamuna (ZC)	40.2	19.3	21.7	27.1
2	9262	LHCC 4	15.2	18.2	13.9	15.8
3	9263	Local Check	22.9	19.4	22.2	21.5
4	9264	DHCC 1801	13.5	20.4	16.6	16.8
5	9265	CNH 17395	23.2	20.6	17.2	20.3

Boll weight (g)

S. No.	Code No.	Entries	Surat (I)	Nagpur (R)	Khandwa (I)	Mean CZ
1	9261	Phule Yamuna (ZC)	3.02	3.20	2.2	2.8
2	9262	LHCC 4	3.17	3.90	2.2	3.1
3	9263	Local Check	3.63	3.70	2.3	3.2
4	9264	DHCC 1801	3.10	3.50	1.9	2.8
5	9265	CNH 17395	3.03	3.70	2.0	2.9

Coordinated Varietal Trial of Naturally Coloured *G. arboreum*

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Surat	Nagpur	Nanded	Khandwa	Mean CZ	Rank
1	9271	CNA 17522	572	1555	1373	703	1051	1
2	9272	DDCC 1801	756	784	1318	759	904	4
3	9273	Local Check	689	1766	1037	692	904	4
4	9274	CNA 1091	644	1532	1013	664	1046	2
5	9275	AKA 7 (ZC)	637	779	1271	696	846	6
6	9276	DDCC 1802	852	1014	1117	716	925	3
		CD @ 5 %	105	549	253	102		
		CV %	10.0	29.4	14	10		
		Local Checks	**G Cot 19**	**AKA 8**	**PA 255**	**JK 5**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Surat	Nagpur	Nanded	Khandwa	Mean CZ
1	9271	CNA 17522	207	572	446	228	363
2	9272	DDCC 1801	248	237	356	272	278
3	9273	Local Check	231	705	327	210	278
4	9274	CNA 1091	217	507	293	192	368
5	9275	AKA 7 (ZC)	245	310	460	217	308
6	9276	DDCC 1802	283	280	287	236	272

Ginning outturn (%)

S. No.	Code No.	Entries	Surat	Nagpur	Nanded	Khandwa	Mean CZ
1	9271	CNA 17522	36.2	36.8	32.3	32.5	34.4
2	9272	DDCC 1801	33.0	30.2	26.8	35.9	31.5
3	9273	Local Check	33.5	39.9	31.5	30.3	33.8
4	9274	CNA 1091	33.6	33.1	29.0	28.9	31.1
5	9275	AKA 7 (ZC)	38.6	39.8	36.2	31.1	36.4
6	9276	DDCC 1802	33.3	27.6	25.7	33.0	29.9

Bolls/plant

S. No.	Code No.	Entries	Surat	Nagpur	Nanded	Khandwa	Mean CZ
1	9271	CNA 17522	16	31	11.2	54.8	28.3
2	9272	DDCC 1801	25	30	10.2	42.9	27.0
3	9273	Local Check	18	30	8.1	50.6	26.7
4	9274	CNA 1091	14	35	7.1	45.4	25.4
5	9275	AKA 7 (ZC)	13	26	9.6	48.7	24.2
6	9276	DDCC 1802	24	29	6.6	44.4	26.0

Boll weight (g)

S. No.	Code No.	Entries	Surat	Nagpur	Nanded	Khandwa	Mean CZ
1	9271	CNA 17522	1.80	2.50	2.7	2.1	2.3
2	9272	DDCC 1801	2.00	2.50	2.3	2.2	2.3
3	9273	Local Check	2.20	3.00	2.6	2.2	2.5
4	9274	CNA 1091	2.55	2.55	2.3	2.2	2.4
5	9275	AKA 7 (ZC)	2.65	2.65	2.7	2.1	2.5
6	9276	DDCC 1802	2.20	2.40	2.5	2.2	2.3

NATIONAL TRIALS – SOUTH ZONE

Br. 02a - Initial Evaluation Trial of *G. hirsutum* (Irrigated)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Raichur	B' Gudi	Arabhavi*	Lam	Adilabad	Coimbatore	Srivilliputhur	Mean SZ	Rank
1	201	CPD 1902	2439	2398		2897	2336	1855	1666	2265	4
2	202	GISV319	3109	1046		2350	2637	1586	1247	1996	13
3	203	RAH 1047	2481	1194		1609	2411	2003	1777	1913	24
4	204	CCH 19-2	2625	1113		1927	2304	2304	1964	2040	12
5	205	BS 8-19	2622	1299		1627	2186	2182	1696	1935	23
6	206	CPD 1901	2563	1369		2217	2376	1899	1471	1983	16
7	207	GJHV 557	2254	1229		2313	2399	2034	1527	1959	19
8	208	Zonal Check	2699	1568		2080	2193	1864	1916	2053	11
9	209	TSH 363	2155	671		2287	2348	1838	2417	1953	20
10	210	RB 614	2953	1160		2274	2625	1864	1789	2111	7
11	211	GTHV 15/34	2223	727		1733	3164	1841	-	1938	22
12	212	RHC 1419	2603	1157		1598	2556	2242	2251	2068	10
13	213	GISV 323	2774	3204		2674	2535	1756	1734	2446	1
14	214	ARBH 1901	2954	1120		1610	2051	2181	1844	1960	18
15	215	Quality Check	2430	1550		1957	2256	1673	2089	1993	14
16	216	RAH 1046	3003	2127		2656	2506	1849	1693	2306	3
17	217	BGDS 1047	2741	1501		2200	2449	2024	1640	2093	9
18	218	RB 615	2722	1505		2533	2162	2239	1492	2109	8
19	219	L 1527	3081	1283		3184	2172	1782	1509	2169	6
20	220	BS 7-19	2432	985		1855	2125	1843	1520	1793	25
21	221	SHS 234	2708	1600		1448	1945	1477	1442	1770	26
22	222	CCH 19-1	2355	1655		1814	1884	2164	1778	1942	21
23	223	Local Checks	2921	1356		1843	1995	1829	1944	1981	17
24	224	TSH 383	3050	1599		2404	2396	2373	2454	2379	2
25	225	RHC 1409	3366	819		2266	2314	2296	2215	2213	5
26	226	GJHV 566	3308	1510		1446	2006	2034	1624	1988	15
		CD @ 5 %	338	243		613	562	276	259		
		CV %	13	18		18	15	10	11		
		Zonal Check	BGDS 1063								
		Quality Check	Suraj								
		Local Checks	**BGDS 1063**	**BGDS 1063**	**ARBH 813**	**NDLH 1938**	**NDLH 1938**	**Co 14**	**SVPR 5**		

*Poor yield - rejected

Br. 02a - Initial Evaluation Trial of *G. hirsutum* (Irrigated)

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Raichur	B' Gudi	Lam	Adilabad	Coimbatore	Srivilliputhur	Mean SZ
1	201	CPD 1902	894	921	1055	883	679	646	846
2	202	GISV319	1117	392	770	1055	589	486	735
3	203	RAH 1047	769	389	600	844	627	534	627
4	204	CCH 19-2	760	375	736	770	701	696	673
5	205	BS 8-19	895	440	522	743	725	566	649
6	206	CPD 1901	994	510	833	846	710	567	743
7	207	GJHV 557	785	431	823	916	689	545	698
8	208	Zonal Check	998	576	800	873	746	744	789
9	209	TSH 363	785	226	778	855	669	884	699
10	210	RB 614	1090	415	684	982	699	667	756
11	211	GTHV 15/34	761	260	627	1155	662	-	693
12	212	RHC 1419	953	394	587	928	772	786	737
13	213	GISV 323	1023	1217	1036	928	626	675	917
14	214	ARBH 1901	1068	403	611	759	805	709	726
15	215	Quality Check	944	541	725	920	598	757	748
16	216	RAH 1046	1094	788	1042	1035	671	654	881
17	217	BGDS 1047	998	571	700	975	705	628	763
18	218	RB 615	961	555	973	865	797	557	785
19	219	L 1527	1092	476	1260	884	603	549	811
20	220	BS 7-19	839	339	712	735	596	476	616
21	221	SHS 234	918	574	579	786	526	507	648
22	222	CCH 19-1	835	566	543	678	712	627	660
23	223	LC	1046	518	655	690	619	703	705
24	224	TSH 383	1053	581	824	858	810	894	837
25	225	RHC 1409	1240	284	811	914	827	811	815
26	226	GJHV 566	1189	556	427	780	771	606	722

Br. 02a - Initial Evaluation Trial of *G. hirsutum* (Irrigated)

Ginning outturn (%)

S. No.	Code No.	Entries	Raichur	B' Gudi	Lam	Adilabad	Coimbatore	Srivilliputhur	Mean SZ
1	201	CPD 1902	36.7	38.5	36.2	37.8	36.6	38.9	37.5
2	202	GISV319	35.9	37.7	32.9	40.0	37.1	39.0	37.1
3	203	RAH 1047	31.0	32.5	38.1	35.0	31.3	30.1	33.0
4	204	CCH 19-2	28.9	33.8	37.1	33.4	30.4	35.3	33.2
5	205	BS 8-19	34.1	34.0	31.1	34.0	33.2	33.3	33.3
6	206	CPD 1901	38.7	37.3	37.5	35.6	37.4	38.6	37.5
7	207	GJHV 557	34.8	35.1	35.4	38.2	33.9	35.8	35.5
8	208	Zonal Check	36.8	36.7	38.3	39.8	40.0	38.9	38.4
9	209	TSH 363	36.5	33.7	33.3	36.4	36.4	36.6	35.5
10	210	RB 614	36.8	35.8	30.0	37.4	37.5	37.3	35.8
11	211	GTHV 15/34	34.2	35.6	36.6	36.5	36.0	35.8	35.8
12	212	RHC 1419	36.6	34.1	37.6	36.3	34.5	34.9	35.7
13	213	GISV 323	37.0	38.1	38.9	36.6	35.6	38.9	37.5
14	214	ARBH 1901	36.1	36.0	37.8	37.0	36.9	38.5	37.1
15	215	Quality Check	38.9	34.5	36.6	40.8	35.8	36.2	37.1
16	216	RAH 1046	36.5	37.1	39.2	41.3	36.3	38.6	38.2
17	217	BGDS 1047	36.4	38.0	31.8	39.8	34.8	38.4	36.5
18	218	RB 615	35.3	37.1	38.6	40.0	35.6	37.4	37.3
19	219	L 1527	35.4	37.1	39.6	40.7	33.8	36.4	37.2
20	220	BS 7-19	34.5	34.4	38.7	34.6	32.3	31.3	34.3
21	221	SHS 234	33.9	35.7	39.0	40.4	35.6	35.3	36.7
22	222	CCH 19-1	35.4	34.2	30.4	36.0	32.9	35.3	34.0
23	223	LC	35.9	38.2	35.9	34.6	33.8	36.1	35.8
24	224	TSH 383	34.5	36.3	34.2	35.8	34.1	36.5	35.2
25	225	RHC 1409	36.7	34.7	35.5	39.5	36.0	36.7	36.5
26	226	GJHV 566	36.0	36.84	30.0	38.9	37.9	37.4	36.2

Br. 02a - Initial Evaluation Trial of *G. hirsutum* (Irrigated)

Bolls/plant

S. No.	Code No.	Entries	Raichur	B' Gudi	Lam	Adilabad	Coimbatore	Srivilliputhur	Mean SZ
1	201	CPD 1902	15.8	25.0	69.1	31.4	23.8	26.1	31.9
2	202	GISV319	19.7	13.7	52.1	38.5	27.4	28.7	30.0
3	203	RAH 1047	15.9	14.3	53.4	34.3	22.7	26.4	27.8
4	204	CCH 19-2	16.8	13.7	41.3	30.1	27.4	29.1	26.4
5	205	BS 8-19	15.7	15.7	48.1	29.7	23.6	24.8	26.3
6	206	CPD 1901	15.5	15.0	64.2	31.7	21.5	23.9	28.6
7	207	GJHV 557	13.8	15.3	53.5	33.9	25.5	26.5	28.1
8	208	Zonal Check	18.6	20.0	54.8	29.9	26.0	25.1	29.1
9	209	TSH 363	12.3	14.0	59.3	31.4	29.3	33.1	29.9
10	210	RB 614	19.3	14.7	47.5	37.8	22.3	24.9	27.8
11	211	GTHV 15/34	13.5	14.0	53.4	41.7	18.4	18.3	26.6
12	212	RHC 1419	14.8	14.3	60.5	37.4	26.9	30.1	30.7
13	213	GISV 323	19.7	32.0	67.5	35.7	21.3	24.2	33.4
14	214	ARBH 1901	19.2	13.3	46.8	28.0	26.0	30.8	27.4
15	215	Quality Check	14.2	18.0	46.7	30.1	28.0	28.6	27.6
16	216	RAH 1046	19.6	22.3	46.1	35.6	26.0	26.1	29.3
17	217	BGDS 1047	19.3	15.3	53.1	35.5	24.4	22.5	28.4
18	218	RB 615	18.1	17.0	58.6	29.3	24.5	25.7	28.9
19	219	L 1527	20.5	15.0	70.0	29.6	23.5	24.1	30.5
20	220	BS 7-19	16.7	13.7	52.1	28.3	22.5	21.8	25.9
21	221	SHS 234	17.9	16.7	37.6	25.1	22.4	24.4	24.0
22	222	CCH 19-1	15.4	15.7	52.0	24.3	24.3	24.7	26.1
23	223	LC	19.5	15.0	51.0	27.1	24.6	27.1	27.4
24	224	TSH 383	20.5	14.9	46.7	33.5	28.5	31.6	29.3
25	225	RHC 1409	21.0	13.7	45.1	30.7	29.3	28.9	28.1
26	226	GJHV 566	20.4	14.7	49.7	27.8	23.9	22.0	26.4

Br. 02a - Initial Evaluation Trial of *G. hirsutum* (Irrigated)

Boll weight (g)

S. No.	Code No.	Entries	Raichur	B' Gudi	Lam	Coimbatore	Srivilliputhur	Mean SZ
1	201	CPD 1902	4.9	3.7	4.6	4.9	4.6	4.5
2	202	GISV319	4.6	3.1	3.9	4.5	3.9	4.0
3	203	RAH 1047	4.8	3.0	3.8	4.5	4.0	4.0
4	204	CCH 19-2	5.5	3.2	3.8	5.2	4.6	4.5
5	205	BS 8-19	5.6	3.5	3.8	4.5	4.4	4.4
6	206	CPD 1901	4.0	2.9	4.5	4.3	3.8	3.9
7	207	GJHV 557	4.4	3.0	3.3	4.4	4.2	3.9
8	208	Zonal Check	4.6	3.4	3.6	4.2	4.3	4.0
9	209	TSH 363	5.6	3.5	4.3	4.7	4.5	4.5
10	210	RB 614	4.9	3.4	3.9	4.7	3.7	4.1
11	211	GTHV 15/34	4.5	2.9	3.7	4.4	3.7	3.8
12	212	RHC 1419	4.8	3.1	4.8	4.4	4.1	4.2
13	213	GISV 323	5.2	4.0	4.5	5.0	3.7	4.5
14	214	ARBH 1901	4.3	2.9	3.4	4.1	3.3	3.6
15	215	Quality Check	5.2	4.2	4.1	5.4	4.7	4.7
16	216	RAH 1046	5.5	4.7	4.4	4.9	4.7	4.8
17	217	BGDS 1047	5.0	3.2	3.9	5.1	3.6	4.2
18	218	RB 615	4.7	3.4	4.5	4.3	4.3	4.2
19	219	L 1527	4.5	2.6	5.0	3.9	4.0	4.0
20	220	BS 7-19	5.1	3.5	3.5	4.8	3.9	4.2
21	221	SHS 234	5.2	3.7	4.0	4.7	4.1	4.3
22	222	CCH 19-1	5.1	3.8	3.9	5.3	4.5	4.5
23	223	LC	4.8	3.5	3.8	5.4	4.1	4.3
24	224	TSH 383	5.7	4.0	4.6	5.3	4.9	4.9
25	225	RHC 1409	5.2	3.0	3.8	4.8	4.7	4.3
26	226	GJHV 566	4.7	3.10	3.6	4.5	3.5	3.9

Br 02b - Initial Evaluation Trial of *G. hirsutum* (Rainfed)
Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Adilabad	Perambalur	Mean SZ	Rank
1	231	TSH 375	1573	2695	2946	1632	2212	7
2	232	GBHV 206	1628	2356	2940	1650	2144	12
3	233	NH 702	1754	2250	2977	1710	2173	9
4	234	ARBH 1951	1857	1939	2612	1748	2039	20
5	235	**Zonal Check**	785	2162	2809	1454	1803	30
6	236	NDLH 2051-3	1657	2689	2667	2453	2367	1
7	237	BS 8-19	1348	1745	2717	1557	1842	29
8	238	RHC 1419	1927	1645	3235	1561	2092	17
9	239	TVH 007	1596	2423	2704	1829	2138	13
10	240	CNDTS 283	1227	1906	2493	1249	1719	31
11	241	RB 610	1567	2362	2598	1458	1996	24
12	242	CCH 19-3	1628	2023	2338	1739	1932	26
13	243	RAH 1046	1197	2262	2830	1293	1896	27
14	244	NH 703	1807	2073	3021	2030	2233	5
15	245	AKH 2013-2	1648	2981	2666	1200	2124	14
16	246	CPD 1951	1870	1228	2697	1606	1850	28
17	247	CNH 09-119	1217	2745	2596	2321	2220	6
18	248	BGDS 1047	1510	2701	2907	1472	2148	11
19	249	CNH 2077	1483	1561	2365	1338	1687	33
20	250	RB 603	1523	2223	3402	1539	2172	10
21	251	TSH 356	606	2067	2362	803	1460	34
22	252	GTHV 15/36	1162	2295	2878	1474	1952	25
23	253	RHC 1409	1419	2512	2804	1673	2102	16
24	254	CPD 1952	1628	2317	2538	1695	2045	19
25	255	CCH 19-2	1512	2406	2503	2052	2118	15
26	256	CNH 17393	1559	2039	2745	1739	2021	22
27	257	**Local Checks**	1779	2445	2887	1606	2179	8
28	258	GBHV 209	1551	2139	2644	1739	2018	23
29	259	RAH 1045	1269	1911	3093	1918	2048	18
30	260	NDLH 2056-4	1591	2723	3021	1838	2293	2
31	261	NH 701	1823	1835	3033	2477	2292	3
32	262	BS 7-19	1506	1261	2561	1512	1710	32
33	263	CNH 1134	1464	2317	3027	2185	2248	4
34	264	**QC (Suraj)**	1512	1773	2700	2123	2027	21
		CD @ 5 %	332	469	421	354		
		CV %	14	13.2	9	13		
		Zonal Check	NDLH 1938					
		Local Checks	**Sahana**	**Sivanandhi**	**NDLH 1938**	**KC 3**		

Br 02b - Initial Evaluation Trial of *G. hirsutum* (Rainfed)

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Adilabad	Perambalur	Mean SZ
1	231	TSH 375	535	857	1075	531	750
2	232	GBHV 206	568	735	1003	531	709
3	233	NH 702	683	806	1099	632	805
4	234	ARBH 1951	698	630	1016	596	735
5	235	**Zonal Check**	262	610	1053	466	598
6	236	NDLH 2051-3	623	904	920	828	819
7	237	BS 8-19	416	499	959	474	587
8	238	RHC 1419	647	490	1203	545	721
9	239	TVH 007	649	841	976	673	785
10	240	CNDTS 283	433	610	937	399	595
11	241	RB 610	574	737	1008	489	702
12	242	CCH 19-3	524	601	849	560	633
13	243	RAH 1046	446	726	1090	395	664
14	244	NH 703	691	738	1169	845	861
15	245	AKH 2013-2	564	730	914	415	656
16	246	CPD 1951	685	437	944	447	628
17	247	CNH 09-119	436	851	968	707	741
18	248	BGDS 1047	541	929	1116	543	782
19	249	CNH 2077	491	540	906	449	596
20	250	RB 603	528	709	1249	487	743
21	251	TSH 356	228	697	909	302	534
22	252	GTHV 15/36	433	771	1076	472	688
23	253	RHC 1409	501	879	1023	593	749
24	254	CPD 1952	594	746	952	559	713
25	255	CCH 19-2	464	707	881	639	673
26	256	CNH 17393	572	675	1029	666	736
27	257	**Local Checks**	669	729	1028	521	737
28	258	GBHV 209	524	715	936	546	680
29	259	RAH 1045	448	633	1098	699	720
30	260	NDLH 2056-4	533	822	1051	610	754
31	261	NH 701	717	640	1128	917	851
32	262	BS 7-19	455	391	914	395	539
33	263	CNH 1134	511	702	1165	826	801
34	264	**QC (Suraj)**	534	558	1048	730	717

Br 02b - Initial Evaluation Trial of *G. hirsutum* (Rainfed)

Ginning outturn (%)

S. No.	Code No.	Entries	Dharwad	Nandyal	Adilabad	Perambalur	Mean SZ
1	231	TSH 375	34.0	31.8	36.5	32.5	33.7
2	232	GBHV 206	34.9	31.2	34.1	32.2	33.1
3	233	NH 702	38.9	35.8	36.9	37.0	37.2
4	234	ARBH 1951	37.6	32.5	38.9	34.1	35.8
5	235	**Zonal Check**	33.3	28.2	37.5	32.0	32.8
6	236	NDLH 2051-3	37.6	33.6	34.5	33.7	34.9
7	237	BS 8-19	30.9	28.6	35.3	30.4	31.3
8	238	RHC 1419	33.6	29.8	37.2	34.9	33.9
9	239	TVH 007	40.7	34.7	36.1	36.8	37.1
10	240	CNDTS 283	35.3	32.0	37.6	32.0	34.2
11	241	RB 610	36.7	31.2	38.8	33.5	35.1
12	242	CCH 19-3	32.2	29.7	36.3	32.2	32.6
13	243	RAH 1046	37.3	32.1	38.5	30.4	34.6
14	244	NH 703	38.3	35.6	38.7	41.6	38.6
15	245	AKH 2013-2	34.2	24.5	34.3	34.6	31.9
16	246	CPD 1951	36.7	35.6	35.0	27.7	33.8
17	247	CNH 09-119	35.8	31.0	37.3	31.2	33.8
18	248	BGDS 1047	35.8	34.4	38.4	38.1	36.7
19	249	CNH 2077	33.1	34.6	38.3	31.4	34.4
20	250	RB 603	34.7	31.9	36.7	32.1	33.9
21	251	TSH 356	37.6	33.7	38.5	35.7	36.4
22	252	GTHV 15/36	37.3	33.6	37.4	33.7	35.5
23	253	RHC 1409	35.3	35.0	36.5	32.7	34.9
24	254	CPD 1952	36.5	32.2	37.5	33.0	34.8
25	255	CCH 19-2	30.7	29.4	35.2	31.1	31.6
26	256	CNH 17393	36.7	33.1	37.5	38.3	36.4
27	257	**Local Checks**	37.6	29.8	35.6	32.5	33.9
28	258	GBHV 209	33.8	33.4	35.4	31.3	33.5
29	259	RAH 1045	35.3	33.1	35.5	36.5	35.1
30	260	NDLH 2056-4	33.6	30.2	34.8	33.1	32.9
31	261	NH 701	39.3	34.9	37.2	37.0	37.1
32	262	BS 7-19	30.2	31.0	35.7	26.1	30.8
33	263	CNH 1134	34.9	30.3	38.5	36.9	35.2
34	264	**QC (Suraj)**	35.3	31.5	38.8	34.4	35.0

Br 02b - Initial Evaluation Trial of *G. hirsutum* (Rainfed)

Bolls/plant

S. No.	Code No.	Entries	Dharwad	Nandyal	Adilabad	Perambalur	Mean SZ
1	231	TSH 375	12.7	19.0	44.7	16.5	23.2
2	232	GBHV 206	11.1	13.9	44.4	24.0	23.4
3	233	NH 702	11.6	13.3	44.9	30.8	25.2
4	234	ARBH 1951	11.4	11.9	36.6	16.8	19.2
5	235	**Zonal Check**	10.5	15.2	40.1	26.2	23.0
6	236	NDLH 2051-3	10.6	18.0	37.5	32.1	24.6
7	237	BS 8-19	10.3	12.0	39.2	22.2	20.9
8	238	RHC 1419	11.3	12.1	49.1	22.7	23.8
9	239	TVH 007	11.5	15.0	39.1	24.1	22.4
10	240	CNDTS 283	11.4	12.9	33.3	17.0	18.7
11	241	RB 610	10.5	16.0	35.7	25.9	22.0
12	242	CCH 19-3	9.5	14.5	29.7	24.5	19.6
13	243	RAH 1046	10.6	13.7	40.9	22.1	21.8
14	244	NH 703	9.3	13.5	45.8	31.7	25.1
15	245	AKH 2013-2	10.8	22.0	37.2	24.8	23.7
16	246	CPD 1951	11.4	9.5	37.9	22.2	20.3
17	247	CNH 09-119	10.4	20.0	35.3	25.3	22.8
18	248	BGDS 1047	9.2	18.0	44.2	20.0	22.9
19	249	CNH 2077	11.2	10.7	31.2	18.5	17.9
20	250	RB 603	11.6	12.9	57.7	23.0	26.3
21	251	TSH 356	9.1	12.5	30.9	16.2	17.2
22	252	GTHV 15/36	10.5	14.6	41.3	16.3	20.7
23	253	RHC 1409	11.9	16.0	39.7	22.9	22.6
24	254	CPD 1952	10.7	13.1	34.2	18.4	19.1
25	255	CCH 19-2	10.9	17.0	34.1	21.0	20.8
26	256	CNH 17393	11.5	11.3	39.5	25.2	21.9
27	257	**Local Checks**	10.3	18.0	42.9	24.7	24.0
28	258	GBHV 209	10.5	13.1	37.0	19.0	19.9
29	259	RAH 1045	12.3	11.8	47.7	20.3	23.0
30	260	NDLH 2056-4	10.7	19.0	45.7	23.7	24.8
31	261	NH 701	11.2	14.2	47.5	32.9	26.5
32	262	BS 7-19	7.3	10.7	34.9	22.2	18.8
33	263	CNH 1134	10.2	14.6	46.4	18.0	22.3
34	264	**QC (Suraj)**	9.9	10.0	37.9	26.1	21.0

Br 02b - Initial Evaluation Trial of *G. hirsutum* (Rainfed)

Boll weight (g)

S. No.	Code No.	Entries	Dharwad	Nandyal	Perambalur	Mean SZ
1	231	TSH 375	4.3	4.0	4.6	4.3
2	232	GBHV 206	4.0	4.0	4.9	4.3
3	233	NH 702	3.6	4.2	4.1	4.0
4	234	ARBH 1951	3.7	3.5	3.9	3.7
5	235	**Zonal Check**	3.9	4.2	4.6	4.2
6	236	NDLH 2051-3	3.9	4.2	5.2	4.4
7	237	BS 8-19	4.4	4.4	5.3	4.7
8	238	RHC 1419	4.3	3.4	4.5	4.1
9	239	TVH 007	4.6	4.4	5.2	4.7
10	240	CNDTS 283	3.6	3.0	4.2	3.6
11	241	RB 610	4.2	3.2	4.6	4.0
12	242	CCH 19-3	4.7	3.8	4.8	4.4
13	243	RAH 1046	4.3	4.3	4.2	4.3
14	244	NH 703	3.6	3.4	4.4	3.8
15	245	AKH 2013-2	4.4	4.6	5.2	4.7
16	246	CPD 1951	3.9	3.6	4.1	3.9
17	247	CNH 09-119	4.3	4.2	4.7	4.4
18	248	BGDS 1047	4.4	4.8	5.0	4.7
19	249	CNH 2077	4.2	4.3	4.6	4.4
20	250	RB 603	4.4	4.4	5.0	4.6
21	251	TSH 356	4.5	4.4	4.8	4.6
22	252	GTHV 15/36	3.9	4.0	4.6	4.2
23	253	RHC 1409	3.9	4.2	5.1	4.4
24	254	CPD 1952	4.7	4.6	5.2	4.8
25	255	CCH 19-2	4.5	4.0	5.2	4.6
26	256	CNH 17393	4.2	4.6	4.8	4.5
27	257	**Local Checks**	4.3	3.6	3.9	3.9
28	258	GBHV 209	4.4	4.4	5.1	4.6
29	259	RAH 1045	4.6	4.4	5.2	4.7
30	260	NDLH 2056-4	4.1	4.4	5.0	4.5
31	261	NH 701	3.8	4.8	4.2	4.3
32	262	BS 7-19	4.3	3.4	5.2	4.3
33	263	CNH 1134	4.0	3.8	5.2	4.3
34	264	**QC (Suraj)**	4.4	4.8	4.7	4.6

Br 02a/b - Initial Evaluation Trial of Naturally Coloured *G. hirsutum*

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Lam	Dharwad	Mean SZ	Rank
1	271	CCHC 19-2	1757	1573	1665	8
2	272	CNH 18529	2217	1654	1936	4
3	273	Suraj (ZC)	2313	1440	1877	5
4	274	DHCC 1901	2650	1877	2264	2
5	275	CCHC 19-1	2180	1478	1829	7
6	276	CNH 18528	2424	1511	1968	3
7	277	Local Check	2024	1727	1876	6
8	278	DHCC 1902	2707	2100	2404	1
		CD @ 5 %	512	357		
		CV %	13	12		
		Local Checks	**NDLH 1938**	**ARBH 813**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Lam	Dharwad	Mean SZ
1	271	CCHC 19-2	521	479	500
2	272	CNH 18529	630	610	620
3	273	Suraj (ZC)	815	533	674
4	274	DHCC 1901	936	601	769
5	275	CCHC 19-1	762	445	604
6	276	CNH 18528	909	525	717
7	277	Local Check	593	630	612
8	278	DHCC 1902	1067	676	872

Ginning outturn (%)

S. No.	Code No.	Entries	Lam	Dharwad	Mean SZ
1	271	CCHC 19-2	29.6	30.5	30.1
2	272	CNH 18529	28.6	36.9	32.8
3	273	Suraj (ZC)	35.4	37.0	36.2
4	274	DHCC 1901	35.3	32.0	33.7
5	275	CCHC 19-1	34.7	30.1	32.4
6	276	CNH 18528	37.6	34.7	36.2
7	277	Local Check	29.1	36.5	32.8
8	278	DHCC 1902	39.5	32.2	35.9

Br 02a/b - Initial Evaluation Trial of Naturally Coloured *G. hirsutum*

Bolls/plant

S. No.	Code No.	Entries	Lam	Dharwad	Mean SZ
1	271	CCHC 19-2	46.6	11.8	29.2
2	272	CNH 18529	52.6	14.9	33.8
3	273	Suraj (ZC)	59.6	11.5	35.6
4	274	DHCC 1901	67.5	10.3	38.9
5	275	CCHC 19-1	66.9	9.1	38.0
6	276	CNH 18528	67.0	11.9	39.5
7	277	Local Check	61.6	11.9	36.8
8	278	DHCC 1902	68.0	11.9	40.0

Boll weight (g)

S. No.	Code No.	Entries	Lam	Dharwad	Mean SZ
1	271	CCHC 19-2	4.3	4.5	4.4
2	272	CNH 18529	3.5	4.0	3.8
3	273	Suraj (ZC)	4.4	4.2	4.3
4	274	DHCC 1901	4.4	3.9	4.2
5	275	CCHC 19-1	3.7	3.8	3.8
6	276	CNH 18528	4.5	4.2	4.4
7	277	Local Check	4.2	4.0	4.1
8	278	DHCC 1902	4.5	3.8	4.2

Br. 06a – Initial Evaluation Trial of Compact genotypes (Irrigated)

Total Seed Cotton Yield at 160 DAS (Total of 130 DAS + 160 DAS) (Kg/ha)

S. No.	Code No.	Entries	Raichur	Lam	Coimbatore	Mean SZ	Rank
1	281	CCH 19-4	2537	2666	1615	2273	10
2	282	BS 9-19	2586	2853	1608	2349	9
3	283	RHC-HD 1405	2864	2341	1455	2220	12
4	284	DSC 1902	2059	2987	2012	2353	8
5	285	GTHV 18/17	2620	2874	1658	2384	6
6	286	Local Check	3204	1966	1974	2381	7
7	287	CCH 15-1	2809	1713	1468	1997	14
8	288	GJHV 584	2546	2506	1745	2266	11
9	289	RAHC 1902	2481	3015	1728	2408	5
10	290	CCH 19-2	2546	3350	1705	2534	2
11	291	TCH 1875	2340	2865	2096	2434	4
12	292	Common Check (Suraj)	2531	3250	1732	2504	3
13	293	DSC 1901	2259	2631	1633	2174	13
14	294	RAHC 1901	1929	2532	1410	1957	15
15	295	RHC-HD 1312	3756	2425	1669	2617	1
		CD @ 5 %	546	57	158		
		CV %	20	10	12		
		Zonal Check	Suraj				
		Local Checks	**Sujay**	**Sivanandi**	**Suraj**		

Seed Cotton Yield (130 DAS) (Kg/ha)

S. No.	Code No.	Entries	Raichur	Lam	Coimbatore	Mean SZ
1	281	CCH 19-4	2044	1327	1091	1487
2	282	BS 9-19	1784	1372	997	1384
3	283	RHC-HD 1405	2169	1610	962	1580
4	284	DSC 1902	1665	2147	1082	1631
5	285	GTHV 18/17	2066	1814	1152	1677
6	286	Local Check	2414	1378	966	1586
7	287	CCH 15-1	2246	1256	978	1493
8	288	GJHV 584	2005	1243	872	1373
9	289	RAHC 1902	1887	1877	965	1576
10	290	CCH 19-2	2051	1508	645	1401
11	291	TCH 1875	1860	2127	1083	1690
12	292	Common Check (Suraj)	1929	2324	1019	1757
13	293	DSC 1901	1813	1784	748	1448
14	294	RAHC 1901	1527	1673	905	1368
15	295	RHC-HD 1312	2821	1289	971	1694

Br. 06a – Initial Evaluation Trial of Compact genotypes (Irrigated)

Seed Cotton Yield (160 DAS) (Kg/ha)

S. No.	Code No.	Entries	Raichur	Lam	Coimbatore	Mean SZ
1	281	CCH 19-4	493	1339	524	785
2	282	BS 9-19	803	1481	611	965
3	283	RHC-HD 1405	696	732	493	640
4	284	DSC 1902	394	840	930	721
5	285	GTHV 18/17	554	1061	506	707
6	286	Local Check	790	588	1008	795
7	287	CCH 15-1	563	457	490	503
8	288	GJHV 584	541	1263	873	892
9	289	RAHC 1902	594	1139	763	832
10	290	CCH 19-2	496	1842	1060	1133
11	291	TCH 1875	479	738	1013	743
12	292	Common Check (Suraj)	602	926	713	747
13	293	DSC 1901	446	847	885	726
14	294	RAHC 1901	402	859	505	589
15	295	RHC-HD 1312	935	1136	699	923

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Raichur	Lam	Coimbatore	Mean SZ
1	281	CCH 19-4	858	827	573	753
2	282	BS 9-19	868	886	551	768
3	283	RHC-HD 1405	983	808	480	757
4	284	DSC 1902	765	1070	760	865
5	285	GTHV 18/17	968	889	575	811
6	286	Local Check	1128	648	727	834
7	287	CCH 15-1	1002	503	518	674
8	288	GJHV 584	805	929	586	773
9	289	RAHC 1902	874	1148	595	872
10	290	CCH 19-2	792	1213	578	861
11	291	TCH 1875	846	1019	777	881
12	292	Common Check (Suraj)	930	1144	633	902
13	293	DSC 1901	783	858	559	733
14	294	RAHC 1901	594	962	484	680
15	295	RHC-HD 1312	1352	784	598	911

Br. 06a – Initial Evaluation Trial of Compact genotypes (Irrigated)

Ginning outturn (%)

S. No.	Code No.	Entries	Raichur	Lam	Coimbatore	Mean SZ
1	281	CCH 19-4	33.8	31.1	35.5	33.5
2	282	BS 9-19	33.6	30.7	34.3	32.9
3	283	RHC-HD 1405	34.3	34.4	33.0	33.9
4	284	DSC 1902	37.2	35.9	37.8	37.0
5	285	GTHV 18/17	36.9	30.9	34.6	34.1
6	286	Local Check	35.2	32.7	36.9	34.9
7	287	CCH 15-1	35.7	29.4	35.3	33.5
8	288	GJHV 584	31.6	37.3	33.6	34.2
9	289	RAHC 1902	35.2	38.2	34.6	36.0
10	290	CCH 19-2	31.1	36.3	33.9	33.8
11	291	TCH 1875	36.2	35.6	37.1	36.3
12	292	Common Check (Suraj)	36.7	35.1	36.6	36.1
13	293	DSC 1901	34.6	32.7	34.2	33.8
14	294	RAHC 1901	30.8	37.4	34.4	34.2
15	295	RHC-HD 1312	36.0	32.3	35.6	34.6

No. of bolls/m^2

S. No.	Code No.	Entries	Raichur	Lam	Coimbatore	Mean SZ
1	281	CCH 19-4	79.7	56.8	105.3	80.6
2	282	BS 9-19	63.7	57.1	107.3	76.0
3	283	RHC-HD 1405	84.0	56.5	98.3	79.6
4	284	DSC 1902	57.3	57.6	108.0	74.3
5	285	GTHV 18/17	81.3	52.9	98.0	77.4
6	286	Local Check	86.0	60.5	114.9	87.1
7	287	CCH 15-1	83.7	45.0	109.0	79.2
8	288	GJHV 584	79.0	52.8	103.3	78.4
9	289	RAHC 1902	70.0	62.7	104.0	78.9
10	290	CCH 19-2	71.0	68.5	110.0	83.2
11	291	TCH 1875	64.0	57.1	130.5	83.9
12	292	Common Check (Suraj)	71.0	64.1	104.7	79.9
13	293	DSC 1901	66.3	45.0	104.0	71.8
14	294	RAHC 1901	55.7	53.9	102.2	70.6
15	295	RHC-HD 1312	97.0	50.8	109.0	85.6

Br. 06a – Initial Evaluation Trial of Compact genotypes (Irrigated)

Plant height (cm)

S. No.	Code No.	Entries	Raichur	Lam	Coimbatore	Mean SZ
1	281	CCH 19-4	163.3	145.0	122.3	143.5
2	282	BS 9-19	125.0	170.6	106.3	134.0
3	283	RHC-HD 1405	142.2	158.9	126.3	142.5
4	284	DSC 1902	110.2	149.5	102.0	120.6
5	285	GTHV 18/17	125.7	165.8	112.3	134.6
6	286	Local Check	128.9	176.0	110.3	138.4
7	287	CCH 15-1	151.7	162.9	124.0	146.2
8	288	GJHV 584	150.5	183.7	115.0	149.7
9	289	RAHC 1902	124.5	144.0	114.7	127.7
10	290	CCH 19-2	143.6	152.3	125.7	140.5
11	291	TCH 1875	161.2	156.0	117.7	145.0
12	292	Common Check (Suraj)	136.8	146.5	109.7	131.0
13	293	DSC 1901	122.6	145.6	106.3	124.8
14	294	RAHC 1901	116.3	154.0	116.3	128.9
15	295	RHC-HD 1312	138.3	165.7	130.3	144.8

No. of monopodia / plant

S. No.	Code No.	Entries	Raichur	Lam	Coimbatore	Mean SZ
1	281	CCH 19-4	1.0	0.4	0.9	0.8
2	282	BS 9-19	0.8	0.9	0.7	0.8
3	283	RHC-HD 1405	0.9	0.9	0.1	0.6
4	284	DSC 1902	0.7	0.7	0.7	0.7
5	285	GTHV 18/17	1.1	0.9	0.7	0.9
6	286	Local Check	1.1	0.8	0.4	0.7
7	287	CCH 15-1	1.1	1.3	1.1	1.2
8	288	GJHV 584	0.9	0.2	0.0	0.4
9	289	RAHC 1902	0.9	1.0	0.5	0.8
10	290	CCH 19-2	0.9	0.2	1.1	0.7
11	291	TCH 1875	0.9	0.3	0.5	0.6
12	292	Common Check (Suraj)	0.9	0.6	0.4	0.6
13	293	DSC 1901	0.7	0.1	0.3	0.4
14	294	RAHC 1901	0.9	0.6	0.7	0.7
15	295	RHC-HD 1312	0.9	0.3	0.7	0.6

Br. 06a – Initial Evaluation Trial of Compact genotypes (Irrigated)

No. of sympodia / plant

S. No.	Code No.	Entries	Raichur	Lam	Coimbatore	Mean SZ
1	281	CCH 19-4	18.3	16.7	12.0	15.7
2	282	BS 9-19	15.7	16.7	11.3	14.5
3	283	RHC-HD 1405	18.5	16.3	14.5	16.4
4	284	DSC 1902	14.8	13.1	11.9	13.3
5	285	GTHV 18/17	18.2	16.7	13.1	16.0
6	286	Local Check	19.0	17.0	12.5	16.2
7	287	CCH 15-1	18.3	16.3	13.5	16.1
8	288	GJHV 584	17.3	17.7	12.3	15.7
9	289	RAHC 1902	17.4	23.5	13.4	18.1
10	290	CCH 19-2	18.1	15.0	13.9	15.6
11	291	TCH 1875	16.5	16.3	12.5	15.1
12	292	Common Check (Suraj)	17.9	16.3	12.7	15.6
13	293	DSC 1901	16.7	13.7	12.4	14.3
14	294	RAHC 1901	14.5	18.7	14.5	15.9
15	295	RHC-HD 1312	20.2	16.3	15.2	17.2

Boll weight (g)

S. No.	Code No.	Entries	Raichur	Lam	Mean SZ
1	281	CCH 19-4	4.8	5.0	4.9
2	282	BS 9-19	4.4	3.6	4.0
3	283	RHC-HD 1405	4.7	4.5	4.6
4	284	DSC 1902	4.5	4.5	4.5
5	285	GTHV 18/17	4.9	4.8	4.8
6	286	Local Check	4.4	4.4	4.4
7	287	CCH 15-1	4.9	4.6	4.7
8	288	GJHV 584	4.6	4.5	4.5
9	289	RAHC 1902	4.6	4.5	4.6
10	290	CCH 19-2	5.3	4.7	5.0
11	291	TCH 1875	5.2	4.9	5.1
12	292	Common Check (Suraj)	5.1	4.5	4.8
13	293	DSC 1901	4.6	4.2	4.4
14	294	RAHC 1901	4.0	3.9	4.0
15	295	RHC-HD 1312	4.6	4.3	4.4

Br. 06a – Initial Evaluation Trial of Compact genotypes (Irrigated)

Lint Index (g)

S. No.	Code No.	Entries	Raichur	Lam	Mean SZ
1	281	CCH 19-4	5.9	5.1	5.5
2	282	BS 9-19	5.0	4.7	4.8
3	283	RHC-HD 1405	5.2	5.1	5.1
4	284	DSC 1902	5.7	5.2	5.5
5	285	GTHV 18/17	5.9	5.0	5.4
6	286	Local Check	5.6	5.4	5.5
7	287	CCH 15-1	6.0	5.2	5.6
8	288	GJHV 584	4.8	5.4	5.1
9	289	RAHC 1902	5.4	5.6	5.5
10	290	CCH 19-2	5.1	5.7	5.4
11	291	TCH 1875	5.7	5.6	5.7
12	292	Common Check (Suraj)	6.1	5.7	5.9
13	293	DSC 1901	5.1	4.5	4.8
14	294	RAHC 1901	3.9	5.1	4.5
15	295	RHC-HD 1312	5.6	4.5	5.0

Seed Index (g)

S. No.	Code No.	Entries	Raichur	Lam	Mean SZ
1	281	CCH 19-4	11.5	11.3	11.4
2	282	BS 9-19	9.8	10.6	10.2
3	283	RHC-HD 1405	10.0	9.7	9.9
4	284	DSC 1902	9.6	9.4	9.5
5	285	GTHV 18/17	10.0	11.3	10.7
6	286	Local Check	10.3	11.4	10.9
7	287	CCH 15-1	10.9	12.5	11.7
8	288	GJHV 584	10.3	9.1	9.7
9	289	RAHC 1902	9.9	9.1	9.5
10	290	CCH 19-2	11.3	10.0	10.6
11	291	TCH 1875	10.1	10.2	10.1
12	292	Common Check (Suraj)	10.5	10.6	10.6
13	293	DSC 1901	9.6	9.4	9.5
14	294	RAHC 1901	8.7	8.8	8.8
15	295	RHC-HD 1312	9.9	9.3	9.6

Br. 06b – Initial Evaluation Trial of Compact genotypes (Rainfed)

Total Seed Cotton Yield at 160 DAS (Total of 130 DAS + 160 DAS) (Kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Adilabad	Perambalur	Mean SZ	Rank
1	301	RAHC 1901	616	1600	3012	1035	1566	3
2	302	TCH 002	769	1247	2766	1147	1482	9
3	303	GBHV 187	296	1570	2252	1195	1328	16
4	304	CNH 09-77	717	1496	2687	1149	1512	6
5	305	RHC-HD 1312	431	1922	2526	1113	1498	8
6	306	CCH 15-1	402	1459	2364	1566	1448	13
7	307	DSC 1951	1054	1337	3147	1199	1684	1
8	308	Common Check (Suraj)	710	1352	2189	1029	1320	17
9	309	CNH 1133	463	1870	2007	1092	1358	15
10	310	CCH 19-4	669	1567	2381	1288	1476	10
11	311	CNH 2046	818	1552	2405	1413	1547	4
12	312	RHC-HD 1405	450	1604	2544	1397	1499	7
13	313	GTHV 18/19	581	1929	2764	1385	1665	2
14	314	CNH 1132	334	1355	2079	1211	1245	20
15	315	Local Check	880	1418	2424	1390	1528	5
16	316	CNDTS 44	444	1470	2062	1205	1295	18
17	317	DSC 1952	646	1244	2666	1129	1421	14
18	318	CNH 09-45	291	1348	2531	954	1281	19
19	319	RAHC 1902	694	1130	2566	1506	1474	11
20	320	CCH 19-5	591	1374	2509	1390	1466	12
		CD @ 5 %	141		517	144		
		CV %	14		12	7		
		Local Checks	**ARBH 813**	**Siva Nandi**	**Suraj**	**Suraj**		

Br. 06b – Initial Evaluation Trial of Compact genotypes (Rainfed)

Seed Cotton Yield (130 DAS) (Kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Mean SZ
1	301	RAHC 1901	154	1300	727
2	302	TCH 002	197	989	593
3	303	GBHV 187	28	1263	646
4	304	CNH 09-77	162	1241	702
5	305	RHC-HD 1312	94	1655	875
6	306	CCH 15-1	86	1181	634
7	307	DSC 1951	331	1070	701
8	308	Common Check (Suraj)	154	1111	633
9	309	CNH 1133	93	1429	761
10	310	CCH 19-4	101	1300	701
11	311	CNH 2046	189	1204	697
12	312	RHC-HD 1405	65	1307	686
13	313	GTHV 18/19	114	1570	842
14	314	CNH 1132	69	1004	537
15	315	Local Check	231	1022	627
16	316	CNDTS 44	112	1118	615
17	317	DSC 1952	128	922	525
18	318	CNH 09-45	35	1163	599
19	319	RAHC 1902	177	641	409
20	320	CCH 19-5	99	1107	603

Seed Cotton Yield (160 DAS) (Kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Mean SZ
1	301	RAHC 1901	462	300	381
2	302	TCH 002	572	258	415
3	303	GBHV 187	267	307	287
4	304	CNH 09-77	555	256	406
5	305	RHC-HD 1312	337	267	302
6	306	CCH 15-1	317	278	298
7	307	DSC 1951	723	267	495
8	308	Common Check (Suraj)	556	241	399
9	309	CNH 1133	370	441	406
10	310	CCH 19-4	567	267	417
11	311	CNH 2046	629	348	489
12	312	RHC-HD 1405	385	296	341
13	313	GTHV 18/19	467	359	413
14	314	CNH 1132	265	352	309
15	315	Local Check	649	396	523
16	316	CNDTS 44	333	352	343
17	317	DSC 1952	517	322	420
18	318	CNH 09-45	256	185	221
19	319	RAHC 1902	517	489	503
20	320	CCH 19-5	492	267	380

Br. 06b – Initial Evaluation Trial of Compact genotypes (Rainfed)

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Adilabad	Perambalur	Mean SZ
1	301	RAHC 1901	211	525	1175	292	551
2	302	TCH 002	218	361	885	256	430
3	303	GBHV 187	95	521	856	381	463
4	304	CNH 09-77	237	497	986	347	517
5	305	RHC-HD 1312	145	646	925	348	516
6	306	CCH 15-1	134	473	818	468	473
7	307	DSC 1951	361	428	1105	389	571
8	308	Common Check (Suraj)	253	460	843	334	472
9	309	CNH 1133	156	655	781	355	487
10	310	CCH 19-4	251	514	750	368	471
11	311	CNH 2046	313	568	820	387	522
12	312	RHC-HD 1405	146	536	834	443	490
13	313	GTHV 18/19	204	656	1028	360	562
14	314	CNH 1132	114	450	780	431	444
15	315	Local Check	305	479	943	389	529
16	316	CNDTS 44	143	503	707	314	417
17	317	DSC 1952	234	450	1010	361	514
18	318	CNH 09-45	94	426	969	205	424
19	319	RAHC 1902	245	314	980	476	504
20	320	CCH 19-5	218	519	888	453	520

Ginning outturn (%)

S. No.	Code No.	Entries	Dharwad	Nandyal	Adilabad	Perambalur	Mean SZ
1	301	RAHC 1901	34.2	32.8	39.0	28.3	33.6
2	302	TCH 002	28.4	29.0	32.0	22.4	28.0
3	303	GBHV 187	32.0	33.2	38.0	32.0	33.8
4	304	CNH 09-77	33.1	33.2	36.7	30.2	33.3
5	305	RHC-HD 1312	33.6	33.6	36.6	31.2	33.8
6	306	CCH 15-1	33.3	32.4	34.6	29.9	32.6
7	307	DSC 1951	34.2	32.0	35.1	32.4	33.4
8	308	Common Check (Suraj)	35.6	34.0	38.5	32.5	35.2
9	309	CNH 1133	33.8	35.0	38.9	32.5	35.1
10	310	CCH 19-4	37.6	32.8	31.5	28.6	32.6
11	311	CNH 2046	38.3	36.6	34.1	27.4	34.1
12	312	RHC-HD 1405	32.4	33.4	32.8	31.7	32.6
13	313	GTHV 18/19	35.1	34.0	37.2	26.0	33.1
14	314	CNH 1132	34.2	33.2	37.5	35.6	35.1
15	315	Local Check	34.7	33.8	38.9	28.0	33.9
16	316	CNDTS 44	32.2	34.2	34.3	26.0	31.7
17	317	DSC 1952	36.2	36.2	37.9	32.1	35.6
18	318	CNH 09-45	32.2	31.6	38.3	21.6	30.9
19	319	RAHC 1902	35.3	27.8	38.2	31.7	33.3
20	320	CCH 19-5	36.9	37.8	35.4	32.7	35.7

Br. 06b – Initial Evaluation Trial of Compact genotypes (Rainfed)

No. of bolls/m^2

S. No.	Code No.	Entries	Nandyal	Adilabad	Mean SZ
1	301	RAHC 1901	53.3	150.7	102.0
2	302	TCH 002	43.7	148.3	96.0
3	303	GBHV 187	63.7	96.9	80.3
4	304	CNH 09-77	54.7	131.7	93.2
5	305	RHC-HD 1312	74.7	107.5	91.1
6	306	CCH 15-1	53.7	98.3	76.0
7	307	DSC 1951	67.7	153.9	110.8
8	308	Common Check (Suraj)	58.7	96.4	77.5
9	309	CNH 1133	68.0	89.4	78.7
10	310	CCH 19-4	70.0	101.5	85.8
11	311	CNH 2046	79.0	102.7	90.9
12	312	RHC-HD 1405	63.0	112.9	88.0
13	313	GTHV 18/19	82.0	133.0	107.5
14	314	CNH 1132	70.7	95.4	83.0
15	315	Local Check	55.3	107.2	81.3
16	316	CNDTS 44	60.0	94.8	77.4
17	317	DSC 1952	55.0	117.7	86.4
18	318	CNH 09-45	67.7	109.6	88.6
19	319	RAHC 1902	61.3	115.3	88.3
20	320	CCH 19-5	54.7	107.4	81.0

Plant height (cm)

S. No.	Code No.	Entries	Nandyal	Adilabad	Mean SZ
1	301	RAHC 1901	57.3	143.4	100.4
2	302	TCH 002	71.3	155.4	113.4
3	303	GBHV 187	92.7	163.0	127.8
4	304	CNH 09-77	87.0	149.4	118.2
5	305	RHC-HD 1312	95.7	166.3	131.0
6	306	CCH 15-1	84.7	139.2	111.9
7	307	DSC 1951	75.0	155.5	115.3
8	308	Common Check (Suraj)	80.3	136.8	108.6
9	309	CNH 1133	85.3	133.8	109.6
10	310	CCH 19-4	96.3	148.1	122.2
11	311	CNH 2046	74.3	127.7	101.0
12	312	RHC-HD 1405	87.3	146.8	117.1
13	313	GTHV 18/19	87.3	137.4	112.4
14	314	CNH 1132	90.0	142.0	116.0
15	315	Local Check	79.7	132.1	105.9
16	316	CNDTS 44	87.7	137.4	112.5
17	317	DSC 1952	77.0	147.9	112.5
18	318	CNH 09-45	84.0	148.9	116.5
19	319	RAHC 1902	73.7	143.3	108.5
20	320	CCH 19-5	78.3	154.5	116.4

Br. 06b – Initial Evaluation Trial of Compact genotypes (Rainfed)

No. of monopodia / plant

S. No.	Code No.	Entries	Nandyal	Adilabad	Mean SZ
1	301	RAHC 1901	0.7	1.1	0.9
2	302	TCH 002	0.0	0.7	0.4
3	303	GBHV 187	0.7	0.1	0.4
4	304	CNH 09-77	1.0	0.3	0.7
5	305	RHC-HD 1312	0.7	0.5	0.6
6	306	CCH 15-1	1.0	0.9	1.0
7	307	DSC 1951	1.0	0.8	0.9
8	308	Common Check (Suraj)	1.3	0.9	1.1
9	309	CNH 1133	1.0	0.3	0.7
10	310	CCH 19-4	1.7	0.9	1.3
11	311	CNH 2046	1.3	0.5	0.9
12	312	RHC-HD 1405	1.3	0.7	1.0
13	313	GTHV 18/19	1.0	1.1	1.1
14	314	CNH 1132	1.7	0.4	1.0
15	315	Local Check	2.0	0.5	1.3
16	316	CNDTS 44	1.7	1.4	1.5
17	317	DSC 1952	1.3	0.5	0.9
18	318	CNH 09-45	2.0	0.4	1.2
19	319	RAHC 1902	0.7	0.8	0.7
20	320	CCH 19-5	1.3	0.1	0.7

No. of sympodia / plant

S. No.	Code No.	Entries	Nandyal	Adilabad	Mean SZ
1	301	RAHC 1901	15.3	21.2	18.3
2	302	TCH 002	13.0	21.3	17.2
3	303	GBHV 187	17.7	20.6	19.1
4	304	CNH 09-77	13.0	22.7	17.9
5	305	RHC-HD 1312	16.7	22.7	19.7
6	306	CCH 15-1	16.0	20.1	18.1
7	307	DSC 1951	18.0	21.7	19.9
8	308	Common Check (Suraj)	16.3	19.1	17.7
9	309	CNH 1133	15.0	18.9	17.0
10	310	CCH 19-4	11.0	18.7	14.9
11	311	CNH 2046	13.3	20.6	17.0
12	312	RHC-HD 1405	16.7	19.1	17.9
13	313	GTHV 18/19	17.7	19.5	18.6
14	314	CNH 1132	17.7	19.3	18.5
15	315	Local Check	16.0	18.3	17.2
16	316	CNDTS 44	16.7	19.3	18.0
17	317	DSC 1952	19.3	22.9	21.1
18	318	CNH 09-45	17.3	20.3	18.8
19	319	RAHC 1902	16.7	20.0	18.3
20	320	CCH 19-5	12.0	18.5	15.3

Br. 06b – Initial Evaluation Trial of Compact genotypes (Rainfed)

Boll weight (g)

S. No.	Code No.	Entries	Nandyal	Perambalur	Mean SZ
1	301	RAHC 1901	3.5	3.8	3.7
2	302	TCH 002	4.0	4.0	4.0
3	303	GBHV 187	3.6	3.8	3.7
4	304	CNH 09-77	4.1	4.4	4.3
5	305	RHC-HD 1312	4.0	4.4	4.2
6	306	CCH 15-1	4.1	4.8	4.5
7	307	DSC 1951	4.0	5.1	4.5
8	308	Common Check (Suraj)	3.9	4.6	4.2
9	309	CNH 1133	3.8	4.3	4.1
10	310	CCH 19-4	4.0	4.7	4.4
11	311	CNH 2046	3.2	4.7	4.0
12	312	RHC-HD 1405	3.8	3.8	3.8
13	313	GTHV 18/19	3.8	4.3	4.1
14	314	CNH 1132	3.7	3.9	3.8
15	315	Local Check	3.6	4.2	3.9
16	316	CNDTS 44	3.3	4.4	3.9
17	317	DSC 1952	3.7	4.7	4.2
18	318	CNH 09-45	4.0	3.8	3.9
19	319	RAHC 1902	3.6	4.8	4.2
20	320	CCH 19-5	4.1	4.1	4.1

Lint Index (g)

S. No.	Code No.	Entries	Nandyal	Adilabad	Mean SZ
1	301	RAHC 1901	4.4	5.4	4.9
2	302	TCH 002	3.8	4.1	4.0
3	303	GBHV 187	4.2	5.2	4.7
4	304	CNH 09-77	4.6	5.0	4.8
5	305	RHC-HD 1312	4.8	5.1	5.0
6	306	CCH 15-1	5.6	4.9	5.3
7	307	DSC 1951	3.2	4.1	3.7
8	308	Common Check (Suraj)	4.8	4.9	4.9
9	309	CNH 1133	5.6	5.5	5.6
10	310	CCH 19-4	4.4	4.3	4.4
11	311	CNH 2046	4.6	4.6	4.6
12	312	RHC-HD 1405	4.6	4.4	4.5
13	313	GTHV 18/19	4.0	5.2	4.6
14	314	CNH 1132	4.6	5.0	4.8
15	315	Local Check	4.5	5.9	5.2
16	316	CNDTS 44	4.0	4.1	4.1
17	317	DSC 1952	4.2	4.9	4.6
18	318	CNH 09-45	6.0	5.8	5.9
19	319	RAHC 1902	3.4	6.0	4.7
20	320	CCH 19-5	5.0	5.3	5.2

Br. 06b – Initial Evaluation Trial of Compact genotypes (Rainfed)
Seed Index (g)

S. No.	Code No.	Entries	Nandyal	Adilabad	Mean SZ
1	301	RAHC 1901	8.6	8.4	8.5
2	302	TCH 002	9.4	8.8	9.1
3	303	GBHV 187	8.6	8.5	8.6
4	304	CNH 09-77	9.0	8.7	8.9
5	305	RHC-HD 1312	9.2	8.9	9.1
6	306	CCH 15-1	11.4	9.3	10.4
7	307	DSC 1951	8.4	7.5	8.0
8	308	Common Check (Suraj)	10.0	7.9	9.0
9	309	CNH 1133	9.6	8.6	9.1
10	310	CCH 19-4	9.0	9.4	9.2
11	311	CNH 2046	7.6	8.9	8.3
12	312	RHC-HD 1405	8.6	9.0	8.8
13	313	GTHV 18/19	7.8	8.7	8.3
14	314	CNH 1132	8.8	8.4	8.6
15	315	Local Check	8.7	9.2	9.0
16	316	CNDTS 44	9.2	7.9	8.6
17	317	DSC 1952	7.4	7.9	7.7
18	318	CNH 09-45	13.0	8.7	10.9
19	319	RAHC 1902	9.2	9.7	9.5
20	320	CCH 19-5	8.0	10.1	9.1

Br 12a - Initial Evaluation Trial of *G. barbadense*

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Dharwad	Lam*	Coimbatore	Mean SZ	Rank
1	321	SBSD 5-6	1281		1477	1379	5
2	322	CCB 64B	1091		1714	1403	4
3	323	DB 1901	1167		1914	1541	1
4	324	Zonal Check	957		1532	1245	6
5	325	CCB 142	1170		1678	1424	3
6	326	CCB 141	1137		1875	1506	2
		CD @ 5 %	274		167		
		CV %	16		7		
		Zonal Check	Suvin				

***Vitiated**

Br 12a - Initial Evaluation Trial of *G. barbadense*

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Dharwad	Coimbatore	Mean SZ
1	321	SBSD 5-6	404	485	445
2	322	CCB 64B	354	581	468
3	323	DB 1901	352	621	487
4	324	Zonal Check	306	509	408
5	325	CCB 142	392	566	479
6	326	CCB 141	336	588	462

Ginning outturn (%)

S. No.	Code No.	Entries	Dharwad	Coimbatore	Mean SZ
1	321	SBSD 5-6	31.5	32.8	32.2
2	322	CCB 64B	32.4	33.9	33.2
3	323	DB 1901	30.2	32.4	31.3
4	324	Zonal Check	32.0	33.2	32.6
5	325	CCB 142	33.6	33.7	33.7
6	326	CCB 141	29.5	31.3	30.4

Bolls/plant

S. No.	Code No.	Entries	Dharwad	Coimbatore	Mean SZ
1	321	SBSD 5-6	13.1	18.0	15.6
2	322	CCB 64B	11.8	21.0	16.4
3	323	DB 1901	11.8	23.7	17.8
4	324	Zonal Check	10.8	18.3	14.6
5	325	CCB 142	13.0	26.7	19.9
6	326	CCB 141	10.6	27.6	19.1

Boll weight (g)

S. No.	Code No.	Entries	Dharwad	Coimbatore	Mean SZ
1	321	SBSD 5-6	3.0	3.5	3.3
2	322	CCB 64B	3.1	3.7	3.4
3	323	DB 1901	2.5	3.2	2.9
4	324	Zonal Check	2.9	3.5	3.2
5	325	CCB 142	2.9	3.2	3.1
6	326	CCB 141	2.8	3.2	3.0

Br 15a –Preliminary Hybrid Trial of Interspecific Hybrid (H X B)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Dharwad	Dharwad (KSSC)	Lam	Coimbatore	Mean SZ	Rank
1	331	DHB 1902	2029	985	1889	1507	1603	3
2	332	RHB 1401	1637	768	2022	1630	1514	5
3	333	Local Checks	2331	1218	1909	1582	1760	1
4	334	DHB 1901	1830	798	2063	1658	1587	4
5	335	Phule Dhara (CC)	1997	794	2644	1597	1758	2
6	336	LAHB 2	1343	747	1970	1658	1430	6
		CD @ 5 %	455	276	388	128		
		CV %	16	17	12	6		
		Local Checks	**DHB 915**	**DHB 915**	**DHB 915**	**DHB 915**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Dharwad	Dharwad (KSSC)	Lam	Coimbatore	Mean SZ
1	331	DHB 1902	644	332	515	464	489
2	332	RHB 1401	508	262	693	515	495
3	333	LC	787	478	676	502	611
4	334	DHB 1901	569	273	688	512	511
5	335	Phule Dhara (CC)	607	284	933	496	580
6	336	LAHB 2	396	249	519	526	423

Ginning outturn (%)

S. No.	Code No.	Entries	Dharwad	Dharwad (KSSC)	Lam	Coimbatore	Mean SZ
1	331	DHB 1902	31.8	33.7	27.4	30.8	30.9
2	332	RHB 1401	31.1	34.1	34.2	31.5	32.7
3	333	LC	33.8	39.3	35.7	31.7	35.1
4	334	DHB 1901	31.1	34.2	33.0	30.9	32.3
5	335	Phule Dhara (CC)	30.4	35.7	35.1	31.0	33.1
6	336	LAHB 2	29.5	33.4	26.2	31.7	30.2

Bolls/plant

S. No.	Code No.	Entries	Dharwad	Dharwad (KSSC)	Lam	Coimbatore	Mean SZ
1	331	DHB 1902	19.5	18.4	66.4	22.9	31.8
2	332	RHB 1401	19.5	17.9	76.2	26.4	35.0
3	333	LC	21.8	14.7	71.5	25.7	33.4
4	334	DHB 1901	19.6	15.8	77.3	27.4	35.0
5	335	Phule Dhara (CC)	22.4	14.7	86.2	29.5	38.2
6	336	LAHB 2	21.5	13.5	61.8	30.3	31.8

Br 15a –Preliminary Hybrid Trial of Interspecific Hybrid (H X B)
Boll weight (g)

S. No.	Code No.	Entries	Dharwad	Dharwad (KSSC)	Lam	Coimbatore	Mean SZ
1	331	DHB 1902	3.6	4.2	3.0	4.3	3.8
2	332	RHB 1401	3.6	4.1	3.2	5.0	4.0
3	333	LC	3.5	3.8	2.6	4.3	3.6
4	334	DHB 1901	3.3	3.9	2.4	4.5	3.5
5	335	Phule Dhara (CC)	3.6	3.9	4.0	4.2	3.9
6	336	LAHB 2	3.4	4.0	3.2	4.5	3.8

Br. 22b – Initial Evaluation Trial of *G. arboreum*

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Mudhole	Kovilpatti	Mean SZ	Rank
1	341	DWDA 1902	856	1673	946	1457	1233	18
2	342	CNA 2036	1344	2039	1176	1440	1500	9
3	343	CNA 2037	1277	1800	1088	1399	1391	13
4	344	NDLA 3116-3	1228	2239	1437	2119	1756	1
5	345	JLA 1102	1172	2023	1537	1539	1568	4
6	346	Zonal Check	1103	1439	1690	1481	1428	10
7	347	PA 863	1002	1984	1231	1374	1398	12
8	348	MDL 2689	899	1917	1144	782	1186	19
9	349	GAM 267	848	1774	1336	988	1237	17
10	350	CNA 1042	999	1784	1028	1358	1292	15
11	351	NDLA 3104-4	1178	2295	1563	1634	1668	2
12	352	LC	1286	2228	1256	864	1409	11
13	353	JLA 1313	1056	2228	1350	1481	1529	7
14	354	GAM 273	1154	2350	1406	1214	1531	5
15	355	PA 860	866	1717	1321	1091	1249	16
16	356	MDL 2679	1304	2123	1459	1235	1530	6
17	357	AKA 2013-8	1380	1834	811	1317	1336	14
18	358	CNA 2035	1269	2217	1505	1543	1634	3
19	359	DWDA 1901	1239	1978	1521	1374	1528	8
		CD @ 5 %	350	421	363	172		
		CV %	19	12.8	17	8		
		Zonal Check	DLSa 17					
		Local Checks	**AK 235**	**Yaganti**	**Veena**	**K 12**		

Br. 22b – Initial Evaluation Trial of *G. arboreum*

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Mudhole	Kovilpatti	Mean SZ
1	341	DWDA 1902	364	669	397	541	493
2	342	CNA 2036	518	742	447	490	549
3	343	CNA 2037	488	706	421	493	527
4	344	NDLA 3116-3	532	829	623	777	690
5	345	JLA 1102	433	704	576	500	553
6	346	Zonal Check	407	579	602	502	523
7	347	PA 863	366	659	475	474	494
8	348	MDL 2689	390	713	484	255	461
9	349	GAM 267	338	607	480	345	443
10	350	CNA 1042	360	635	398	449	461
11	351	NDLA 3104-4	453	826	599	571	612
12	352	LC	492	793	481	249	504
13	353	JLA 1313	421	793	558	513	571
14	354	GAM 273	449	856	536	427	567
15	355	PA 860	314	604	480	355	438
16	356	MDL 2679	574	904	648	437	641
17	357	AKA 2013-8	540	693	324	404	490
18	358	CNA 2035	485	820	595	493	598
19	359	DWDA 1901	499	724	575	478	569

Ginning outturn (%)

S. No.	Code No.	Entries	Dharwad	Nandyal	Mudhole	Kovilpatti	Mean SZ
1	341	DWDA 1902	42.6	40.0	41.9	37.2	40.4
2	342	CNA 2036	38.5	36.4	38.1	34.0	36.8
3	343	CNA 2037	38.3	39.2	38.9	35.3	37.9
4	344	NDLA 3116-3	43.3	37.0	43.3	36.6	40.1
5	345	JLA 1102	36.9	34.8	37.5	32.4	35.4
6	346	Zonal Check	36.9	40.2	35.6	33.7	36.6
7	347	PA 863	36.5	33.2	38.4	34.5	35.7
8	348	MDL 2689	43.3	37.2	42.2	32.7	38.9
9	349	GAM 267	39.9	34.2	36.2	34.9	36.3
10	350	CNA 1042	36.1	35.6	38.2	33.1	35.8
11	351	NDLA 3104-4	38.5	36.0	37.7	35.0	36.8
12	352	LC	38.3	35.6	37.9	28.8	35.2
13	353	JLA 1313	39.9	35.6	38.4	34.6	37.1
14	354	GAM 273	38.9	36.4	38.2	35.3	37.2
15	355	PA 860	36.3	35.2	36.9	32.5	35.2
16	356	MDL 2679	44.0	42.6	44.5	35.4	41.6
17	357	AKA 2013-8	39.2	37.8	39.7	30.7	36.9
18	358	CNA 2035	38.3	37.0	39.7	32.0	36.8
19	359	DWDA 1901	40.3	36.6	37.2	34.8	37.2

Br. 22b – Initial Evaluation Trial of *G. arboreum*

Bolls/plant

S. No.	Code No.	Entries	Dharwad	Nandyal	Mudhole	Kovilpatti	Mean SZ
1	341	DWDA 1902	7.0	11.6	17.5	9.0	11.3
2	342	CNA 2036	9.4	16.0	20.1	8.9	13.6
3	343	CNA 2037	8.8	13.1	33.1	9.4	16.1
4	344	NDLA 3116-3	9.5	18.0	24.0	10.1	15.4
5	345	JLA 1102	9.3	17.0	22.7	9.1	14.5
6	346	Zonal Check	9.3	12.0	21.7	10.2	13.3
7	347	PA 863	7.7	16.0	21.9	9.5	13.8
8	348	MDL 2689	7.9	15.0	15.6	7.1	11.4
9	349	GAM 267	9.7	12.0	19.9	7.7	12.3
10	350	CNA 1042	9.3	13.2	19.5	10.0	13.0
11	351	NDLA 3104-4	8.9	19.0	18.8	8.9	13.9
12	352	LC	10.1	17.0	18.1	7.8	13.3
13	353	JLA 1313	9.0	16.0	21.1	8.9	13.8
14	354	GAM 273	7.7	20.0	17.9	8.3	13.5
15	355	PA 860	11.7	14.9	23.1	8.9	14.7
16	356	MDL 2679	9.8	14.0	17.5	6.9	12.1
17	357	AKA 2013-8	11.3	16.0	21.0	8.3	14.2
18	358	CNA 2035	11.2	16.0	23.5	10.1	15.2
19	359	DWDA 1901	9.7	14.2	22.9	8.4	13.8

Boll weight (g)

S. No.	Code No.	Entries	Dharwad	Nandyal	Mudhole	Kovilpatti	Mean SZ
1	341	DWDA 1902	2.7	2.7	3.4	3.6	3.1
2	342	CNA 2036	2.4	2.3	2.7	2.7	2.5
3	343	CNA 2037	2.5	2.6	2.5	2.8	2.6
4	344	NDLA 3116-3	2.7	2.4	3.0	3.6	2.9
5	345	JLA 1102	2.3	1.9	2.5	2.6	2.3
6	346	Zonal Check	2.2	2.3	2.5	2.9	2.5
7	347	PA 863	2.6	2.6	2.9	2.7	2.7
8	348	MDL 2689	2.9	2.9	3.2	2.6	2.9
9	349	GAM 267	2.3	2.5	3.1	2.8	2.7
10	350	CNA 1042	2.4	2.2	2.7	2.4	2.4
11	351	NDLA 3104-4	2.1	2.4	2.9	2.6	2.5
12	352	LC	2.4	2.3	2.8	2.3	2.5
13	353	JLA 1313	2.4	2.5	2.8	2.6	2.6
14	354	GAM 273	2.9	2.6	3.2	2.9	2.9
15	355	PA 860	2.4	2.0	2.8	2.7	2.5
16	356	MDL 2679	3.2	2.8	3.5	2.9	3.1
17	357	AKA 2013-8	2.8	2.0	2.8	2.7	2.6
18	358	CNA 2035	2.7	2.5	2.7	2.7	2.7
19	359	DWDA 1901	3.0	3.0	2.6	2.7	2.8

Br. 22b – Initial Evaluation Trial of long linted *G. arboreum*

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Nandyal	Kovilpatti	Mean SZ	Rank
1	361	PAIG 396	2033	1424	1729	1
2	362	PA 880	1604	1173	1389	4
3	363	CINA 1067	1590	1029	1310	5
4	364	PA 869	1605	856	1231	8
5	365	PA 873	1377	1078	1228	9
6	366	CINA 1068	1677	1136	1407	3
7	367	Quality Check	1312	947	1130	10
8	368	PA 864	1570	947	1259	6
9	369	PAIG 394	1548	955	1252	7
10	370	CINA 1069	1906	1078	1492	2
		CD @ 5 %	407	180		
		CV %	14.6	10		
		Quality Check	DLSa 17			

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Nandyal	Kovilpatti	Mean SZ
1	361	PAIG 396	724	474	599
2	362	PA 880	560	388	474
3	363	CINA 1067	541	355	448
4	364	PA 869	538	307	423
5	365	PA 873	482	386	434
6	366	CINA 1068	594	395	495
7	367	Quality Check	469	329	399
8	368	PA 864	503	317	410
9	369	PAIG 394	503	319	411
10	370	CINA 1069	640	376	508

Ginning outturn (%)

S. No.	Code No.	Entries	Nandyal	Kovilpatti	Mean SZ
1	361	PAIG 396	35.6	33.3	34.5
2	362	PA 880	34.9	33.1	34.0
3	363	CINA 1067	34.0	34.5	34.3
4	364	PA 869	33.5	35.9	34.7
5	365	PA 873	35.0	35.8	35.4
6	366	CINA 1068	35.4	34.6	35.0
7	367	Quality Check	35.7	34.7	35.2
8	368	PA 864	32.0	33.5	32.8
9	369	PAIG 394	32.5	33.4	33.0
10	370	CINA 1069	33.6	34.9	34.3

Br. 22b – Initial Evaluation Trial of long linted *G. arboreum*

Bolls/plant

S. No.	Code No.	Entries	Nandyal	Kovilpatti	Mean SZ
1	361	PAIG 396	21.0	6.3	13.7
2	362	PA 880	16.0	6.9	11.5
3	363	CINA 1067	16.0	7.2	11.6
4	364	PA 869	15.0	7.5	11.3
5	365	PA 873	14.1	8.2	11.2
6	366	CINA 1068	17.0	7.4	12.2
7	367	Quality Check	13.0	7.1	10.1
8	368	PA 864	14.0	7.5	10.8
9	369	PAIG 394	16.9	6.5	11.7
10	370	CINA 1069	18.5	7.3	12.9

Boll weight (g)

S. No.	Code No.	Entries	Nandyal	Kovilpatti	Mean SZ
1	361	PAIG 396	3.0	2.8	2.9
2	362	PA 880	3.0	2.7	2.9
3	363	CINA 1067	2.9	2.6	2.8
4	364	PA 869	2.7	2.9	2.8
5	365	PA 873	2.7	3	2.9
6	366	CINA 1068	2.8	2.9	2.9
7	367	Quality Check	2.8	2.5	2.7
8	368	PA 864	3.1	2.7	2.9
9	369	PAIG 394	2.8	2.5	2.7
10	370	CINA 1069	2.9	2.7	2.8

Br. 22b – Initial Evaluation Trial of Naturally Coloured *G. arboreum*

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Mean SZ	Rank
1	381	DDCC 1902	1112	1678	1395	3
2	382	Zonal Check	862	1594	1228	7
3	383	CNA 18562	1005	1549	1277	6
4	384	DDCC 1 (CC)	1247	1810	1529	1
5	385	DDCC 1901	815	1890	1353	4
6	386	Local Check	909	1953	1431	2
7	387	CNA 18563	1064	1639	1352	5
		CD @ 5 %	280	303		
		CV %	16	9.8		
		Zonal Check	DLSa 17			
		Local Checks	**AK 235**	**Yaganti**		

Br. 22b – Initial Evaluation Trial of Naturally Coloured *G. arboreum*

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Mean SZ
1	381	DDCC 1902	373	524	449
2	382	Zonal Check	311	492	402
3	383	CNA 18562	361	513	437
4	384	DDCC 1 (CC)	413	588	501
5	385	DDCC 1901	262	561	412
6	386	Local Check	331	586	459
7	387	CNA 18563	392	544	468

Ginning outturn (%)

S. No.	Code No.	Entries	Dharwad	Nandyal	Mean SZ
1	381	DDCC 1902	33.6	31.2	32.4
2	382	Zonal Check	36.1	30.9	33.5
3	383	CNA 18562	36.0	33.1	34.6
4	384	DDCC 1 (CC)	33.1	32.5	32.8
5	385	DDCC 1901	32.2	29.7	31.0
6	386	Local Check	36.5	30.0	33.3
7	387	CNA 18563	36.9	33.2	35.1

Bolls/plant

S. No.	Code No.	Entries	Dharwad	Nandyal	Mean SZ
1	381	DDCC 1902	10.4	16.0	13.2
2	382	Zonal Check	8.5	14.3	11.4
3	383	CNA 18562	10.5	14.6	12.6
4	384	DDCC 1 (CC)	11.9	18.0	15.0
5	385	DDCC 1901	11.5	18.5	15.0
6	386	Local Check	9.5	19.0	14.3
7	387	CNA 18563	10.3	15.3	12.8

Boll weight (g)

S. No.	Code No.	Entries	Dharwad	Nandyal	Mean SZ
1	381	DDCC 1902	2.1	2.2	2.2
2	382	Zonal Check	2.2	2.3	2.3
3	383	CNA 18562	2.4	2.1	2.3
4	384	DDCC 1 (CC)	2.2	2.1	2.2
5	385	DDCC 1901	2.0	2.1	2.1
6	386	Local Check	2.3	2.2	2.3
7	387	CNA 18563	2.4	2.1	2.3

SOUTH ZONE TRIALS

Br 03a – Preliminary Varietal Trial - *G. hirsutum* (South Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Arabhavi*	Raichur	Lam	Srivilliputhur	Mean SZ	Rank
1	9501	RAH 1075		2665	2319	2312	2432	3
2	9502	BS 4-18		2581	2324	1727	2211	10
3	9503	GSHV 208		2909	2542	2090	2514	1
4	9504	CPD 1701		3059	2401	1797	2419	4
5	9505	ZC (BGDS 1063)		2933	2690	1910	2511	2
6	9506	GISV 322		1817	1771	2199	1929	12
7	9507	GJHV-554		2767	1932	2002	2234	9
8	9508	LC		2687	2341	1941	2323	5
9	9509	RAH 1076		2173	2144	2219	2179	11
10	9510	TSH 357		2065	2456	2249	2257	7
11	9511	TCH 1837		2603	1869	2260	2244	8
12	9512	QC (Suraj)		2589	2197	2007	2264	6
		CD @ 5 %		307	441	298		
		CV %		12	12	10		
		Local Checks	**ARBH 813**	**BGDS 1063**	**NDLH 1938**	**SVPR 5**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Raichur	Lam	Srivilliputhur	Mean SZ
1	9501	RAH 1075	1003	784	877	888
2	9502	BS 4-18	901	764	645	770
3	9503	GSHV 208	1001	780	777	853
4	9504	CPD 1701	1168	822	693	894
5	9505	ZC (BGDS 1063)	987	889	697	858
6	9506	GISV 322	630	465	822	639
7	9507	GJHV-554	1035	707	689	810
8	9508	LC	939	820	687	815
9	9509	RAH 1076	760	749	835	781
10	9510	TSH 357	760	906	792	819
11	9511	TCH 1837	844	613	792	750
12	9512	QC (Suraj)	963	551	768	761

Br 03a – Preliminary Varietal Trial - *G. hirsutum* (South Zone)

Ginning outturn (%)

S. No.	Code No.	Entries	Raichur	Lam	Srivilliputhur	Mean SZ
1	9501	RAH 1075	37.5	33.7	38.0	36.4
2	9502	BS 4-18	34.9	32.9	37.3	35.0
3	9503	GSHV 208	34.3	30.7	37.2	34.1
4	9504	CPD 1701	38.2	34.1	38.6	37.0
5	9505	ZC (BGDS 1063)	33.7	32.9	36.6	34.4
6	9506	GISV 322	34.7	26.4	37.5	32.9
7	9507	GJHV-554	37.4	36.7	34.4	36.2
8	9508	LC	35.0	34.9	35.4	35.1
9	9509	RAH 1076	35.0	34.8	37.7	35.8
10	9510	TSH 357	36.8	37.0	35.2	36.3
11	9511	TCH 1837	32.4	32.6	35.0	33.3
12	9512	QC (Suraj)	37.3	25.2	38.3	33.6

Bolls/plant

S. No.	Code No.	Entries	Raichur	Lam	Srivilliputhur	Mean SZ
1	9501	RAH 1075	17.9	54.4	30.7	34.3
2	9502	BS 4-18	17.7	61.6	25.9	35.1
3	9503	GSHV 208	19.8	59.6	23.7	34.4
4	9504	CPD 1701	21.0	49.6	23.1	31.2
5	9505	ZC (BGDS 1063)	20.2	68.9	30.3	39.8
6	9506	GISV 322	12.8	55.3	27.7	31.9
7	9507	GJHV-554	18.0	64.7	25.7	36.1
8	9508	LC	17.9	59.1	30.2	35.7
9	9509	RAH 1076	15.0	53.3	28.3	32.2
10	9510	TSH 357	14.2	64.0	25.9	34.7
11	9511	TCH 1837	16.7	47.4	30.7	31.6
12	9512	QC (Suraj)	15.1	53.2	29.0	32.4

Boll weight (g)

S. No.	Code No.	Entries	Raichur	Lam	Srivilliputhur	Mean SZ
1	9501	RAH 1075	4.3	3.6	4.7	4.2
2	9502	BS 4-18	4.8	4.0	4.2	4.3
3	9503	GSHV 208	5.0	3.7	4.2	4.3
4	9504	CPD 1701	4.4	3.8	4.8	4.3
5	9505	ZC (BGDS 1063)	5.3	4.5	4.4	4.7
6	9506	GISV 322	4.7	3.8	4.8	4.4
7	9507	GJHV-554	3.7	3.4	3.4	3.5
8	9508	LC	4.5	4.0	4.1	4.2
9	9509	RAH 1076	4.4	4.3	4.1	4.3
10	9510	TSH 357	4.5	4.5	4.9	4.6
11	9511	TCH 1837	5.1	4.0	4.6	4.6
12	9512	QC (Suraj)	5.3	4.2	4.6	4.7

Br 04a – Coordinated Varietal Trial - *G. hirsutum* (South Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Arabhavi*	Raichur	Lam	Srivilliputhur	Mean SZ	Rank
1	9521	RHC 1217		2024	2089	2294	2136	5
2	9522	GSHV 185		2839	2499	1676	2338	1
3	9523	LC		2513	2522	1819	2285	2
4	9524	SIMA-5		2159	2073	2492	2241	4
5	9525	QC (Suraj)		2084	2142	1795	2007	9
6	9526	CPD 1702		2495	1968	1822	2095	6
7	9527	TSH 325		1897	1519	2136	1851	10
8	9528	ZC (BGDS 1063)		2190	2764	1875	2276	3
9	9529	BS 1		2426	1788	2029	2081	7
10	9530	HS 298		2232	1854	2038	2041	8
		CD @ 5 %		258	444	268		
		CV %		11	12	9		
		Local Checks	**ARBH 813**	**BGDS 1063**	**NDLH 1938**	**SVPR 5**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Raichur	Lam	Srivilliputhur	Mean SZ
1	9521	RHC 1217	754	618	842	738
2	9522	GSHV 185	990	909	575	825
3	9523	LC	918	931	647	832
4	9524	SIMA-5	719	764	883	789
5	9525	QC (Suraj)	769	732	711	737
6	9526	CPD 1702	921	662	703	762
7	9527	TSH 325	676	508	789	658
8	9528	ZC (BGDS 1063)	710	1084	660	818
9	9529	BS 1	796	614	713	708
10	9530	HS 298	811	548	786	715

Ginning outturn (%)

S. No.	Code No.	Entries	Raichur	Lam	Srivilliputhur	Mean SZ
1	9521	RHC 1217	37.4	29.6	36.7	34.6
2	9522	GSHV 185	34.8	36.3	34.3	35.1
3	9523	LC	36.5	37.1	35.6	36.4
4	9524	SIMA-5	33.4	36.8	35.5	35.2
5	9525	QC (Suraj)	36.8	33.8	39.4	36.7
6	9526	CPD 1702	36.9	33.6	38.6	36.4
7	9527	TSH 325	35.6	33.4	36.9	35.3
8	9528	ZC (BGDS 1063)	32.4	39.1	35.2	35.6
9	9529	BS 1	32.8	34.1	35.1	34.0
10	9530	HS 298	36.3	29.7	38.6	34.9

Br 04a – Coordinated Varietal Trial - *G. hirsutum* (South Zone)

Bolls/plant

S. No.	Code No.	Entries	Raichur	Lam	Srivilliputhur	Mean SZ
1	9521	RHC 1217	13.7	59.5	31.5	34.9
2	9522	GSHV 185	21.6	62.1	28.0	37.2
3	9523	LC	18.1	66.5	31.3	38.6
4	9524	SIMA-5	14.5	58.9	30.6	34.7
5	9525	QC (Suraj)	16.9	59.5	31.7	36.0
6	9526	CPD 1702	17.8	60.3	27.6	35.2
7	9527	TSH 325	12.9	48.0	31.3	30.7
8	9528	ZC (BGDS 1063)	15.5	68.2	33.8	39.2
9	9529	BS 1	17.5	55.4	30.4	34.4
10	9530	HS 298	16.0	49.1	31.2	32.1

Boll weight (g)

S. No.	Code No.	Entries	Raichur	Lam	Srivilliputhur	Mean SZ
1	9521	RHC 1217	4.8	4.1	4.7	4.5
2	9522	GSHV 185	5.1	4.4	4.3	4.6
3	9523	LC	4.8	4.5	3.8	4.4
4	9524	SIMA-5	4.1	4.3	5.0	4.5
5	9525	QC (Suraj)	5.3	4.9	4.1	4.8
6	9526	CPD 1702	5.0	4.0	4.8	4.6
7	9527	TSH 325	5.5	4.3	4.2	4.7
8	9528	ZC (BGDS 1063)	5.4	4.9	4.1	4.8
9	9529	BS 1	4.8	4.7	4.5	4.7
10	9530	HS 298	5.3	4.0	4.3	4.5

Br 05a – Coordinated Hybrid Trial - Intra *hirsutum* hybrids (South Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Raichur	B' Gudi	Dharwad (KSSC)	Lam	Srivilliputhur	Mean SZ	Rank
1	9531	DHH 1902	3042	1361	1135	2025	1994	1911	8
2	9532	BGDHH 697	3598	949	1033	2138	2248	1993	5
3	9533	ARBHH 1901	2941	872	1133	2431	1911	1858	9
4	9534	ZC (RAHH 455)	2876	1182	1037	2673	1944	1942	7
5	9535	LAHH 36	3607	1420	1074	2571	2230	2180	4
6	9536	ARBHH 1902	2671	1003	1304	2632	1506	1823	10
7	9537	LC	3627	1964	1217	2851	2586	2449	1
8	9538	DHH 1901	3163	924	996	2452	2200	1947	6
9	9539	RAHH 1952	3775	1585	976	2614	2282	2246	3
10	9540	RAHH 1951	4262	1359	983	2957	2347	2382	2
		CD @ 5 %	234	149	236	495	323		
		CV %	7	12	13	11	11		
		Local Checks	**SHH 818**	**SHH 818**	**DHH 11**	**LAHH 5**	**SHH 818**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Raichur	B' Gudi	Dharwad (KSSC)	Lam	Srivilliputhur	Mean SZ
1	9531	DHH 1902	1142	520	454	723	777	723
2	9532	BGDHH 697	1290	346	397	753	788	715
3	9533	ARBHH 1901	1070	333	438	787	719	669
4	9534	ZC (RAHH 455)	1004	426	373	898	700	680
5	9535	LAHH 36	1295	540	388	940	814	795
6	9536	ARBHH 1902	958	373	521	800	546	640
7	9537	LC	1297	738	488	987	979	898
8	9538	DHH 1901	1173	353	403	815	813	711
9	9539	RAHH 1952	1409	634	385	960	911	860
10	9540	RAHH 1951	1492	511	357	1140	863	873

Br 05a – Coordinated Hybrid Trial - Intra *hirsutum* hybrids (South Zone)

Ginning outturn (%)

S. No.	Code No.	Entries	Raichur	B' Gudi	Dharwad (KSSC)	Lam	Srivilliputhur	Mean SZ
1	9531	DHH 1902	37.5	38.2	40.0	35.7	38.9	38.1
2	9532	BGDHH 697	35.9	36.5	38.4	35.3	35.0	36.2
3	9533	ARBHH 1901	36.4	38.2	38.7	32.5	37.5	36.7
4	9534	ZC (RAHH 455)	34.9	35.9	36.0	33.6	36.3	35.3
5	9535	LAHH 36	35.9	38.1	36.1	36.3	36.5	36.6
6	9536	ARBHH 1902	35.9	37.1	39.9	30.3	36.4	35.9
7	9537	LC	35.7	37.6	40.1	34.6	37.9	37.2
8	9538	DHH 1901	37.0	38.2	40.5	33.3	36.8	37.2
9	9539	RAHH 1952	37.3	40.0	39.5	36.7	39.9	38.7
10	9540	RAHH 1951	35.0	37.6	36.3	38.5	36.7	36.8

Bolls/plant

S. No.	Code No.	Entries	Raichur	B' Gudi	Dharwad (KSSC)	Lam	Srivilliputhur	Mean SZ
1	9531	DHH 1902	27.4	21.0	16.3	58.3	27.5	30.1
2	9532	BGDHH 697	30.5	18.3	14.9	49.8	27.1	28.1
3	9533	ARBHH 1901	24.7	16.0	15.7	47.6	24.7	25.7
4	9534	ZC (RAHH 455)	25.3	20.0	15.1	63.7	27.5	30.3
5	9535	LAHH 36	30.8	23.3	14.5	62.1	29.8	32.1
6	9536	ARBHH 1902	21.6	16.0	13.9	53.0	20.6	25.0
7	9537	LC	31.4	29.7	15.5	50.0	31.3	31.6
8	9538	DHH 1901	29.4	17.3	15.7	62.7	23.1	29.6
9	9539	RAHH 1952	32.5	24.3	15.3	65.8	28.8	33.3
10	9540	RAHH 1951	37.3	22.3	15.3	68.7	32.5	35.2

Boll weight (g)

S. No.	Code No.	Entries	Raichur	B' Gudi	Dharwad (KSSC)	Lam	Srivilliputhur	Mean SZ
1	9531	DHH 1902	4.3	3.7	5.2	3.8	4.3	4.3
2	9532	BGDHH 697	5.3	3.6	6.0	4.4	5.2	4.9
3	9533	ARBHH 1901	5.3	3.8	6.6	4.8	5.1	5.1
4	9534	ZC (RAHH 455)	4.5	3.4	5.6	5.0	4.8	4.7
5	9535	LAHH 36	5.2	4.6	6.0	5.2	5.1	5.2
6	9536	ARBHH 1902	5.0	4.5	7.4	4.8	4.8	5.3
7	9537	LC	4.4	4.3	6.0	4.7	4.8	4.8
8	9538	DHH 1901	4.5	3.5	5.4	4.9	4.4	4.5
9	9539	RAHH 1952	4.9	3.8	5.3	4.7	4.4	4.6
10	9540	RAHH 1951	4.6	4.2	5.4	5.3	4.5	4.8

Br 06a – CVT of Compact genotypes (South Zone) (Irrigated)

Total Seed Cotton Yield at 160 DAS (Total of 130 DAS + 160 DAS) (Kg/ha)

S. No.	Code No.	Entries	Raichur	Arabhavi*	Lam	Mudhole	Srivilliputtur	Mean SZ	Rank
1	9551	RHC HD 1433	3533		2249	3564	1765	2778	1
2	9552	LHDP 5	1976		3073	2376	2431	2464	6
3	9553	RAHC 1028	2744		2343	3068	1972	2532	5
4	9554	DS C 1801	2708		1943	2657	2104	2353	8
5	9555	Local Check	2942		2663	1265	2378	2312	9
6	9556	RHC HD 1420	3372		2189	2506	2083	2538	4
7	9557	LHDP 2	1733		3147	2632	2335	2462	7
8	9558	Zonal Check (Suraj)	2970		2147	3012	2198	2582	3
9	9559	RHC-HD 1438	2780		2459	2733	2510	2621	2
		CD @ 5 %	284		485	746	314		
		CV %	10		11	16	10		
		Local Checks	**Sujay**	**ARBH 813**	**L 604**	**L 604**	**Suraj**		

***Poor yield – rejected**

Seed Cotton Yield (130 DAS) (Kg/ha)

S. No.	Code No.	Entries	Raichur	Lam	Srivilliputtur	Mean SZ
1	9551	RHC HD 1433	2886	1708	1040	1878
2	9552	LHDP 5	1607	2415	1070	1697
3	9553	RAHC 1028	2241	1937	552	1577
4	9554	DS C 1801	2216	1618	965	1600
5	9555	Local Check	2405	2281	858	1848
6	9556	RHC HD 1420	2754	1858	645	1752
7	9557	LHDP 2	1415	2652	907	1658
8	9558	Zonal Check (Suraj)	2424	1781	831	1679
9	9559	RHC-HD 1438	2258	2039	1083	1793

Seed Cotton Yield (160 DAS) (Kg/ha)

S. No.	Code No.	Entries	Raichur	Lam	Srivilliputtur	Mean SZ
1	9551	RHC HD 1433	646	541	725	637
2	9552	LHDP 5	369	657	1361	796
3	9553	RAHC 1028	504	406	1420	777
4	9554	DS C 1801	492	325	1139	652
5	9555	Local Check	537	382	1520	813
6	9556	RHC HD 1420	618	332	1438	796
7	9557	LHDP 2	318	495	1427	747
8	9558	Zonal Check (Suraj)	546	366	1367	760
9	9559	RHC-HD 1438	502	421	1427	783

Br 06a – CVT of Compact genotypes (South Zone) (Irrigated)

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Raichur	Lam	Mudhole	Srivilliputtur	Mean SZ
1	9551	RHC HD 1433	1243	696	1317	674	983
2	9552	LHDP 5	675	1121	884	940	905
3	9553	RAHC 1028	944	809	1098	657	877
4	9554	DS C 1801	974	601	982	788	836
5	9555	Local Check	983	997	388	861	807
6	9556	RHC HD 1420	1253	764	862	788	917
7	9557	LHDP 2	602	1220	978	838	910
8	9558	Zonal Check (Suraj)	1065	652	1172	803	923
9	9559	RHC-HD 1438	945	793	981	897	904

Ginning outturn (%)

S. No.	Code No.	Entries	Raichur	Lam	Mudhole	Srivilliputtur	Mean SZ
1	9551	RHC HD 1433	35.2	30.6	36.9	38.2	35
2	9552	LHDP 5	34.2	36.3	37.2	38.7	37
3	9553	RAHC 1028	34.4	34.4	35.7	33.4	34
4	9554	DS C 1801	36.0	30.9	36.9	37.5	35
5	9555	Local Check	33.4	37.2	30.9	36.3	34
6	9556	RHC HD 1420	37.2	35.0	34.4	37.8	36
7	9557	LHDP 2	34.7	38.5	37.2	36.0	37
8	9558	Zonal Check (Suraj)	35.8	30.3	38.9	36.5	35
9	9559	RHC-HD 1438	34.0	32.2	35.9	35.7	34

No. of bolls/m^2

S. No.	Code No.	Entries	Raichur	Lam	Mudhole	Srivilliputtur	Mean SZ
1	9551	RHC HD 1433	99.0	54.7	76.9	108.9	85
2	9552	LHDP 5	70.3	68.8	69.6	121.3	83
3	9553	RAHC 1028	77.7	50.6	64.1	125.2	79
4	9554	DS C 1801	77.3	40.7	59.0	116.7	73
5	9555	Local Check	84.3	64.7	74.5	125.8	87
6	9556	RHC HD 1420	91.0	41.8	66.4	116.9	79
7	9557	LHDP 2	58.3	62.4	60.4	127.4	77
8	9558	Zonal Check (Suraj)	87.0	46.1	66.6	123.4	81
9	9559	RHC-HD 1438	80.3	50.4	65.4	128.4	81

Br 06a – CVT of Compact genotypes (South Zone) (Irrigated)

Plant height (cm)

S. No.	Code No.	Entries	Raichur	Lam	Mudhole	Srivilliputtur	Mean SZ
1	9551	RHC HD 1433	106.9	127.5	117.2	95.9	112
2	9552	LHDP 5	102.0	136.0	119.0	101.1	115
3	9553	RAHC 1028	120.0	137.1	128.5	103.6	122
4	9554	DS C 1801	107.0	137.7	122.3	103.9	118
5	9555	Local Check	116.5	143.8	130.1	101.7	123
6	9556	RHC HD 1420	123.3	173.9	148.6	102.7	137
7	9557	LHDP 2	99.5	124.8	112.1	100.4	109
8	9558	Zonal Check (Suraj)	115.9	133.0	124.4	101.6	119
9	9559	RHC-HD 1438	137.7	154.3		104.3	132

No. of monopodia / plant

S. No.	Code No.	Entries	Raichur	Lam	Mudhole	Srivilliputtur	Mean SZ
1	9551	RHC HD 1433	1.0	0.2	0.6	0.3	1
2	9552	LHDP 5	1.3	1.3	1.3	0.3	1
3	9553	RAHC 1028	1.3	0.8	1.0	0.7	1
4	9554	DS C 1801	1.1	0.4	0.8	0.4	1
5	9555	Local Check	1.0	0.7	0.8	0.5	1
6	9556	RHC HD 1420	0.6	0.3	0.5	0.8	1
7	9557	LHDP 2	1.4	0.7	1.1	0.7	1
8	9558	Zonal Check (Suraj)	0.9	0.5	0.7	0.4	1
9	9559	RHC-HD 1438	0.7	0.4	0.6	0.5	1

No. of sympodia / plant

S. No.	Code No.	Entries	Raichur	Lam	Mudhole	Srivilliputtur	Mean SZ
1	9551	RHC HD 1433	19.9	20.1	20.0	13.7	18
2	9552	LHDP 5	14.6	19.7	17.1	14.5	16
3	9553	RAHC 1028	15.9	21.8	18.8	14.3	18
4	9554	DS C 1801	15.7	17.3	16.5	14.5	16
5	9555	Local Check	16.1	17.8	17.0	14.5	16
6	9556	RHC HD 1420	17.9	18.7	18.3	13.7	17
7	9557	LHDP 2	14.3	19.7	17.0	14.6	16
8	9558	Zonal Check (Suraj)	17.1	17.7	17.4	15.1	17
9	9559	RHC-HD 1438	16.6	20.7	18.6	14.4	18

Br 06a – CVT of Compact genotypes (South Zone) (Irrigated)

Boll weight (g)

S. No.	Code No.	Entries	Raichur	Lam	Mudhole	Srivilliputtur	Mean SZ
1	9551	RHC HD 1433	4.7	4.8	4.8	4.3	5
2	9552	LHDP 5	4.3	4.8	4.5	3.8	4
3	9553	RAHC 1028	5.5	4.7	5.1	3.9	5
4	9554	DS C 1801	4.3	3.9	4.1	3.8	4
5	9555	Local Check	4.8	4.8	4.8	3.8	5
6	9556	RHC HD 1420	4.7	4.1	4.4	3.9	4
7	9557	LHDP 2	4.2	4.8	4.5	3.6	4
8	9558	Zonal Check (Suraj)	5.2	4.5	4.8	3.7	5
9	9559	RHC-HD 1438	5.0	4.3	4.6	4.4	5

Lint Index (g)

S. No.	Code No.	Entries	Raichur	Lam	Mudhole	Mean SZ
1	9551	RHC HD 1433	5.5	5.2	5.5	5
2	9552	LHDP 5	4.9	5.2	5.6	5
3	9553	RAHC 1028	6.2	5.0	6.1	6
4	9554	DS C 1801	5.2	4.9	5.1	5
5	9555	Local Check	5.3	5.2	4.1	5
6	9556	RHC HD 1420	5.6	5.5	5.3	5
7	9557	LHDP 2	5.1	5.3	5.3	5
8	9558	Zonal Check (Suraj)	6.0	5.1	6.6	6
9	9559	RHC-HD 1438	5.9	4.9	5.6	5

Seed Index (g)

S. No.	Code No.	Entries	Raichur	Lam	Mudhole	Mean SZ
1	9551	RHC HD 1433	10.1	11.9	11.0	11
2	9552	LHDP 5	9.4	9.2	9.3	9
3	9553	RAHC 1028	11.8	9.0	10.4	10
4	9554	DS C 1801	9.3	10.9	10.1	10
5	9555	Local Check	10.5	8.7	9.6	10
6	9556	RHC HD 1420	9.4	10.3	9.8	10
7	9557	LHDP 2	9.7	8.6	9.1	9
8	9558	Zonal Check (Suraj)	10.8	11.8	11.3	11
9	9559	RHC-HD 1438	11.4	10.4	10.9	11

Br 13a – Preliminary Varietal Trial - *G. barbadense* (South Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Dharwad	Lam*	Coimbatore	Mean SZ	Rank
1	9571	CCB 26	1134		1384	1259	6
2	9572	CCB 51	1205		1486	1346	3
3	9573	ZC (Suvin)	1087		1659	1373	2
4	9574	CCB 28	912		1427	1170	7
5	9575	CCB 29	932		1679	1306	4
6	9576	DB 1801	1187		1802	1495	1
7	9577	CCB 64	1041		1502	1272	5
		CD @ 5 %	332		115		
		CV %	17		5		

*Vitiated

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Dharwad	Coimbatore	Mean SZ
1	9571	CCB 26	363	457	410
2	9572	CCB 51	380	496	438
3	9573	ZC (Suvin)	345	541	443
4	9574	CCB 28	275	450	363
5	9575	CCB 29	302	543	423
6	9576	DB 1801	372	591	482
7	9577	CCB 64	338	508	423

Ginning outturn (%)

S. No.	Code No.	Entries	Dharwad	Coimbatore	Mean SZ
1	9571	CCB 26	32.0	33.0	32.5
2	9572	CCB 51	31.5	33.4	32.5
3	9573	ZC (Suvin)	31.8	32.6	32.2
4	9574	CCB 28	30.2	31.5	30.9
5	9575	CCB 29	32.4	32.4	32.4
6	9576	DB 1801	31.3	32.8	32.1
7	9577	CCB 64	32.4	33.8	33.1

Bolls/plant

S. No.	Code No.	Entries	Dharwad	Coimbatore	Mean SZ
1	9571	CCB 26	12.7	17.9	15.3
2	9572	CCB 51	14.7	24.8	19.8
3	9573	ZC (Suvin)	13.5	28.4	21.0
4	9574	CCB 28	15.1	27.5	21.3
5	9575	CCB 29	11.1	26.5	18.8
6	9576	DB 1801	12.5	28.8	20.7
7	9577	CCB 64	11.1	28.4	19.8

Br 13a – Preliminary Varietal Trial - *G. barbadense* (South Zone)

Boll weight (g)

S. No.	Code No.	Entries	Dharwad	Coimbatore	Mean SZ
1	9571	CCB 26	3.3	3.9	3.6
2	9572	CCB 51	3.2	3.7	3.5
3	9573	ZC (Suvin)	3.3	3.7	3.5
4	9574	CCB 28	3.3	3.6	3.5
5	9575	CCB 29	3.2	3.4	3.3
6	9576	DB 1801	3.0	3.3	3.2
7	9577	CCB 64	3.4	4.0	3.7

Br 14a – Coordinated Varietal Trial - *G. barbadense* (South Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Dharwad	Lam*	Coimbatore	Mean SZ	Rank
1	9581	CCB 51-2	1361		1561	1461	2
2	9582	DB-1701	1282		1755	1519	1
3	9583	SB SG 1-5	1199		1503	1351	5
4	9584	ZC (Suvin)	1182		1541	1362	4
5	9585	CCB 143B	1226		1532	1379	3
6	9586	CCB 129	1017		1650	1334	6
		CD @ 5 %	217		115		
		CV %	12		5		

*Vitiated

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Dharwad	Coimbatore	Mean SZ
1	9581	CCB 51-2	438	524	481
2	9582	DB-1701	389	578	484
3	9583	SB SG 1-5	394	510	452
4	9584	ZC (Suvin)	370	515	443
5	9585	CCB 143B	384	501	443
6	9586	CCB 129	314	534	424

Br 14a – Coordinated Varietal Trial - *G. barbadense* (South Zone)

Ginning outturn (%)

S. No.	Code No.	Entries	Dharwad	Coimbatore	Mean SZ
1	9581	CCB 51-2	32.2	33.5	32.9
2	9582	DB-1701	30.4	32.9	31.7
3	9583	SB SG 1-5	32.9	33.9	33.4
4	9584	ZC (Suvin)	31.3	33.4	32.4
5	9585	CCB 143B	31.3	32.7	32.0
6	9586	CCB 129	30.9	32.3	31.6

Bolls/plant

S. No.	Code No.	Entries	Dharwad	Coimbatore	Mean SZ
1	9581	CCB 51-2	12.4	20.7	16.6
2	9582	DB-1701	12.1	21.3	16.7
3	9583	SB SG 1-5	17.2	18.0	17.6
4	9584	ZC (Suvin)	13.8	16.8	15.3
5	9585	CCB 143B	12.8	17.4	15.1
6	9586	CCB 129	12.8	19.7	16.3

Boll weight (g)

S. No.	Code No.	Entries	Dharwad	Coimbatore	Mean SZ
1	9581	CCB 51-2	3.1	3.9	3.5
2	9582	DB-1701	2.9	3.4	3.2
3	9583	SB SG 1-5	3.3	3.9	3.6
4	9584	ZC (Suvin)	3.2	3.7	3.5
5	9585	CCB 143B	3.2	3.7	3.5
6	9586	CCB 129	3.0	3.2	3.1

Br 15a - CHT - Interspecific Hybrid (*hirsutum* x *barbadense*) (South Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Dharwad	Dharwad (KSSC)	Lam	Coimbatore	Mean SZ	Rank
1	9591	RHB 1623	1764	947	2227	1986	1731	3
2	9592	ZC (DCH 32)	2217	979	2035	2064	1824	1
3	9593	RHB 1624	1778	934	1597	2047	1589	5
4	9594	LC	1675	1031	2324	2043	1768	2
5	9595	RHB 1002	1654	929	2405	1869	1714	4
		CD @ 5 %	348	201	363	190		
		CV %	12	11	11	7		
		Local Checks	**DHB 915**	**DHB 915**	**DHB 915**	**DHB 915**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Dharwad	Dharwad (KSSC)	Lam	Coimbatore	Mean SZ
1	9591	RHB 1623	564	309	728	620	555
2	9592	ZC (DCH 32)	768	328	749	640	621
3	9593	RHB 1624	533	295	546	617	498
4	9594	LC	550	382	732	654	580
5	9595	RHB 1002	455	285	767	590	524

Ginning outturn (%)

S. No.	Code No.	Entries	Dharwad	Dharwad (KSSC)	Lam	Coimbatore	Mean SZ
1	9591	RHB 1623	32.0	32.7	32.9	31.2	32.2
2	9592	ZC (DCH 32)	34.7	33.5	36.8	31.0	34.0
3	9593	RHB 1624	30.0	31.5	34.5	30.1	31.5
4	9594	LC	32.9	37.0	31.4	32.0	33.3
5	9595	RHB 1002	27.5	30.6	31.8	31.6	30.4

Bolls/plant

S. No.	Code No.	Entries	Dharwad	Dharwad (KSSC)	Lam	Coimbatore	Mean SZ
1	9591	RHB 1623	18.8	26.6	73.1	27.4	36.5
2	9592	ZC (DCH 32)	17.9	25.1	78.5	27.4	37.2
3	9593	RHB 1624	20.2	22.7	74.1	28.8	36.5
4	9594	LC	21.0	23.9	80.0	27.2	38.0
5	9595	RHB 1002	20.4	21.3	79.4	28.2	37.3

Boll weight (g)

S. No.	Code No.	Entries	Dharwad	Dharwad (KSSC)	Lam	Coimbatore	Mean SZ
1	9591	RHB 1623	4.2	4.2	3.2	5.1	4.2
2	9592	ZC (DCH 32)	4.0	4.7	3.4	4.8	4.2
3	9593	RHB 1624	4.4	4.7	3.0	5.6	4.4
4	9594	LC	4.3	4.2	3.3	4.9	4.2
5	9595	RHB 1002	4.1	4.2	4.0	4.8	4.3

Br 03b – Preliminary Variety Trial - *G. hirsutum* (South Zone) (Rainfed)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Perambalur	Mean SZ	Rank
1	9601	BGDS 1033	1246	1600	1649	1498	5
2	9602	LC	1660	1495	1574	1576	4
3	9603	RAH 1075	1290	1473	2153	1639	3
4	9604	GBHV-193	1497	1806	1735	1679	1
5	9605	ZC (Sahana)	1671	1306	1514	1497	6
6	9606	BS 6-18	1240	1272	1620	1377	8
7	9607	QC (Suraj)	1360	1484	1574	1473	7
8	9608	NDLH – 2035-5	1229	1895	1806	1643	2
		CD @ 5 %	210	297	397		
		CV %	9	11.0	15		
		Local Checks	**ARBH 813**	**Sivanandi**	**KC 3**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Perambalur	Mean SZ
1	9601	BGDS 1033	460	499	541	500
2	9602	LC	602	435	492	510
3	9603	RAH 1075	438	405	683	509
4	9604	GBHV-193	522	509	624	552
5	9605	ZC (Sahana)	635	400	470	502
6	9606	BS 6-18	411	374	593	459
7	9607	QC (Suraj)	480	457	480	472
8	9608	NDLH – 2035-5	434	640	580	551

Ginning outturn (%)

S. No.	Code No.	Entries	Dharwad	Nandyal	Perambalur	Mean SZ
1	9601	BGDS 1033	36.9	31.2	32.8	33.6
2	9602	LC	36.2	29.1	31.3	32.2
3	9603	RAH 1075	34.0	27.5	31.7	31.1
4	9604	GBHV-193	34.9	28.2	36.0	33.0
5	9605	ZC (Sahana)	38.0	30.6	31.0	33.2
6	9606	BS 6-18	33.1	29.4	36.6	33.0
7	9607	QC (Suraj)	35.3	30.8	30.4	32.2
8	9608	NDLH – 2035-5	35.3	33.8	32.1	33.7

Br 03b – Preliminary Variety Trial - *G. hirsutum* (South Zone) (Rainfed)

Bolls/plant

S. No.	Code No.	Entries	Dharwad	Nandyal	Perambalur	Mean SZ
1	9601	BGDS 1033	10.6	14.0	26.9	17.2
2	9602	LC	12.1	12.0	21.8	15.3
3	9603	RAH 1075	13.3	10.7	27.2	17.1
4	9604	GBHV-193	11.3	15.0	27.3	17.9
5	9605	ZC (Sahana)	14.9	10.0	21.6	15.5
6	9606	BS 6-18	12.7	9.5	24.3	15.5
7	9607	QC (Suraj)	11.3	11.0	20.1	14.1
8	9608	NDLH – 2035-5	12.2	14.0	27.1	17.8

Boll weight (g)

S. No.	Code No.	Entries	Dharwad	Nandyal	Perambalur	Mean SZ
1	9601	BGDS 1033	3.9	3.7	4.2	3.9
2	9602	LC	4.5	4.1	3.7	4.1
3	9603	RAH 1075	4.7	4.2	4.8	4.6
4	9604	GBHV-193	4.1	3.5	4.4	4.0
5	9605	ZC (Sahana)	4.3	4.0	5.2	4.5
6	9606	BS 6-18	4.7	4.4	5.2	4.8
7	9607	QC (Suraj)	4.7	4.1	5.0	4.6
8	9608	NDLH – 2035-5	4.4	4.0	4.8	4.4

Br 04b – Coordinated Varietal Trial - *G. hirsutum* (South Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Perambalur	Mean SZ	Rank
1	9611	RAH 1071	1200	1369	1585	1385	8
2	9612	LC	1743	1658	1735	1712	3
3	9613	BS 1	1558	1374	1689	1540	6
4	9614	NDLH 20511	1619	1916	2383	1973	1
5	9615	ZC (Sahana)	1837	1311	1446	1531	7
6	9616	BGDS 1072	1450	1622	1978	1683	5
7	9617	GSHV 191	1677	1937	1793	1802	2
8	9618	QC (Suraj)	1546	1533	2013	1697	4
		CD @ 5 %	162	318	276		
		CV %	6	12.7	9		
		Local Checks	**ARBH 813**	**Sivanandi**	**KC 3**		

Br 04b – Coordinated Varietal Trial - *G. hirsutum* (South Zone)

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Perambalur	Mean SZ
1	9611	RAH 1071	408	409	483	433
2	9612	LC	643	542	546	577
3	9613	BS 1	488	408	505	467
4	9614	NDLH 20511	604	623	782	670
5	9615	ZC (Sahana)	690	454	438	527
6	9616	BGDS 1072	545	592	573	570
7	9617	GSHV 191	506	529	463	499
8	9618	QC (Suraj)	546	468	655	556

Ginning outturn (%)

S. No.	Code No.	Entries	Dharwad	Nandyal	Perambalur	Mean SZ
1	9611	RAH 1071	34.0	29.9	30.4	31.4
2	9612	LC	36.9	32.7	31.5	33.7
3	9613	BS 1	31.3	29.7	29.9	30.3
4	9614	NDLH 20511	37.3	32.5	32.8	34.2
5	9615	ZC (Sahana)	37.6	34.6	30.3	34.2
6	9616	BGDS 1072	37.6	36.5	29.0	34.4
7	9617	GSHV 191	30.2	27.3	25.8	27.8
8	9618	QC (Suraj)	35.3	30.5	32.5	32.8

Bolls/plant

S. No.	Code No.	Entries	Dharwad	Nandyal	Perambalur	Mean SZ
1	9611	RAH 1071	12.7	9.0	31.2	17.6
2	9612	LC	11.6	13.0	25.8	16.8
3	9613	BS 1	11.5	11.0	22.9	15.1
4	9614	NDLH 20511	14.5	13.0	24.4	17.3
5	9615	ZC (Sahana)	12.5	7.7	25.4	15.2
6	9616	BGDS 1072	12.9	12.0	29.7	18.2
7	9617	GSHV 191	14.1	14.0	20.7	16.3
8	9618	QC (Suraj)	14.9	10.0	20.5	15.1

Boll weight (g)

S. No.	Code No.	Entries	Dharwad	Nandyal	Perambalur	Mean SZ
1	9611	RAH 1071	5.0	4.4	5.6	5.0
2	9612	LC	4.5	4.1	3.6	4.1
3	9613	BS 1	4.9	4.2	4.8	4.6
4	9614	NDLH 20511	4.6	4.3	4.7	4.5
5	9615	ZC (Sahana)	4.2	3.8	5.0	4.3
6	9616	BGDS 1072	4.2	4.0	5.2	4.5
7	9617	GSHV 191	4.4	4.2	5.4	4.7
8	9618	QC (Suraj)	5.0	4.5	5.0	4.8

Br 05b – Coordinated Hybrid Trial (South Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Perambalur	Mean SZ	Rank
1	9621	ARBHH 1951	1921	1086	2033	1680	6
2	9622	ZC (DHH 11)	2361	777	1388	1509	9
3	9623	ARBHH 1952	2087	970	2193	1750	5
4	9624	RAHH 1952	1766	1638	2148	1851	4
5	9625	DHH 1951	1855	1070	1735	1553	7
6	9626	LC	-	1931	-	1931	2
7	9627	BGDHH 697	2162	1924	1700	1929	3
8	9628	DHH 1952	2004	1618	2186	1936	1
9	9629	RAHH 1951	1364	1700	1527	1530	8
		CD @ 5 %	453	311	417		
		CV %	13	12.7	13		
		Local Checks	**DHH 11**	**NDLHH 240**	**DHH 11**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Perambalur	Mean SZ
1	9621	ARBHH 1951	717	376	642	578
2	9622	ZC (DHH 11)	871	284	539	565
3	9623	ARBHH 1952	756	323	661	580
4	9624	RAHH 1952	612	516	770	633
5	9625	DHH 1951	705	362	490	519
6	9626	LC	-	624	-	624
7	9627	BGDHH 697	764	654	629	682
8	9628	DHH 1952	788	626	621	678
9	9629	RAHH 1951	512	573	372	486

Ginning outturn (%)

S. No.	Code No.	Entries	Dharwad	Nandyal	Perambalur	Mean SZ
1	9621	ARBHH 1951	37.3	34.6	31.7	34.5
2	9622	ZC (DHH 11)	36.9	36.5	35.3	36.2
3	9623	ARBHH 1952	36.2	33.3	30.7	33.4
4	9624	RAHH 1952	34.7	31.5	36.6	34.3
5	9625	DHH 1951	38.0	33.8	27.9	33.2
6	9626	LC	-	32.3	-	32.3
7	9627	BGDHH 697	35.3	34.0	33.1	34.1
8	9628	DHH 1952	39.3	38.7	26.3	34.8
9	9629	RAHH 1951	37.6	33.7	21.1	30.8

Br 05b – Coordinated Hybrid Trial (South Zone)

Bolls/plant

S. No.	Code No.	Entries	Dharwad	Nandyal	Perambalur	Mean SZ
1	9621	ARBHH 1951	12.7	9.9	20.3	14.3
2	9622	ZC (DHH 11)	18.0	10.7	18.1	15.6
3	9623	ARBHH 1952	14.7	10.5	22.3	15.8
4	9624	RAHH 1952	12.0	13.7	21.3	15.7
5	9625	DHH 1951	14.9	10.6	25.3	16.9
6	9626	LC	-	16.0	-	16.0
7	9627	BGDHH 697	15.1	13.9	25.0	18.0
8	9628	DHH 1952	15.1	11.2	24.5	16.9
9	9629	RAHH 1951	12.1	15.0	23.0	16.7

Boll weight (g)

S. No.	Code No.	Entries	Dharwad	Nandyal	Perambalur	Mean SZ
1	9621	ARBHH 1951	6.0	4.6	5.9	5.5
2	9622	ZC (DHH 11)	5.1	3.7	4.7	4.5
3	9623	ARBHH 1952	6.3	4.3	5.5	5.4
4	9624	RAHH 1952	4.5	4.2	5.5	4.7
5	9625	DHH 1951	4.8	4.1	4.5	4.5
6	9626	LC	-	4.3	-	4.3
7	9627	BGDHH 697	4.6	4.4	3.9	4.3
8	9628	DHH 1952	4.8	4.3	5.0	4.7
9	9629	RAHH 1951	4.0	3.5	5.0	4.2

Br 06b – CVT of Compact genotypes - (South Zone) (Rainfed)

Total Seed Cotton Yield at 160 DAS (Total of 130 DAS + 160 DAS) (Kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Mudhole	Perambalur	Mean SZ	Rank
1	9631	AKH 1302	650	2356	2544	1439	1747	1
2	9632	DSC 1851	391	1942	2778	1283	1599	7
3	9633	Local Check	844	2187	2135	1263	1607	6
4	9634	RAHC 1029	570	1859	2652	1487	1642	4
5	9635	GISV 312	572	1640	2918	1301	1608	5
6	9636	RHC HD 1420	319	1801	2815	968	1476	8
7	9637	AKH 1301	385	2026	2355	1041	1452	10
8	9638	CNH 1128	476	2180	2940	1190	1697	3
9	9639	BRCC 1621 S	444	1551	2642	1192	1457	9
10	9640	Zonal Check (Suraj)	627	1822	3008	1351	1702	2
		CD @ 5 %	107	338	432	278		
		CV %	12	10.1	9	14		
		Local Checks	**ARBH 813**	**Siva Nandi**	**L 604**	**Suraj**		

Br 06b – CVT of Compact genotypes - (South Zone) (Rainfed)

Seed Cotton Yield (130 DAS) (Kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Mean SZ
1	9631	AKH 1302	199	1937	1068
2	9632	DSC 1851	51	1447	749
3	9633	Local Check	205	1687	946
4	9634	RAHC 1029	100	1531	816
5	9635	GISV 312	69	1353	711
6	9636	RHC HD 1420	56	1485	771
7	9637	AKH 1301	66	1618	842
8	9638	CNH 1128	81	1638	860
9	9639	BRCC 1621 S	79	1138	609
10	9640	Zonal Check (Suraj)	114	1553	834

Seed Cotton Yield (160 DAS) (Kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Mean SZ
1	9631	AKH 1302	451	419	435
2	9632	DSC 1851	340	495	418
3	9633	Local Check	639	500	570
4	9634	RAHC 1029	470	328	399
5	9635	GISV 312	504	287	396
6	9636	RHC HD 1420	263	317	290
7	9637	AKH 1301	318	408	363
8	9638	CNH 1128	396	541	469
9	9639	BRCC 1621 S	365	413	389
10	9640	Zonal Check (Suraj)	513	269	391

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Mudhole	Perambalur	Mean SZ
1	9631	AKH 1302	225	768	931	420	586
2	9632	DSC 1851	135	627	1039	367	542
3	9633	Local Check	316	647	780	375	530
4	9634	RAHC 1029	199	628	1054	513	599
5	9635	GISV 312	244	694	1264	438	660
6	9636	RHC HD 1420	112	652	1006	260	508
7	9637	AKH 1301	140	701	883	353	519
8	9638	CNH 1128	163	719	1089	325	574
9	9639	BRCC 1621 S	157	521	964	313	489
10	9640	Zonal Check (Suraj)	230	601	1167	439	609

Br 06b – CVT of Compact genotypes - (South Zone) (Rainfed)

Ginning outturn (%)

S. No.	Code No.	Entries	Dharwad	Nandyal	Mudhole	Perambalur	Mean SZ
1	9631	AKH 1302	34.7	32.6	36.6	29.2	33
2	9632	DSC 1851	34.5	32.3	37.4	28.7	33
3	9633	Local Check	37.4	29.6	36.7	29.7	33
4	9634	RAHC 1029	34.9	33.8	39.7	34.4	36
5	9635	GISV 312	42.6	42.3	43.4	33.7	41
6	9636	RHC HD 1420	35.1	36.2	35.8	26.8	33
7	9637	AKH 1301	36.3	34.6	37.5	34.7	36
8	9638	CNH 1128	34.2	33.0	37.0	27.4	33
9	9639	BRCC 1621 S	35.4	33.6	36.5	26.3	33
10	9640	Zonal Check (Suraj)	36.7	33.0	38.8	32.5	35

No. of bolls/m^2

S. No.	Code No.	Entries	Nandyal	Mudhole	Mean SZ
1	9631	AKH 1302	106.0	83.7	95
2	9632	DSC 1851	97.0	87.7	92
3	9633	Local Check	91.7	35.7	64
4	9634	RAHC 1029	72.0	90.3	81
5	9635	GISV 312	71.0	62.3	67
6	9636	RHC HD 1420	83.0	37.7	60
7	9637	AKH 1301	88.7	55.3	72
8	9638	CNH 1128	94.7	70.3	83
9	9639	BRCC 1621 S	78.3	81.7	80
10	9640	Zonal Check (Suraj)	71.0	70.0	71

Plant height (cm)

S. No.	Code No.	Entries	Nandyal	Mudhole	Mean SZ
1	9631	AKH 1302	86.7	147.1	117
2	9632	DSC 1851	92.7	129.1	111
3	9633	Local Check	86.7	144.9	116
4	9634	RAHC 1029	76.3	116.2	96
5	9635	GISV 312	80.7	142.9	112
6	9636	RHC HD 1420	94.7	162.2	128
7	9637	AKH 1301	102.7	136.4	120
8	9638	CNH 1128	91.0	152.2	122
9	9639	BRCC 1621 S	81.0	146.3	114
10	9640	Zonal Check (Suraj)	82.3	139.1	111

Br 06b – CVT of Compact genotypes - (South Zone) (Rainfed)

No. of monopodia / plant

S. No.	Code No.	Entries	Nandyal	Mudhole	Mean SZ
1	9631	AKH 1302	1.0	2.2	2
2	9632	DSC 1851	0.7	1.2	1
3	9633	Local Check	1.3	2.1	2
4	9634	RAHC 1029	1.7	1.5	2
5	9635	GISV 312	0.7	1.5	1
6	9636	RHC HD 1420	0.7	0.8	1
7	9637	AKH 1301	0.7	0.3	0
8	9638	CNH 1128	1.0	0.5	1
9	9639	BRCC 1621 S	0.7	0.7	1
10	9640	Zonal Check (Suraj)	0.7	1.3	1

No. of sympodia / plant

S. No.	Code No.	Entries	Nandyal	Mudhole	Mean SZ
1	9631	AKH 1302	19.3	20.1	20
2	9632	DSC 1851	16.3	18.1	17
3	9633	Local Check	16.7	20.7	19
4	9634	RAHC 1029	15.0	17.3	16
5	9635	GISV 312	14.7	21.2	18
6	9636	RHC HD 1420	17.7	21.6	20
7	9637	AKH 1301	20.7	19.8	20
8	9638	CNH 1128	16.0	21.3	19
9	9639	BRCC 1621 S	19.0	19.6	19
10	9640	Zonal Check (Suraj)	14.3	18.8	17

Boll weight (g)

S. No.	Code No.	Entries	Nandyal	Mudhole	Perambalur	Mean SZ
1	9631	AKH 1302	4.1	4.4	4.6	4
2	9632	DSC 1851	3.5	4.5	4.3	4
3	9633	Local Check	3.9	4.2	4.7	4
4	9634	RAHC 1029	4.3	4.6	5.1	5
5	9635	GISV 312	4.2	4.7	4.4	4
6	9636	RHC HD 1420	3.9	4.7	4.3	4
7	9637	AKH 1301	4.0	4.4	4.9	4
8	9638	CNH 1128	4.2	4.5	4.4	4
9	9639	BRCC 1621 S	3.2	3.4	3.7	3
10	9640	Zonal Check (Suraj)	3.9	5.0	4.2	4

Br 06b – CVT of Compact genotypes - (South Zone) (Rainfed)

Lint Index (g)

S. No.	Code No.	Entries	Nandyal	Mudhole	Mean SZ
1	9631	AKH 1302	3.8	5.0	4
2	9632	DSC 1851	4.7	5.9	5
3	9633	Local Check	4.0	5.7	5
4	9634	RAHC 1029	6.0	5.9	6
5	9635	GISV 312	5.3	6.5	6
6	9636	RHC HD 1420	4.4	5.4	5
7	9637	AKH 1301	5.2	5.5	5
8	9638	CNH 1128	4.6	5.4	5
9	9639	BRCC 1621 S	3.6	4.5	4
10	9640	Zonal Check (Suraj)	4.8	6.0	5

Seed Index (g)

S. No.	Code No.	Entries	Nandyal	Mudhole	Mean SZ
1	9631	AKH 1302	7.0	8.7	8
2	9632	DSC 1851	9.6	9.9	10
3	9633	Local Check	9.2	9.9	10
4	9634	RAHC 1029	10.0	8.9	9
5	9635	GISV 312	9.0	8.5	9
6	9636	RHC HD 1420	7.2	9.6	8
7	9637	AKH 1301	9.4	9.2	9
8	9638	CNH 1128	9.0	9.2	9
9	9639	BRCC 1621 S	7.8	7.8	8
10	9640	Zonal Check (Suraj)	10.4	9.5	10

Br 24b – Coordinated Variety Trial - *G. arboreum* - (South Zone)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Kovilpatti	Mean SZ	Rank
1	9651	GAM 260	1421	1406	790	1206	9
2	9652	LC	1589	1473	926	1329	7
3	9653	NDLA 3116-4	1227	1667	1601	1498	4
4	9654	MDL 2667	1294	1528	979	1267	8
5	9655	ZC (DLSa 17)	1151	1172	1235	1186	11
6	9656	JLA-1227	1591	1650	1383	1541	3
7	9657	CNA 1054	1379	1289	938	1202	10
8	9658	GAM 259	1603	1923	1407	1644	1
9	9659	DWDa 1801	1415	1456	1165	1345	6
10	9660	DWDa 1802	1579	1545	1519	1548	2
11	9661	CNA 1031	1306	1445	1568	1440	5
		CD @ 5 %	246	346	217		
		CV %	10	13.4	10		
		Local Checks	**AKA 235**	**Yaganti**	**K 12**		

Br 24b – Coordinated Variety Trial - *G. arboreum* - (South Zone)

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Kovilpatti	Mean SZ
1	9651	GAM 260	568	527	287	461
2	9652	LC	636	508	282	475
3	9653	NDLA 3116-4	511	595	597	568
4	9654	MDL 2667	526	578	321	475
5	9655	ZC (DLSa 17)	429	407	439	425
6	9656	JLA-1227	615	555	486	552
7	9657	CNA 1054	524	416	279	406
8	9658	GAM 259	641	673	500	605
9	9659	DWDa 1801	531	492	395	473
10	9660	DWDa 1802	632	579	497	569
11	9661	CNA 1031	505	504	553	521

Ginning outturn (%)

S. No.	Code No.	Entries	Dharwad	Nandyal	Kovilpatti	Mean SZ
1	9651	GAM 260	40.0	37.5	36.3	37.9
2	9652	LC	40.0	34.5	30.6	35.0
3	9653	NDLA 3116-4	41.6	35.7	37.2	38.2
4	9654	MDL 2667	40.7	37.8	32.7	37.1
5	9655	ZC (DLSa 17)	37.3	34.7	35.4	35.8
6	9656	JLA-1227	38.7	33.6	35.0	35.8
7	9657	CNA 1054	38.0	32.3	29.6	33.3
8	9658	GAM 259	40.0	35	35.5	36.8
9	9659	DWDa 1801	37.6	33.8	33.9	35.1
10	9660	DWDa 1802	40.0	37.5	32.7	36.7
11	9661	CNA 1031	38.7	34.9	35.3	36.3

Br 24b – Coordinated Variety Trial - *G. arboreum* - (South Zone)

Bolls/plant

S. No.	Code No.	Entries	Dharwad	Nandyal	Kovilpatti	Mean SZ
1	9651	GAM 260	13.3	15.9	6.9	12.0
2	9652	LC	11.1	14.5	8.5	11.4
3	9653	NDLA 3116-4	9.9	15.0	7.7	10.9
4	9654	MDL 2667	9.1	12.7	6.3	9.4
5	9655	ZC (DLSa 17)	10.8	10.3	7.5	9.5
6	9656	JLA-1227	12.5	14.0	8.0	11.5
7	9657	CNA 1054	13.1	12.0	7.9	11.0
8	9658	GAM 259	9.1	19.0	7.7	11.9
9	9659	DWDa 1801	11.6	13.7	7.3	10.9
10	9660	DWDa 1802	11.9	15.0	8.4	11.8
11	9661	CNA 1031	11.7	13.5	8.0	11.1

Boll weight (g)

S. No.	Code No.	Entries	Dharwad	Nandyal	Kovilpatti	Mean SZ
1	9651	GAM 260	2.4	1.9	2.6	2.3
2	9652	LC	2.5	2.0	2.7	2.4
3	9653	NDLA 3116-4	2.6	2.2	3.0	2.6
4	9654	MDL 2667	3.2	2.6	3.1	3.0
5	9655	ZC (DLSa 17)	2.1	2.1	2.6	2.3
6	9656	JLA-1227	2.4	2.1	2.4	2.3
7	9657	CNA 1054	2.5	2.0	2.5	2.3
8	9658	GAM 259	2.6	2.3	2.8	2.6
9	9659	DWDa 1801	2.2	2.1	2.6	2.3
10	9660	DWDa 1802	2.6	2.0	3.0	2.5
11	9661	CNA 1031	2.6	2.2	2.6	2.5

Br 24b (LL) – CVT- Long Linted *G. arboreum*-(Rainfed)

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Mudhole	Kovilpatti	Mean SZ	Rank
1	9671	PA 837	1349	1698	2363	1111	1630	1
2	9672	PA 833	1106	1637	1824	922	1372	8
3	9673	PAIG 377	1176	1485	2285	794	1435	6
4	9674	PA 839	1319	1549	2442	930	1560	2
5	9675	PA 778	1247	1593	2229	918	1497	4
6	9676	PAIG 380	1267	1407	2171	860	1426	7
7	9677	PAIG 384	1362	1543	2421	716	1511	3
8	9678	PA 806	1195	990	2220	580	1246	10
9	9679	ZC (DLSa 17)	1055	1056	1632	1012	1189	11
10	9680	PA 807	1162	801	2111	588	1166	12
11	9681	PA 809	1182	1489	1845	840	1339	9
12	9682	CNA 1065	1311	1441	2218	778	1437	5
		CD @ 5 %	197	277	443	155		
		CV %	9	11.7	12	11		
		Local Checks	**AKA 235**	**Yaganti**	**Yaganti**	**K 12**		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Dharwad	Nandyal	Mudhole	Kovilpatti	Mean SZ
1	9671	PA 837	519	552	925	398	599
2	9672	PA 833	416	542	683	318	490
3	9673	PAIG 377	440	496	861	285	521
4	9674	PA 839	508	527	965	316	579
5	9675	PA 778	480	564	857	339	560
6	9676	PAIG 380	484	477	787	278	507
7	9677	PAIG 384	534	520	889	237	545
8	9678	PA 806	417	285	762	183	412
9	9679	ZC (DLSa 17)	392	336	602	358	422
10	9680	PA 807	444	280	865	205	449
11	9681	PA 809	436	496	681	301	479
12	9682	CNA 1065	493	479	808	271	513

Br 24b (LL) – CVT- Long Linted *G. arboreum*-(Rainfed)

Ginning outturn (%)

S. No.	Code No.	Entries	Dharwad	Nandyal	Mudhole	Kovilpatti	Mean SZ
1	9671	PA 837	38.5	32.5	39.1	35.9	36.5
2	9672	PA 833	37.6	33.1	37.7	34.3	35.7
3	9673	PAIG 377	37.4	33.4	37.5	35.8	36.0
4	9674	PA 839	38.5	34.0	39.6	33.8	36.5
5	9675	PA 778	38.5	35.4	38.5	36.9	37.3
6	9676	PAIG 380	38.3	33.9	36.2	32.3	35.2
7	9677	PAIG 384	39.2	33.7	36.8	33.1	35.7
8	9678	PA 806	34.9	28.8	34.5	31.5	32.4
9	9679	ZC (DLSa 17)	37.2	31.8	36.9	35.3	35.3
10	9680	PA 807	38.3	34.9	40.9	34.8	37.2
11	9681	PA 809	36.9	33.3	36.8	35.9	35.7
12	9682	CNA 1065	37.6	33.2	36.5	34.8	35.5

Bolls/plant

S. No.	Code No.	Entries	Dharwad	Nandyal	Mudhole	Kovilpatti	Mean SZ
1	9671	PA 837	11.3	21.0	21.9	6.7	15.2
2	9672	PA 833	10.6	19.0	18.9	6.7	13.8
3	9673	PAIG 377	9.5	14.9	26.1	5.9	14.1
4	9674	PA 839	10.1	18.0	26.1	6.7	15.2
5	9675	PA 778	8.7	18.0	31.8	7.6	16.5
6	9676	PAIG 380	10.1	13.3	27.7	7.5	14.7
7	9677	PAIG 384	12.0	17.0	25.7	6.5	15.3
8	9678	PA 806	11.7	11.9	21.0	6.0	12.7
9	9679	ZC (DLSa 17)	10.9	14.3	22.9	6.1	13.6
10	9680	PA 807	8.8	12.4	23.0	6.2	12.6
11	9681	PA 809	9.7	16.0	28.4	6.6	15.2
12	9682	CNA 1065	11.1	13.3	26.7	5.9	14.3

Boll weight (g)

S. No.	Code No.	Entries	Dharwad	Nandyal	Mudhole	Kovilpatti	Mean SZ
1	9671	PA 837	2.7	2.5	3.2	2.8	2.8
2	9672	PA 833	3.0	3.0	3.3	2.8	3.0
3	9673	PAIG 377	2.8	3.0	3.5	3.0	3.1
4	9674	PA 839	2.7	2.9	3.0	2.5	2.8
5	9675	PA 778	2.8	3.0	3.0	2.7	2.9
6	9676	PAIG 380	2.6	2.6	2.9	2.8	2.7
7	9677	PAIG 384	2.8	2.8	3.0	2.8	2.9
8	9678	PA 806	2.6	2.8	3.0	2.6	2.8
9	9679	ZC (DLSa 17)	2.3	2.3	2.6	2.3	2.4
10	9680	PA 807	2.6	2.7	2.8	2.3	2.6
11	9681	PA 809	2.6	3.1	2.8	2.4	2.7
12	9682	CNA 1065	2.6	2.6	2.9	2.6	2.7

Coordinated Varietal Trial of Naturally Coloured *G. hirsutum*

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Raichur (I)	Dharwad (R)	Lam (I)	Nandyal (R)	Mean SZ	Rank
1	9701	LHCC 3	2169	1314	1993	1789	1816	10
2	9702	LHCC 4	1946	1192	2054	2239	1858	9
3	9703	LHCC 1	2044	1302	2369	2128	1961	7
4	9704	CNH 17395	2876	1702	2152	2462	2298	2
5	9705	Suraj (ZC)	2630	1532	1679	2067	1977	6
6	9706	16301 DB	2568	1652	1742	2723	2171	3
7	9707	DHCC 1801	1960	2091	2115	1945	2028	5
8	9708	LHCC 2	1808	1242	2345	1597	1748	12
9	9709	Local Check	2763	1831	2262	2489	2336	1
10	9710	16337 LB	2489	1436	1970	2384	2070	4
11	9711	16315 LB	1741	1232	2119	2356	1862	8
12	9712	DHCC 1802	2489	1992	2014	645	1785	11
		CD @ 5 %	249	255	N/A	536		
		CV %	11	10	12	15.3		

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Raichur (I)	Dharwad (R)	Lam (I)	Nandyal (R)	Mean SZ
1	9701	LHCC 3	539	415	632	397	496
2	9702	LHCC 4	489	391	727	493	525
3	9703	LHCC 1	517	441	919	481	590
4	9704	CNH 17395	1015	571	688	817	773
5	9705	Suraj (Zonal Check)	944	561	618	682	701
6	9706	16301 DB	902	576	619	882	745
7	9707	DHCC 1801	656	660	699	587	651
8	9708	LHCC 2	474	394	652	428	487
9	9709	Local Check	977	651	800	752	795
10	9710	16337 LB	820	488	711	763	696
11	9711	16315 LB	497	372	726	686	570
12	9712	DHCC 1802	883	597	665	186	583

Coordinated Varietal Trial of Naturally Coloured *G. hirsutum*

Ginning outturn (%)

S. No.	Code No.	Entries	Raichur (I)	Dharwad (R)	Lam (I)	Nandyal (R)	Mean SZ
1	9701	LHCC 3	24.8	31.6	31.8	22.2	27.6
2	9702	LHCC 4	25.1	32.8	35.7	22.0	28.9
3	9703	LHCC 1	25.4	33.9	38.9	22.6	30.2
4	9704	CNH 17395	35.4	33.6	32.2	33.2	33.6
5	9705	Suraj (Zonal Check)	35.9	36.7	36.4	33.0	35.5
6	9706	16301 DB	35.1	34.9	35.8	32.4	34.6
7	9707	DHCC 1801	33.4	31.5	33.2	30.2	32.1
8	9708	LHCC 2	26.2	31.7	33.0	26.8	29.4
9	9709	Local Check	35.4	35.6	35.8	30.2	34.3
10	9710	16337 LB	33.0	34.0	35.9	32.0	33.7
11	9711	16315 LB	28.5	30.2	34.0	29.1	30.5
12	9712	DHCC 1802	35.4	30.0	33.1	28.8	31.8

Bolls/plant

S. No.	Code No.	Entries	Raichur (I)	Dharwad (R)	Lam (I)	Nandyal (R)	Mean SZ
1	9701	LHCC 3	15.2	8.0	48.5	14.0	21.4
2	9702	LHCC 4	12.6	9.5	58.7	18.0	24.7
3	9703	LHCC 1	13.6	9.1	69.8	17.0	27.4
4	9704	CNH 17395	21.6	10.3	62.0	21.0	28.7
5	9705	Suraj (Zonal Check)	18.5	9.6	57.8	15.0	25.2
6	9706	16301 DB	18.3	13.5	57.2	22.0	27.8
7	9707	DHCC 1801	12.9	12.9	61.0	15.0	25.5
8	9708	LHCC 2	11.7	12.1	60.8	13.0	24.4
9	9709	Local Check	19.5	9.7	61.5	20.0	27.7
10	9710	16337 LB	17.5	16.7	65.5	19.0	29.7
11	9711	16315 LB	11.6	10.4	56.4	19.0	24.4
12	9712	DHCC 1802	18.2	16.3	47.2	10.0	22.9

Coordinated Varietal Trial of Naturally Coloured *G. hirsutum*

Boll weight (g)

S. No.	Code No.	Entries	Raichur (I)	Dharwad (R)	Lam (I)	Nandyal (R)	Mean SZ
1	9701	LHCC 3	4.3	4.0	4.0	4.2	4.1
2	9702	LHCC 4	4.4	4.3	3.8	4.2	4.2
3	9703	LHCC 1	4.3	4.3	4.8	3.8	4.3
4	9704	CNH 17395	3.6	4.2	4.0	4.1	4.0
5	9705	Suraj (Zonal Check)	5.2	4.2	4.2	4.1	4.4
6	9706	16301 DB	3.9	4.1	3.4	4.0	3.9
7	9707	DHCC 1801	3.7	4.2	4.1	3.4	3.9
8	9708	LHCC 2	4.8	4.4	3.5	4.3	4.3
9	9709	Local Check	4.8	4.2	4.4	4.8	4.6
10	9710	16337 LB	4.3	4.2	4.6	4.2	4.3
11	9711	16315 LB	4.5	4.1	4.2	4.0	4.2
12	9712	DHCC 1802	3.6	4.2	3.8	3.1	3.7

Coordinated Varietal Trial of Naturally Coloured *G. arboreum*

Seed Cotton Yield (Kg/ha)

S. No.	Code No.	Entries	Raichur (I)	Dharwad (R)	Kovilpatti	Nandyal (R)	Mean SZ	Rank
1	9721	CNA 1091	2094	1050	864	1317	1331	4
2	9722	16377 LB-A	2109	957	831	1150	1262	7
3	9723	CNA 405	2388	1096	667	1339	1373	2
4	9724	CNA 17522	1982	1168	700	1328	1295	6
5	9725	DLSa 17 (ZC)	2402	801	444	1250	1224	9
6	9726	DDCC 1801	2478	1135	642	1650	1476	1
7	9727	DDCC 1802	2460	883	551	1408	1326	5
8	9728	Local Check	2591	630	329	1139	1172	10
9	9729	16378 LB-A	1836	874	798	1450	1240	8
10	9730	CNA 407-SLP	1677	698	444	961	945	11
11	9731	DDCC 1	2581	1088	551	1161	1345	3
12	9732	CNA 407	1729	682	440	828	920	12
		CD @ 5 %	323	170	146	288		
		CV %	15	11	14	13.6		
		Local Checks	**DLSa 17**	**AK-235**	**K 12**	**Yaganti**		

Coordinated Varietal Trial of Naturally Coloured *G. arboreum*

Lint Yield (kg/ha)

S. No.	Code No.	Entries	Raichur (I)	Dharwad (R)	Kovilpatti	Nandyal (R)	Mean SZ
1	9721	CNA 1091	649	361	281	436	432
2	9722	16377 LB-A	767	350	294	399	453
3	9723	CNA 405	822	389	231	449	473
4	9724	CNA 17522	698	405	245	466	454
5	9725	DLSa 17 (ZC)	817	290	149	410	417
6	9726	DDCC 1801	834	375	210	535	489
7	9727	DDCC 1802	754	278	183	391	402
8	9728	Local Check	914	244	115	410	421
9	9729	16378 LB-A	652	325	254	522	438
10	9730	CNA 407-SLP	558	248	160	305	318
11	9731	DDCC 1	827	365	200	389	445
12	9732	CNA 407	562	246	150	263	305

Ginning outturn (%)

S. No.	Code No.	Entries	Raichur (I)	Dharwad (R)	Kovilpatti	Nandyal (R)	Mean SZ
1	9721	CNA 1091	30.8	34.5	32.6	33.1	32.8
2	9722	16377 LB-A	36.4	36.7	35.3	34.7	35.8
3	9723	CNA 405	34.4	35.6	34.7	33.5	34.6
4	9724	CNA 17522	35.2	34.7	35.0	35.1	35.0
5	9725	DLSa 17 (ZC)	34.2	36.2	33.4	32.8	34.2
6	9726	DDCC 1801	33.6	33.1	32.8	32.4	33.0
7	9727	DDCC 1802	30.5	31.5	33.1	27.8	30.7
8	9728	Local Check	35.4	38.7	35.0	36.0	36.3
9	9729	16378 LB-A	35.5	37.2	31.6	36.0	35.1
10	9730	CNA 407-SLP	33.4	35.6	36.3	31.7	34.3
11	9731	DDCC 1	32.1	33.6	36.2	33.5	33.9
12	9732	CNA 407	32.4	36.0	34.2	31.8	33.6

Coordinated Varietal Trial of Naturally Coloured *G. arboreum*

Bolls/plant

S. No.	Code No.	Entries	Raichur (I)	Dharwad (R)	Kovilpatti	Nandyal (R)	Mean SZ
1	9721	CNA 1091	16.6	11.6	4.5	14.0	11.7
2	9722	16377 LB-A	17.1	10.5	4.9	10.0	10.6
3	9723	CNA 405	17.6	10.7	6.1	16.0	12.6
4	9724	CNA 17522	17.0	11.2	4.5	14.0	11.7
5	9725	DLSa 17 (ZC)	18.8	5.9	4.3	13.0	10.5
6	9726	DDCC 1801	21.3	11.7	4.5	18.0	13.9
7	9727	DDCC 1802	19.3	12.9	4.8	17.0	13.5
8	9728	Local Check	25.7	7.7	3.7	11.5	12.2
9	9729	16378 LB-A	15.4	12.0	5.1	16.0	12.1
10	9730	CNA 407-SLP	15.0	9.7	3.7	11.0	9.9
11	9731	DDCC 1	23.9	10.4	5.1	12.0	12.9
12	9732	CNA 407	15.9	8.1	4.3	10.0	9.6

Boll weight (g)

S. No.	Code No.	Entries	Raichur (I)	Dharwad (R)	Kovilpatti	Nandyal (R)	Mean SZ
1	9721	CNA 1091	3.3	2.4	2.2	2.5	2.6
2	9722	16377 LB-A	2.4	2.2	2.2	2.3	2.3
3	9723	CNA 405	2.5	2.5	2.4	2.4	2.5
4	9724	CNA 17522	2.5	2.5	2.2	2.3	2.4
5	9725	DLSa 17 (ZC)	2.8	2.2	2.2	2.2	2.4
6	9726	DDCC 1801	2.6	2.2	2.1	2.1	2.3
7	9727	DDCC 1802	2.8	2.2	2.1	2.1	2.3
8	9728	Local Check	3.1	2.3	2.3	2.0	2.4
9	9729	16378 LB-A	3.1	2.5	2.1	2.3	2.5
10	9730	CNA 407-SLP	2.5	1.9	2.2	2.2	2.2
11	9731	DDCC 1	2.7	2.3	2.2	2.1	2.3
12	9732	CNA 407	2.3	2.0	1.9	2.2	2.1

AICRP on COTTON

ANNUAL REPORT:2019-20

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CROP PRODUCTION

AGRONOMY, PHYSIOLOGY AND BIOCHEMISTRY

The following Experiments were carried out during *Kharif*-2019-20 at various centers of AICRP on Cotton.

AGRONOMY

Agronomy IA	Agronomic requirements of promising pre-release/recently released *hirsutum/ arboreum/ barbadense* genotypes including compact / hybrids of both interspecific and desi hybrids of cotton
Agronomy 1B	Evaluation of compact culture under HDPS with different nutrient levels
Agronomy II	Augmenting ELS cotton production
Agronomy III	Enhancing Nitrogen use efficiency in Bt cotton
Agronomy IV	Technology for Organic Cotton Production
Agronomy V	Conservation agriculture
Agronomy VI	Labour saving techniques in Cotton cultivation
Agronomy VII	Input use pattern & cost of cultivation
Agronomy VIII	Strategies to mitigate/minimize soil crust formation in cotton in North zone
Agronomy IX	Standardisation of geometry for Bt varieties
Agronomy X	Physiological Manipulation of Morphoframe, growth and development of cotton by PGR

PHYSIOLOGY and BIOCHEMISTRY

PHY1	Canopy management in HDPS cotton
PHY2	Preparing for climate change - Growth and development of *arboreum* cotton in response to growth regulators
PHY 3	Moisture Stress management through use of different Osmo-protectants
BIO CHEM1	Screening of Cotton genotypes for abiotic stress tolerance and estimation of for seed oil
BIO CHEM1A	Screening of Cotton genotypes for drought and salinity tolerance
BIO CHEM1B	Estimation of seed oil, gossypol and protein
BIO CHEM.2	Effect of PGRs on host plant resistance and influence of sucking pest in cotton
BIO.CHEM.3	Evaluation of Bt hybrids for biochemical basis of tolerance to sucking pests

The trials conducted zone-wise are as follows:

North zone	Faridkot, Bathinda, Sirsa (CCSHAU) and Sriganganagar
Central Zone	Surat, Akola, Rahuri, Nanded, , Khandwa, Junagadh and Bhawanipatna
South Zone	Lam (Guntur), Nandyal, Dharwad**,** Chamrajanagar, Coimbatore, Srivilliputtur and Raichur

The project-wise findings and salient highlights of the research pertaining to North, Central and South zones are summarized below.

Agronomy IA: Agronomic requirements of promising pre-release/recently released *hirsutum/ arboreum /barbadense* genotypes/hybrids of cotton

In cotton, better crop growth is ensured only through scientific crop production practices. The responses of cotton to spacing have shown that it has altered the plant architecture, photosynthetic efficiency of leaves, smaller boll size and fruit production pattern. The efficient use of nutrients is an important goal in maximizing yield of a crop in a way that has a minimal impact on the environment.

Agronomy IA: Agronomic requirements of promising pre-release *hirsutum* genotypes of cotton in Central Zone (rainfed)

Nanded

The studies on spacing and nutrient requirement of pre released *hirsutum* genotypes revealed that the genotypes (**G1.CPD 1652 and G2.AKH 09/5)** were statistically similar in relation to seed cotton yield, bolls per m^2 and yield per plant. The highest number of bolls /m^2 was recorded in 60 x 22.5 cm, however, the highest boll weight (g) was recorded in 60 x 45 cm. Increase in fertilizer level resulted in significant increase in seed cotton yield, yield per plant and bolls /m^2.The plant density of 55,555 plants (spacing 60 x 30 cm) performed better over lower density. Both the varieties responded to fertilizer dose of 125% RDN(Table 1).The study inferred that spacing of 60 x 30 cm and 125 % RDN were optimum for the tested genotypes(**G1.CPD 1652 and G2.AKH 09/5)**

Table1 . Seed cotton yield (kg/ha) of genotypes as influenced by spacing levels and nutrient levels

Treatments	G1.CPD 1652			G2.AKH 09/5				Grand Mean
	S1. 60 x 22.5 cm	S2.60 x 30 cm	S3. 60 x 45 cm	S1. 60 x 22.5 cm	S2.60 x 30 cm	S3. 60 x 45 cm		
F1.75%RDN	1618	1715	1443	1509	1456	1405		**F1-1524**
F2.100% RDN	1750	1786	1569	1661	1636	1613		**F2-1669**
F3.125% RDN	1853	1858	1619	1826	1803	1789		**F3-1791**
Interaction	S1. 60 x 22.5 cm	S2.60 x 30 cm	S3. 60 x 45 cm	G1.CPD 1652	G2.AKH 09/5	Interaction	G1.CPD 1652	G2.AKH 09/5
F1. 75% **RDN**	1564	1586	1424	1592	1457	S1. 60 x22.5 cm	1740	1666
F2. 100% **RDN**	1706	1711	1591	1701	1637	S2.60 x 30 cm	1786	1632
F3. 125% **RDN**	1839	1831	1704	1777	1806	S3. 60 x 45 cm	1540	1602
Mean	**S1-1703**	**S2-1709**	**S3-1573**	**G1- 1690**	**G2-1633**			
ANOVA	Geno-type	Spacing	Fertilizers	GXS	GXF	SXF	GXSXF	
SE d	33.52	41.05	39.60	58.06	56.01	68.59	97.01	
CD (5%)	N.S.	129.15	115.42	N.S.	N.S.	N.S.	N.S.	

Bhawanipatna

The data on agronomic requirement trial revealed that all the growth and yield parameters and seed cotton yield of the test variety CPD 1652 (G_1) and AKH 09/5 (G_2) were significant. The number of bolls/m^2 (118.53), boll weight (4.91 g) and seed cotton yield (2576 kg/ha) were significant and maximum with the spacing S_3 (90 cm x 30 cm) (Table 2).Nutrient levels also had significant effect on all the growth and yield parameters and seed cotton yield. Application of F_3 (125 % RDN) recorded the maximum plant height (104.1 cm), lowest number of monopodia (1.74), highest number of sympodia (13.11), highest boll weight (4.98 g) as compared to the other two levels of fertilizer. The number of bolls per m^2 (90.27) and seed cotton yield (2755 kg/ha) was also maximum with F_3(125 % RDF).The results conclude that 90 X 30 cm with application of 125% RDN were optimum for both the genotypes.

Table 2. Seed cotton yield (kg/ha) of genotypes as influenced by spacing and nutrient levels

Treatments	**G1.** CPD 1652			**G2.** AKH 09/5						Grand Mean
	S1.90 X60	**S2.90 X 45**	**S3.90 X 30**	**S1.90X60**	**S2.90 X 45**	**S3.90 X 30**				
F1.75%	1975	2117	2110	2172	2317	2447				2190
F2.100 %	2395	2258	2357	2358	2211	2660				2373
F3.125 %	2617	2517	2694	2728	2788	3187				2755
Interaction (two way)	**S1.90 X60**	**S2.90 X 45**	**S3.90 X 30**	**G1.**CPD 1652	**G2.**AKH 09/5		**Interaction (two way)**	**G1.**CPD 1652	**G2.**AKH 09/5	
F1.75%	2074	2217	2278	2067	2312		**S1.90X 60**	2329	2419	
F2.100 %	2376	2235	2508	2337	2410		**S2.90 X 45**	2297	2439	
F3.125 %	2672	2652	2941	2609	2901		**S3.90 X 30**	2387	2765	
Mean	2374	2368	2576	2338	2541			2338	2541	
ANOVA	**Genotype**	**Spacing**	**Fertilizers**	**GXS**	**GXF**	**SXF**	**GXSXF**			
SE d	120.0	67.46	224.95	95.41	129.87	159.0	41.15			
CD (5%)	324.24	147.78	622.16	208.99	359.24	439.93	177.42			

Agronomy IA: Agronomic requirements of promising pre-release *hirsutum* genotypes of cotton in Central Zone (irrigated)

Rahuri

The results revealed that genotypes are not differed significantly with respect to seed cotton yield. The 90 cm x 30 cm spacing recorded significantly higher seed cotton yield (2072 kg/ha) (Table 3) and plant height (122.53 cm) than rest of spacing's i.e., 90 cm x 60 cm and 90 cm x 90 cm. Application of 125 % RDN (100:50:50 NPK kg/ha) recorded significantly higher seed cotton yield (2024 kg/ha) and at par with 100 % RDN (1937 kg/ha). The results indicated that spacing of 90 x 30 cm (2072 kg/ha) and fertilized with 100 % RDN were optimum for all three genotypes

Table 3. Seed cotton yield (q ha^{-1}) as influenced by genotypes, spacing levels and nutrient levels (three way tables)

Treatments	G1.RHC 1217			G2.GSHV 310			G3.RHC 0717			Grand Mean
	S1.90X30 cm	S2.90 X 60 cm	S3.90 X 90 cm	S1.90X30 cm	S2.90 X 60 cm	S3.90 X 90 cm	S1.90X30 cm	S2.90 X 60 cm	S3.90 X 90 cm	
F1. 75%RDN	1757	1559	1395	2047	1852	1683	1737	1734	1766	1716
F2.100% RDN	1967	1767	1605	2264	2087	1928	1935	1934	1978	1937
F3.125% RDN	2048	1877	1719	2351	2162	1984	2036	2041	2088	2024
Interaction	S1.90X30 cm	S2.90 X 60 cm	S3.90 X 90 cm	G1. RHC 1217	G2. GSHV 310	G3.RHC 0717	Interaction	G1. RHC 1217	G2. GSHV 310	G3.RHC 0717
F1. 75% RDN	1902	1706	1539	1570	1861	1746	S1.90X30 cm	1924	2221	1903
F2.100% RDN	2116	1927	1767	1780	2093	1949	S2.90X60 cm	1734	2034	1903
F3.125% RDN	2199	2020	1852	1881	2166	2055	S3.90X90 cm	1573	1865	1944
Mean	2072	1884	1719	1744	2040	1917	-			
ANOVA	Genotype	Spacing	Fertilizers	GXS	GXF	SXF	GXSXF			
SE d	81.3	25.3	33.8	43.8	58.6	58.6	101.5			
CD (5%)	NS	77.9	97.0	135	NS	NS	NS			

Junagadh

The trial on agronomic requirement studies found that genotypes were not significantly varying with respect to spacing and nutrients levels (Table 4).The interaction effect was found non-significant in respect to seed cotton yield and all growth characters. The trial inferred that recommended spacing and application of 100 % RDN were optimum for the tested genotypes (G1. RHC-1217and G2. GISV-310).

Table4. Seed cotton yield (kg/ha) of genotypes as influenced by spacing and nutrient levels

Treatments	G1. RHC-1217			G2. GISV-310			Grand Mean
	S1. 120 X 45 cm	S2. 120 X 30 cm	Mean	S1. 120 X 45 cm	S2. 120 X 30 cm	Mean	
F1.75%RDN	1830	1867	1849	1878	1808	1843	1846
F2.100% RDN	1936	2079	2008	1922	1887	1905	1956
F3.125% RDN	1883	1869	1876	1847	1887	1867	1872
Interaction (two way)	S1. 120 X 45 cm	S2. 120 X 30 cm	Mean	G1. RHC-1217	G2. GISV-310		
F1.75% RDN	1865	1878		1876	1867		
F2.100% RDN	1929	1983	1872	2007	1905	1872	
F3.125% RDN	1854	1837	1956	1848	1843	1956	
Mean S	1883	1900	1846	1911	1872	1846	
ANOVA	Genotype	Spacing	Fertilizers	GXS	GXF	SXF	
SE d	40	40	49	57	70	70	
CD (5%)	NS	NS	NS	NS	NS	NS	

Agronomy IA: Agronomic requirements of promising pre-release *barbadense* genotypes of cotton in Central Zone (Irrigated)

Rahuri

The variety RHC011B recorded significantly higher seed cotton yield (1293kg/ha), which was on par with DB 1602 (1123 kg/ha) but superior than SB SG 1-5 (991 kg/ha). The 90 cm x 60 cm spacing recorded numerically higher seed cotton yield (1229 kg/ha). The spacing 90 cm x 90 cm recorded significantly higher number of boll plant^{-1} (23.06), average boll weight (2.61 g) and yield plant^{-1} (91.68 g). Application of 125 % RDN (100:50:50 NPK kg/ha) recorded significantly maximum seed cotton yield (12.00 q ha^{-1}) (Table 5). The results interpreted that planting of 90 x 60 cm with application of 125 % RDN found optimum for the genotypes includes DB 1602andSB SG 1-5.

Table5.Seed cotton yield (q ha^{-1}) as influenced by genotypes, spacing levels and nutrient levels

Treatments	G1. DB 1602			G2.SB SG 1-5			G3.RHC 011b			Grand Mean
	S1.90X60 cm	S2.90 X 90 cm	S3.90 X 75cm	S1.90X60 cm	S2.90 X 90 cm	S3.90 X 75cm	S1.90X60 cm	S2.90 X 90cm	S3.90 X 75cm	
F1. 75%RDN	1133	706	936	1000	637	805	1100	1129	1097	870
F2.100%RDN	1344	982	1144	1217	881	1040	1300	1375	1297	1102
F3.125%RDN	1455	1126	1284	1222	967	1145	1429	1481	1434	1200
Interaction (two way)	S1.90X60	S2.90 X 90	S3.90 X 75	G1. DB 1602	G2.SB SG 1-5	G3.RHC 011b	Interaction	G1. DB 1602	G2.SB SG 1-5	G3.RHC 011b
F1. 75%RDN	1067	671	871	925	814	1109	S1.90X60 cm	1311	1147	1276
F2.100%RDN	1281	932	1092	1157	1046	1324	S2.90X90 cm	938	828	1328
F3.125%RDN	1339	1047	1215	1288	1111	1448	S3.90X75 cm	1121	997	1276
Mean	1229	883	1059	1123	991	1293	-	1123	991	1293
ANOVA	Genotype	Spacing	Fertilizers	GXS	GXF	SXF	GXSXF			
SE d	43	49	29	85	51	51	89			
CD (5%)	168	151	85							

Surat

Barbadense genotypes DB 1602 and SBSG 1-5 were tested for their agronomic requirement in split plot design. The genotypes were taken in main plot while sub-plot treatments comprised of combination of two spacing (in cm), S_1- 120 x 45 and S_2 – 120 x 30 cm and three fertilizer levels applied @ 75, 100 and 125 per cent of recommended dose (180 kg N/ha). The yield of the two barbadense genotypes showed inconsistent results due to low flowering and boll setting.

Agronomy IA: Agronomic requirements of promising pre-release *arboreum* genotypes of cotton in Central Zone (rainfed)

Akola

The significantly highest values of plant height, sympodial branches, sympodial length and boll weight were observed in arboreum genotype (AKA-8), however number of bolls were the highest in genotype (PA 810).The seed cotton yield (SCY) was significantly higher with PA-810 (1272 kg/ha) which was found at par with genotype CNA-1032 (1218 kg/ha) (Table 6).The SCY was significantly the highest (1350 kg/ha) with spacing of 60x10 cm with plant density of 1.66 lakh/ha which was found significantly superior over wider spacing of 60X15 cm and 60x30 cm with plant density of 1.11 lakh/ha and 0.55 lakh/ha respectively. The highest SCY (1236 kg/ha) with 150 % RDN and which was found significantly superior over 100 %RDN(1119 kg/ha) recommended dose of fertilizer and on par with 125 % RDN (1153 kg/ha).The results interpreted that adoption of spacing of 60x10 cm with fertilizer dose of 125% RDN was found optimum for all three genotypes.

Table 6. Seed Cotton Yield (Kg/ha) of genotypes as influenced by genotypes, spacing levels and nutrient levels

Treatments	V1:CNA-1032			V2: PA-810			V3:AKA-8			Mean
	S1.60X10 cm	S2.60x15 cm	S3.60x30 cm	Mean F	S2.60x15 cm	S3.60x30 cm	S1.60X10 cm	S2.60x15cm	S3.60x30 cm	
F1.100%RDN	1323	1397	1125	1427	906	975	1339	787	794	1119
F2.125%RDN	1321	1138	937	1256	1121	1169	1169	1280	988	1153
F3.150%RDN	1665	1170	883	1466	1034	1190	1187	1023	1505	1236
Interaction	**S1. 60X10cm**	**S2. 60x15 cm**	**S3. 60x30 cm**	**V1:CAN-1032**	**V2: PA-810**	**V3:AKA-8**	**Interaction**	**V1:CAN-1032**	**V2: PA-810**	**V3:AKA-8**
F1.100%RDN	1363	1030	965	1282	1103	973	S1.60X10 cm	1436	1383	1232
F2.125%RDN	1249	1180	1031	1132	1182	1146	S2.60x30 cm	1235	1020	1030
F3.150%RDN	1439	1076	1193	1239	1230	1238	S3.60x30 cm	982	1112	1096
Mean	1350	1095	1063	1218	1272	1119		1218	1272	1119
ANOVA	Genotype	Spacing	Fertilizers	VXS	VXF	SXF	VXSXF			
SE d	20.65	20.65	20.60	35.76	35.68	35.68	61.79			
CD (5%)	61.90	61.90	59.13	107.22	102.41	102.41	177.38			

Nagpur

The results of CNA 1032 indicated that row spacing did not significantly influence the seed cotton yield and boll weight but the boll number/sq m was significantly higher at 60 x 10 cm. Application of 100% RDN gave significantly higher yield (3707 kg/ha) and boll weight as compared to 75% RDN but the difference in yield at 100% and 125% RDF was not significant for either trait. The interaction effect was significant for boll weight. From the trial it is inferred that 100 % RDN (50:25:25) with 60x30 cm spacing was ideal for **CNA 1032** for rainfed Vertisols of AESR 10.2, dry sub-humid tropical climate. The results of PA 810 found that row spacing did not significantly influence the seed cotton yield but the boll weight was significantly higher at 30 cm spacing and the boll number/sq m was significantly higher at 10 cm spacing compared to the other two spacing. Application of125% RDN gave significantly higher yield (2791 kg/ha) and boll weight as compared to 75% RDN but the difference in yield at 100% and 125% RDN was not significant for either traits (Table 7).From the trial it is inferred that 100 % RDN (50:25:25) with 60x30 cm spacing was ideal for PA 810 for rainfed Vertisols of AESR 10.2, dry sub-humid tropical climate.

Table 7. Seed Cotton Yield (Kg/ha) of genotypes as influenced by spacing and nutrient levels

Treatments	CNA 1032				PA 810			
	60x10 cm	60x15 cm	60x30 cm	Mean	60x10 cm	60x15 cm	60x30 cm	Mean
F1.75% RDN	3307	3303	2748	3119	2535	2626	2403	2521
F2.100% RDN	3655	3736	3730	3707	2711	2872	2522	2702
F3.125% RDN	4120	3642	3479	3747	3002	2611	2760	2791
Mean	3694	3560	3319		2749	2703	2562	
ANOVA	Spacing	Nutrients	S X N			Spacing	Nutrients	S X N
CD (5 %)	NS	419.9	NS			NS	235.3	NS

Agronomy IA: Agronomic requirements of promising pre-release released *Desi*hybridsof cotton in Central Zone (rainfed)

Akola

The agronomic requirement studies of Desi hybrids found that seed cotton yield (SCY) was significantly highest with AJAH-101 (1288 kg/ha) followed by PDKV DH-1 (1226 kg/ha) (Table 8).The SCY was significantly highest (1373 kg/ha) with plant density (0.56 lakh/ha) i.e. with 60 x 30 cm spacing which was found significantly superior over wider spacing of 60 x45 cm with plant density of 0.37 lakh/ha. There was significant response to NPK levels and the highest SCY (1323 kg/ha) with 150 % RDN and which was found significantly superior over 100 %RDN(1182 kg/ha) recommended dose of fertilizer but was found at par with 125 % fertilizer dose. (1265 kg/ha).The results interpreted that adopting of spacing of 60x30 cm with fertilizer dose of 125 % RDN were found optimum for all three pre released genotypes

Table 8. Seed cotton yield (kg/ha) as influenced by genotypes, spacing and nutrient levels (Desi hybrids)

Treatments	V1- AJAH-101			V2- PDKV DH-1 (check)			Mean F
	S1.60X30 cm	S2.60 X 45cm		S1.60X30 cm	S2.60 X 45cm		
F1.100%RDN	1298	1001		1335	1092		1182
F2.125%RDN	1349	1106		1418	1188		1265
F3.150%RDN	1423	1175		1417	1278		1323
Interaction (two way)	**S1.60X30 cm**	**S2.60x45cm**		**V1- AJAH-101**	**V2- PDKV DH-1**		
F1.100%RDN	1316	1047		1214	1150		
F2.125%RDN	1384	1147		1303	1228		
F3.150%RDN	1420	1227		1348	1299		
Mean	1373	1140		1288	1226		
ANOVA	Genotype	Spacing	Fertilizers	VXS	VXF	VXSXF	
SE d	15.95	15.95	37.03	22.55	52.57	74.06	
CD (5%)	55.18	55.18	111.02	NS	NS	NS	

Agronomy IA: Agronomic requirements of promising pre-release *hirsutum* genotypesof cotton in South Zone (irrigated)

Raichur

The experimental results indicated that significantly higher seed cotton yield was recorded with CPD-165 (2909 kg/ha) compared to SCS-1061 (2838 kg/ha). The increase in higher seed cotton yield was mainly due to increased sympodia/plant and higher boll number /sq m. Amongst nutrient levels tested, significantly higher seed cotton yield was obtained with 125% RDN (2935 kg/ha) as compared to 100% RDN (2811kg/ha) (Table 9). Amongst different spacing, planting in closure spacing of 75 x 30 cm recorded significantly higher seed cotton yield (2938 kg/ha) compared to other spacing (90 x 30 cm and 90 x 45 cm). Interaction effect was found non-significant. The results conclude that 75 x 30 cm spacing with 125 % RDN is recommended for the tested genotypes (**G1.SCS-1061 and G2.CPD-165).**

Table9 . Seed cotton yield (kg/ha) as influenced by genotypes, spacing levels an d nutrient levels

Treatments	G1.SCS-1061			G2.CPD-165			Grand Mean
	S1: 75 cm X 30 cm	S2: 90 cm X 30 cm	S3: 90 cm X 45 cm	S1: 75 cm X 30 cm	S2: 90 cm X 30 cm	S3: 90 cm X 45 cm	
F1.100% RDN	2848	2786	2684	2927	2854	2767	2811
F2.125%RDN	2953	2907	2847	3022	2974	2908	2935
Interaction (two way)	**S1: 75 cm X 30 cm**	**S2: 90 cm X 30 cm**	**S3: 90 cm X 45 cm**	**G1.SCS-1061**	**G2.CPD-165**		
F1.100% RDN	2888	2820	2726	2773	2849		
F2.125%RDN	2988	2940	2878	2902	2968		
Mean (Spacings)	**2938**	**2880**	**2801**	**2838**	**2909**		
ANOVA	**Genotype**	**Fertilizers**	**Spacing**	**GXF**	**GXS**	**FXS**	
SE d	9.67	39.36	145.85	55.66	206.26	206.26	
CD (5%)	42.26	108.65	NS	NS	NS	NS	

Srivilliputhur

The results indicated that spacing and nutrient levels exerted significant influence on seed cotton yield but varieties performed non-significantly. The existing recommended spacing of 75 x 30 cm produced significantly higher yield of 2058 kg/ha than wider spacing of 75 x 45 cm (1910 kg/ha). Amongst nutrient levels, application of 125 % RDN produced significantly the highest seed cotton yield of 2103 kg/ha which was comparable with that of 100 % RDN (2040 kg/ha) and effect of both these higher levels significantly higher than the lesser one of 75 % RDN (1809 kg/ha) (Table 10). The interaction effect was found not significant. The study revealed that spacing of 75 x 30 cm with application of 125 % RDN is recommended for the tested pre released genotypes (CPD 1652 and SCS 1061).

Table10. Seed cotton yield (kg/ha) of genotypes as influenced by spacing and nutrient levels

Treatments	CPD 1652			SCS 1061			Grand Mean
	S1.75 x 30cm	S2.75 X 45cm		S1.75 x 30cm	S2.75 X 45cm		
F1.75 %RDN	1713	1646		2001	1877		1809
F2.100%RDN	2172	1951		2027	2011		2040
F3.125%RDN	2234	1957		2199	2022		2103
Two way Interaction table							
Treatments	S1.75 x 30 cm	S2.75 X 45cm		CPD 1652	SCS 1061		
F1.75 %RDN	1857	1761		1680	1939		
F2.100% RDN	2100	1981		2082	2019		
F3.125%RDN	2217	1989		2096	2110		
Mean	2058	1911		1946	2023		
Treatments	S1.75 x 30 cm	S2.75 X 45cm					
CPD 1652	2040	1851					
SCS 1061	2076	1970					
Mean	2058	1911					
ANOVA	Genotype	Spacing	Fertilizers	GXS	GXF	SXF	GX SX F
SEd	72.3	67.1	63.5	-	-	-	-
CD (5%)	NS	136.2	132.3	NS	NS	NS	NS

Agronomy IA: Agronomic requirements of promising pre-release *Hirsutum x barbadense* genotypes of cotton in South Zone (irrigated)

LAM

The results of the study revealed that there was significant difference in growth, yield contributing characters with spacing tested. Seed cotton yield recorded was similar among the hybrids tested. Amongst spacing tested, more number of sympodia per plant were recorded at 105x60cm, however the number of bolls per square meter recorded were significantly superior at closer spacing of 90x 45cm (125/sqm) compared to 105x60cm (102/sqm). Maximum seed cotton yield was recorded in 90x45cm (2833 kg/ha) and was significantly superior to 105x60cm (2347 kg/ha) (Table 11). Application of different levels of nutrients did not influence the seed cotton yield. Interactions were found non-significant. The trial inferred that 100 % RDN with spacing of 90 x 45 cm is recommended for the pre released hybrids(ARBHB 1 and LAHB 1)

Table11 . Seed cotton yield (kg/ha) as influenced by genotypes, spacing levels and nutrient levels (Hirsutum X Barbadense)

Treatments	ARBHB 1		LAHB 1		Grand Mean			
	90x45cm	105x60cm	90x45cm	105x60cm				
100% RDF	2613	2382	2606	2004	2402			
125% RDF	2937	2558	3131	2234	2715			
150% RDF	2965	2380	2746	2525	2654			
Interaction	90x45cm	105x60cm	ARBHB 1	LAHB 1	Interaction	ARBHB 1	LAHB 1	Mean
100% RDF	2610	2193	2498	2306	90x45cm	2839	2828	2833
125% RDF	3034	2396	2748	2683	105x60cm	2440	2255	2347
150% RDF	2856	2452	2673	2636				
Mean	2833	2347	2640	2541	Mean	2640	2541	
Anova	Genotype	Spacing	Fertilizers	GXS	GXF	SXF	GXSXF	
SE d	104	132	130	187	184	184	260	
CD (5%)	NS	365	NS	NS	NS	NS	NS	

Coimbatore

The genotypes of ARBHB 1601 and LAHB 1 evaluated with different spacing and fertilizer levels. On par performance of genotypes (G1.ARBHB 1601 and G2.LAHB 1) was observed.The data on yield revealed that spacing of 150 x 60 cm recorded significantly higher yield of 2539 kg/ha compared to other spacing (Table 12). Application of 135% RDN registered higher seed cotton yield (2619 kg/ha); which was comparable yield with 112.5% RDN (2566 kg/ha) and 100 % of RDN(2404 kg/ha). The study inferred that 100 % RDN and spacing of 125 x 60 cm is recommended for both the genotype (G1.ARBHB 1601 and G2.LAHB 1).

Table 12.Seed cotton yield (kg/ha) as influenced by genotypes, spacing levels and nutrient levels (Hirsutum x Barbadense)

Treatments	G1.ARBHB 1601			G2.LAHB 1						Grand Mean
	S1.90X 60 cm	S2.120 X 60 cm	S3.150 X 60cm	S1.90X60 cm	S2.120 X 60 cm	S3.150 X 60 cm				
F1.100% RDN	2366	2703	2650	2066	2966	2433				2404
F2.112.5% RDN	2800	2516	2633	2200	2400	2566				2566
F3.135%RDN	2926	2580	2500	2066	2233	2933				2619
Interaction (two way)	S1.90X60 cm	S2.120 X 60 cm	S3.150 X 60 cm	G1.ARBHB 1601	G2.LAHB 1		Interaction	G1.ARBHB 1601	G2.LAHB 1	
F1.100% RDN	2216	2835	2542	2697	2111		S1.90X60 cm	2573	2488	2573
F2.112.5% RDN	2500	2458	2600	2600	2533		S2.120 X 60 cm	2650	2389	2650
F3.135%RDN	2496	2407	2717	2594	2644		S3.150 X 60 cm	2669	2411	2669
Mean	2531	2519	2540	2630	2429			2630	2429	2630
ANOVA	Genotype	Spacing	Fertilizers	GXS	GXF		GXSXF			
SE d	66.5	60.1	119.9	96.19	153.6		NS			
CD (5%)	286.3	138.6	248.2	328.9	429.4					

Agronomy IA: Agronomic requirements of promising pre-release *barbadense* of cotton in South Zone (Irrigated)

LAM

The results of the study revealed that between two prereleased genotypes (DB1601- and DB1602)tested, growth parameters and seed cotton yield recorded were not varying statistically. Amongst spacing tested, number of bolls per square meter recorded were significantly superior at closer spacing of 90x45cm (118/sqm) compared to 105 x 60cm (83/sqm). This might be due to more number of plants per unit area in closer spacing. The maximum seed cotton yield was recorded with 90 x 45cm (3065 kg/ha) and was significantly superior to105 x 60cm (1877 kg/ha). Application of 150% RDN recorded maximum number of bolls per square meter (110/sqm) and the lowest was recorded at 100% RDN (91/sqm). The significantly highest seed cotton yield was recorded with application of 150% RDN (2722 kg/ha), which was significantly superior to the other two levels tested (Table 13). The results inferred that 90 x 45 cm spacing with application of 150 % of RDN is recommended for both the pre released cultures (DB 1601 &DB 1602).

Table13 . Seed cotton yield (kg/ha) of genotypes as influenced by spacing and nutrient levels

Treatments	DB 1601		DB 1602			Grand Mean			
	90x45cm	105x60cm	90x45cm	105x60cm					
100% RDN	2860	1664	2400	1728		2163			
125% RDN	3200	1909	3149	1857		2529			
150% RDN	3277	2099	3505	2006		2722			
Interaction	90x45cm	105x60cm	DB 1601	DB 1602		Interaction	DB 1601	DB 1602	Mean
100% RDN	2630	1696	2262	2064		90x45cm	3112	3018	3065
125% RDN	3175	1883	2555	2503		105x60cm	1891	1864	1877
150% RDN	3391	2053	2688	2756					
Mean	3065	1877	2502	2441		Mean	2502	2441	
Anova	Genotype	Spacing	Fertilizers	GXS	GXF	SXF	GXSXF		
SE d	107	119	81	168	115	115	162		
CD (5%)	NS	328	172	NS	NS	243	NS		

Coimbatore

The agronomic requirement of studies of pre released barbadense genotypes (DB-1601, DB-1602 and CCB 51) found that yield attribute (No. of bolls/sqm) and seed cotton yield (kg/ha) were significantly influenced by spacing and nutrient levels. Amongst spacing, 90 x 60 cm registered significantly higher seed cotton yield (1581 kg/ha) and was on par with 120 x 60 cm (1558 kg/ha) but superior than 150 x 60 cm. Amongst nutrient levels imposed, F3:135%RDN recorded significant higher number of bolls/sqm (75/sqm), which was on par with F2:112.5% RDN (70/sqm). In case of nutrient levels tested, F3:135 %RDN recorded higher seed cotton yield of 1596 kg/ha which was on par with F2:112.5% RDN (1559 kg/ha) (Table 14) . The study showed that 120 x 60 cm spacing with application of F2:112.5 %RDN were found optimum for the tested genotypes.

Table 14.Seed cotton yield (kg/ha) as influenced by genotypes, spacing levels and nutrient levels (Barbadense)

Treatments	G1.DB 1601			G2.DB 1602			G3.CCB 51			Grand Mean
	S1.90X60 cm	S2.120 X 60 cm	S3.150 X 60cm	S1.90X60 cm	S2.120 X 60 cm	S3.150 X 60cm	S1.90X60 cm	S2.120 X 60 cm	S3.150 X 60cm	
F1:100%RDN	1368	1533	1350	1593	1473	1460	1493	1417	1350	1449
F2:112.5% RDN	1867	1760	1140	1600	1593	1517	1483	1413	1390	1559
F3:135 %RDN	1623	1683	1653	1783	1687	1600	1417	1460	1458	1596
Interaction (two way)	**S1.90X60 cm**	**S2.120 X 60 cm**	**S3.150 X 60cm**	**G1.DB 1601**	**G2.DB 1602**	**G3.CCB 51**	**Interaction**	**G1.DB 1601**	**G2.DB 1602**	**G3.CCB 51**
F1:100%RDN	1485	1474	1387	1417	1509	1420	S1.90X60cm	1619	1659	1464
F2:112.5% RDN	1650	1589	1439	1679	1570	1429	S2.120 X 60 cm	1659	1584	1430
F3:135 %RDN	1608	1610	1571	1653	1690	1445	S3.150 X 60cm	1471	1526	1399
Mean	1581	1558	1465	1583	1590	1431		1583	1590	1431
ANOVA	Genotype	Spacing	Fertilizers	GXS	GXF	S X F	GXSXF			
SE d	19	25	24	40	39	42	74			
CD (5%)	52	54	49	NS	86	NS	53			

Agronomy IA: Agronomic requirements of promising pre-release *arboretum* cotton in South Zone (rainfed)

Dharwad

The results revealed that seed cotton yield was influenced by genotypes, nutrients levels and planting geometry. Amongst genotypes tested, JLA-1110(G_2) (1265 Kg/ha) recorded significantly higher seed cotton yield as compared to PA 810 (G_1) (1075 Kg/ha). However, it was on par with check DLSA-17 (G_3) (1206 kg/ha).Amongst planting geometry either 60X30 cm (S_1) or 75X30 cm (S_2) recorded significantly higher seed cotton yield as compared to 90X30 cm (S_3) spacing. It showed, optimum population is required to produce higher yields ranged from 60-75x 30 cm and more than 75 cm row spacing leads to reduced yields. Application of 100% RDN(1122 Kg/ha) to 125% RDN (1169 Kg/ha) did not increase seed cotton yield significantly as compared to 150% RDN (1255 kg/ha) (Table 15). Amongst inter actions results, genotypes JLA-1110 (G_2) had recorded significantly higher seed cotton yield with 60X30 cm (S_1) and 150% RDF (F_3) (1501 Kg/ha). The results inferred that 75 x 30 cm spacing with application of 150 % RDN was found optimum for the pre released genotypes (PA 810 and JLA 1110).

Table 15. Seed cotton yield as affected by levels of fertilizers and spacing in *G arboreum* varieties

Genotype(G)	Spacing(S)	Fertiliser levels(F)			Mean
		F1:100%RDF	F2:125%RDF	F3:150%RDF	
(G_1)PA 810	S_1: 60 x 30 cm	997	1244	1221	1154
	S_2: 75 x 30 cm	983	954	1263	1067
	S_3: 90 x 30 cm	1078	869	1066	1004
	Mean	1019	1022	1183	1075
(G_2)JLA 1110	S_1: 60 x 30 cm	1195	1180	1501	1292
	S_2: 75 x 30 cm	1251	1338	1352	1313
	S_3: 90 x 30 cm	1144	1286	1136	1189
	Mean	1197	1268	1330	1265
(G_3)DLSA 17	S_1: 60 x 30 cm	1136	1256	1122	1171
	S_2: 75 x 30 cm	1270	1291	1259	1273
	S_3: 90 x 30 cm	1041	1104	1371	1172
	Mean	1149	1217	1251	1206
Mean of S	S_1: 60 x 30 cm	1109	1226	1282	1206
	S_2: 75 x 30 cm	1168	1194	1291	1218
	S_3: 90 x 30 cm	1088	1086	1191	1122
Mean		1122	1169	1255	
For comparison of Means		S.Em±		CD @ 5%	
Genotype(G)		30		117	
Spacing (S)		20		63	
Fertiliser (F)		19		53	
G X S		35		NS	
G X F		32		NS	
S X F		32		NS	
G X S X F		56		160	

Nandyal

The results of agronomic requirement studies found that there was significant effect of different nutrient levels on number of bolls per square metre. Higher number of bolls per square metre (87.7) was recorded with 150% RDN. Lower number of bolls per square meter (77.5) was recorded with 100 % RDN. Spacing and genotypes din not show any significant effect on number of bolls per square metre and boll weight. Higher boll weight (2.9g) was recorded with 150% RD N and was on par with 125 % RDN (2.9g).There was significant effect of different nutrient levels on seed cotton yield. Amongst nutrient levels, the highest seed cotton yield (3408 kg/ha) was recorded with 150% RDN (Table 16). The tested spacing levels did not show significant effect on seed cotton yield. The results showed that application of 150 % RDN with 60 x 15 cm was optimum for the pre released genotypes (PA 810 and JLA 1110).

Table 16.Seed cotton yield (kg/ha) of genotypes as influenced by spacing and nutrient levels

Treatments	Yaganti		PA 810		JLA 1110		Grand mean		
	S1: 60X30 cm	S2: 60X15 cm	S1: 60X30 cm	S2: 60X15 cm	S1: 60X30 cm	S2: 60X15 cm			
F1.100%RDN	2709	2443	2731	2923	2867	2665	2723		
F2.125%RDN	2399	3030	2382	2914	2472	3254	2715		
F3.150%RDN	3533	3530	3617	3204	3264	3301	3408		
Interaction	S1: 60X30 cm	S2: 60X15 cm	Yaganti	PA 810	JLA 1110	Interaction	Yaganti	PA 810	JLA 1110
F1.100%RDN	2769	2677	2576	2827	2766	S1: 60X30 cm	2880	2910	2867
F2.125%RDN	2418	3066	2715	2648.0	2863	S2: 60X15 cm	3001	3013	3073
F3.150%RDN	3471	3345	3532	3410.7	3282				
Mean	2886	3029	2941	2962	2970	Mean	2941	2962	2970
ANOVA	S	F	V	SXF	SXV	FXV	SXFXV		
SE d	60	173	115	244	163	200	282		
CD(5%)	NS	398	NS	NS	NS	NS	NS		

Agronomy 1B:Evaluation of compact cultures under HDPS with different spacing and nutrient levels in North Zone (irrigated)

Preamble: Cotton is capable of producing acceptable yields in a wide range of plant populations. However, the general conclusion may not be applicable to all genotypes / situations. High density planting with compact genotypes proved, as high potential system of cotton cultivation in many situations. Many cotton producing countries like Brazil, China, Australia, Spain Uzbekistan, Argentina and Greece tested, proved and adopted narrow row planting system of cotton as tool to achieve higher productivity. Previously, there were no exclusive genotypes for high density planting system. Keeping this in view, development of compact genotypes is prioritised. The agronomic requirement studies are under taken for pre released genotypes in multi-location.

Faridkot

The experiment on agronomic requirement of pre released compact cultures revealed that wider planting geometry (67.5 x 60 cm) resulted in significantly least yield (2530 kg/ha). Amongst, narrow geometry67.5 x 20 cm (3372 kg/ha) exhibited significantly higher seed cotton yield than 67.5 x 10 cm (2959 kg/ha). Nutrition levels also exerted significant effect on seed cotton yield. Both 125 % (3063 kg) and 150 % (3146 kg) RDN resulted in significantly higher seed cotton yield than 100 % N (2808 kg/ha), while statistically 125 % and 150 % RD of N remained at par (Table 17). The interaction indicated that RS2818 recorded the highest yield (3516 kg/ha) at a spacing level of 67.5 x 20 cm with 125 % recommended level of nutrients.

Table 17. Growth, yield and yield contributing characters of RS2818hirsutism**cotton variety under different spacing and Nutrient levels**

Treatments	Plant height (cm)	Monopods per plant	Sympods per plant	Length of monopodial branch (cm)	Boll /m^2	Boll weight (g)	Seed cotton yield (Kg/ha)
Planting geometry							
67.5 x 10 cm	152.7	0.74	11.48	66.8	233.7	3.04	2959
67.5 x 15cm	147	0.81	13.1	70.4	179.2	3.24	3162
67.5 x 20 cm	143.7	0.93	14.95	70.7	147.5	3.23	3372
67.5 x 60 cm	128.2	1.85	19.67	91.7	118.1	3.62	2530
CD (p=0.05)	11.7	0.22	1.16	9.0	42.3	0.23	293
SEd	4.79	0.09	0.47	3.71	17.3	0.09	119.7
Nutrition levels							
100 % RDN	135.6	0.86	12.59	68.2	150.7	3.23	2808
125% RDN	143.4	1.05	15.25	77.0	173.9	3.28	3063
150% RDN	149.7	1.33	16.55	79.5	184.3	3.33	3146
CD (p=0.05)	NS	0.2	1.33	5.3	19.7	NS	175
SEd	6.79	0.09	0.62	2.52	9.3	0.04	82.7
Interaction	NS	NS	NS	NS	NS	NS	NS

Hisar

The results on agronomic requirement of compact culture (RS 2827) revealed that number of bolls per square metre were significantly higher with plant spacing of 67.5x10cm. Significantly higher number of bolls per square metre was recorded with the application of 150% RDN. Significantly lower boll weight(67.5 x 10 cm, 2.50 g) was recorded with closer plant spacing as compared to wider plant spacing (67.5 x 60 cm 3.45 g). Seed cotton yield was significantly higher with plant spacing of 67.5x20 cm (3462 kg/ha) as compared to wider spacingof 67.5x60 cm (2955 kg/ha) (Table 18). The interaction results found that highest seed cotton yield was recorded with plant spacing of 67.5x20 cm with application of 150% RDN.

Table18 . Seed cotton yield (kg/ha) as influenced by spacing and nutrient levels

Treatments	S1.67.5 X 10	S2.67.5X 15	S3.67.5X 20	S4.67.5 X 60	Mean	Anova	**SE d**	**CD (5%)**
F1.100%RDN	3301	2924	3360	2690	3068	Spacing	89	223
F2.125%RDN	3439	3095	3443	3003	3245	Nutrients	121	NS
F3.150%RDN	3603	3134	3583	3173	3373	S X N	242	NS
Mean	3448	3051	3462	2955				

Agronomy 1B: Evaluation of compact cultures under HDPS with different spacing and nutrient levels in Central Zone (rainfed)

Akola

The agronomic requirement of compact genotypes trial found that seed cotton yield (SCY) was significantly higherinAKH-081 (1443 kg/ha) followed by BS-30 (1327 kg/ha) and ARBC-1651 (1159 kg/ha).The SCY was significantly highest (1358 kg /ha) with plant density (1.66 lakh/ha) i.e. with 60 x 10 cm spacing which was at par with spacing of 45X10 cm and 60X30 cm and was found significantly superior over 75X10 cm spacing with plant population of 1.11 lakh/ha (Table 19).There was positive response to nutrient levels in seed cotton yield. The highest SCY (1372 kg/ha) with 150 % RDN was found significantly superior over 100 % and 125 %RDN.

Table 19. Seed cotton yield (kg/ha) as influenced by genotypes, spacing levels and nutrient levels

Treat ments	V1:ARBC-1651				V2: BS-30				V3:AKH-081				Grand Mean
	S1.60X 10cm	S2.75x 10cm	S3.45x 10cm	S4.60x 30cm	S1.60X 10cm	S2.75 x10cm	S3.45x 10cm	S4.60 x30 cm	S1.60 X10 cm	S2.75x 10 cm	S3.45 x10 cm	S4.60x 30 cm	
F1.100%RDN	1285	1122	1189	1017	1199	1307	1319	1339	1516	1215	1338	1381	1310
F2.125%RDN	1318	1024	1174	1133	1365	1142	1303	1388	1478	1331	1391	1424	
F3.150%RDN	1316	1044	1237	1051	1163	1562	1267	1575	1583	1583	1524	1558	
Interaction (two way)	**S1.60X 10cm**	**S2.75x 10cm**	**S3.45x 10cm**	**S4.60x 30cm**	**V1:ARBC-1651**	**V2: BS-30**	**V3:AKH-081**		**Interaction**	**V1:ARBC-1651**	**V2: BS-30**	**V3:AKH-081**	**Mean F**
F1.100%RDN	1333	1215	1282	1246	1153	1291	1362		S1.60 X10 cm	1307	1242	1526	**1269**
F2.125%RDN	1387	1166	1289	1315	1162	1299	1406		S2.75 x10 cm	1364	1337	1377	**1289**
F3.150%RDN	1354	1396	1343	1395	1162	1392	1562		S3.45 x10	1200	1297	1418	**1372**
									S4.60 x30 cm	1167	1434	1454	
Mean	1358	1259	1305	1318	1159	1327	1443			1159	1327	1443	
ANOVA	Genotype	Spacing	Fertilizers		VXS	VXF	SXF		VXSXF				
SE d	24	28	21		49	36	42		73				
CD (5%)	71	83	61		142	NS	NS		NS				

Nanded

The experimental results revealed that genotypes were found on par with each other with respect to number of boll counted per m^2, boll weight, yield per plant and seed cotton yield. The variety, BS 30 recorded numerically higher seed cotton yield (1762 kg/ha) and other yield attributes. The spacing (45 x 10 cm) recorded the highest seed cotton yield (1890 kg/ha) which was significantly superiorto75 x 10 cm (1613 kg/ha) but was at par with 60 x 10 cm (17512 kg/ha). The 150%RDNwas significantly superior over 100% RDN for yield contributing characters and seed cotton yield (1791 kg/ha).The interactions found non-significant effect. The trial results showed that 60 X 10 cm with

application of 150 % RDN can be recommended for the both pre released cultures (V1 - ARBC 1601 and V2 - BS 30).

Table 20. Seed cotton yield (kg/ha) as influenced by genotypes, spacing levels an d nutrient levels

Treatments	V1 - ARBC 1601				V2 - BS 30				Grand Mean
	S1 – 45 X10 cm	S2 – 60 X 10cm	S3 - 75 X 10cm	S4 – 60 x 30cm	S1 – 45 X10 cm	S2 – 60 X 10cm	S3 - 75 X 10cm	S4 – 60 x 30cm	
F1-100%RDN	1721	1626	1618	1447	1909	1717	1460	1606	1638
F2-125%RDN	1766	1673	1663	1611	2013	1829	581	1653	1724
F3-150%RDN	1837	1745	1684	1683	2094	1914	1673	1695	1791
Interaction (two way)	S1 – 45 X10 cm	S2 – 60 X 10cm	S3 - 75 X 10cm	S4 – 60 x 30cm	V1 - ARBC 1601	V2 – BS 30	Interaction	V1 - ARBC 1601	V2 – BS 30
F1-100%RDN	1815	1672	1539	1526	1603	1673	S1 – 45 X10 cm	1774	2005
F2-125%RDN	1890	1751	1622	1632	1678	1769	S2 - 60 X 10 cm	681	1820
F3-150%RDN	1965	1829	1679	1689	1737	1844	S3 - 75 X 10	1655	1571
Mean	1890	1751	1613	1616	1673	1762	S4 - 60 x 30 cm	1580	1651
ANOVA	Genotype	Spacing	Fertilizers	GXS	GXF	SXF	GXSXF		
SE d	44.79	63.35	37.28	89.59	52.72	74.56	105.44		
CD (5%)	N.S.	191.86	103.17	N.S.	N.S.	N.S.	N.S.		

Agronomy 1B: Evaluation of compact cultures under HDPS with different spacing and nutrient levels in Central Zone (Irrigated)

Surat

The results of HDPS experiment on pre released culture found that significantly higher number of bolls was recorded in genotype G_2 BS 30 (88.1/plant) as compared to genotype G_1 ARBC 1601 (81.7/plant). The number of bolls per sqm decreased significantly with increase in spacing levels. Significantly higher number of bolls per sqm was recorded at S1.60 x 10 cm(125.1/sqm) as compared to rest of the spacing levels. The genotype, G_2 (BS 30) recorded significantly higher seed cotton yield (1982 kg/ha) as compared to genotype G_1*i.e.*, ARBC 1601 (1703 kg/ha) (Table 21). Amongst spacing level,S1.60 x10 cm recorded significantly higher seed cotton yield of 2399 kg/ha as compared to rest of the spacing levels. Nutrient levels and interaction effect also failed to exert any significant difference on seed cotton yield. The results concluded that spacing of S1.60X10 cm and application of 100%RDN were optimum for the genotypes (G1.ARBC 1601 and G2. BS 30).

Table 21. Seed cotton yield (kg/ha) as influenced by genotypes, spacing levels and nutrient levels

Treatments	G1.ARBC 1601				G2. BS 30				Grand Mean
	S1.60X10 cm	S2.75 X 10 cm	S3.90 X 10 cm	S4.120 X 45 cm	S1.60X10 cm	S2.75 X 10 cm	S3.90 X 10 cm	S4.120 X 45 cm	
F1.100%RDN	2386	1814	1924	602	2402	2271	2251	774	**1803**
F2.125%RDN	2353	1879	1906	633	2516	2386	2269	926	**1859**
F3.150%RDN	2288	1912	2052	692	2451	2369	2288	874	**1866**
Interaction	S1.60X10 cm	S2.75 X 10 cm	S3.90 X 10 cm	S4.120 X 45 cm	G1.ARBC 1601	G2. BS 30	Interaction	G1.ARBC 1601	G2. BS 30
F1.100%RDN	2394	2042	2088	688	1681	1925	S1.60X10 cm	2342	2456
F2.125%RDN	2435	2132	2088	779	1693	2024	S2.75 X 10 cm	1868	2342
F3.150%RDN	2369	2141	2170	783	1736	1996	S3.90 X 10 cm	1961	2269
Mean	**2399**	**2105**	**2115**	**750**	**1703**	**1982**	S4.120 X 45 cm	642	858
ANOVA	Genotype	Spacing	Fertilizers	GXS	GXF	SXF		**1703**	**1982**
SE d	38.95	55.08	47.70	77.89	67.46	95.40	GXSXF		
CD (5%)	**111**	**157**	**NS**	**NS**	**NS**	**NS**	134.91		

Rahuri

The results revealed that the variety BS 30 recorded significantly higher seed cotton yield (2198 kg/ha)than ARBC 1601 (2087 kg/ha). The spacing of 90x 10 cm recorded maximum number of bolls (34.47), average boll weight (4.90 g), number of sympodia (22.04) and also seed cotton yield (2272 kg/ha) than other spacing. However, it was at par with 75x10 cmspacing for seed cotton yield. The nutrient levelof 150 % RDN registeredsignificantly higher seed cotton yield (2216 kg/ha) than rest of the levels (Table 22). However, it was at par with the fertilizer level of 125 %RDN.The interaction effect was found non-significant. It is recommended that 90x10 cm spacing with 125 % RDN were optimum for thetested pre released genotypes (V1.ARBC 1601 and V2.BS 30).

Table 22. Seed cotton yield (kg/ha) as influenced by genotypes, spacing levels and nutrient levels

Treatments	V1.ARBC 1601				V2.BS 30				Grand Mean
	S1.60X10 cm	S2.75X10 cm	S3.90X10 cm	S4.90X60 cm	S1.60X10 cm	S2.75X10 cm	S3.90X10 cm	S4.90X60 cm	
F1.100%RDN	1936	2045	2076	1906	1768	2137	2157	2184	**2026**
F2.125%RDN	2064	2208	2241	2002	1962	2324	2419	2263	**2185**
F3.150%RDN	2016	2187	2315	2045	1998	2394	2426	2346	**2216**
Interaction (two way)	S1.60X10 cm	S2.75X10 cm	S3.90X10 cm	S4.90X60 cm	V1.ARBC 1601	V2.BS 30	Interaction	V1.ARBC 1601	V2.BS 30
F1.100%RDN	1852	2091	2117	2045	1991	2061	S1.60X10	2005	1909
F2.125%RDN	2013	2266	2330	2133	2129	2242	S2.75X10	2147	2285
F3.150%RDN	2007	2290	2370	2195	2141	2291	S3.90X10	2211	2334
Mean	**1957**	**2216**	**2272**	**2124**	**2087**	**2198**	S4.90X60	1985	2264
--	--	--	--	--	--	--	Mean	**2087**	**2198**
ANOVA	Genotype	Spacing	Fertilizers	GXS	GXF	SXF	GXSXF	--	--
SE d	**35.26**	**47.63**	**34.06**	**67.36**	**48.17**	**68.13**	**96.34**	--	--
CD (5%)	**NS**	**146.76**	**98.12**	**NS**	**NS**	**NS**	**NS**	--	--

Agronomy 1B: Evaluation of compact cultures under HDPS with different spacing and nutrient levels in South Zone (rainfed)

Nandyal

The results of pre released culture trial indicated higher sympodial length (23.8 cm) with 150% RDN. Amongst nutrient levels tested, higher number of bolls per square metre (87.0) and Boll weight (4.0 g) were recorded with 150% RDN and lower number of bolls per square metre (81.0) and lower boll weight (3.7g) were recorded with 100%RDN. Amongst genotypes, ARBC 1651 recorded more number of bolls per square metre (85.6). Spacing did not show any significant effect on number of bolls per square metre. The significantly highest seed cotton yield was recorded with 150% RDN (3905 kg/ha) and was on par with 125% RDN (3877 kg/ha) (Table 23). The genotype, ARBC 1651 recorded higher seed cotton yield (4075 kg/ha), where as DSC 1651 recorded lower seed cotton yield (3506 kg/ha) (Table).The spacing showed no effect on seed cotton yield. The trial conclude that 60 x 15 cm with application of F2:125 % RDN were recommended for the pre released genotypes (DSC 1651 and ARBC 1651).

Table 23. Seed cotton yield (kg/ha)as influenced by genotypes, spacing levels and nutrient Levels

Treatments	DSC 1651 (V1)				ARBC 1651(V2)				Grand Mean
	S1: 45 X 10	S2: 60 X 10	S3: 75 X 10	S4: 60X15	S1: 45 X 10	S2: 60 X 10	S3: 75 X 10	S4: 60X15	
F1.100%	3243	3787	2829	3053	4509	3173	4093	4031	**3590**
F2.125%	3811	3501	3491	3337	4033	4034	4442	4367	**3877**
F3.150%	3717	3605	3667	4031	3937	3978	3957	4350	**3905**
Interaction (two way)	S1: 45 X 10	S2: 60 X 10	S3: 75 X 10	S4: 60X15	DSC 1651 (V1)	ARBC 1651(V2)	Interaction	DSC 1651(V1)	ARBC 1651(V2)
F1.100%	3876	3480	3461	3542	3228	3951	**S1: 45 X 10**	3590	4160
F2.125%	3922	3767	3966	3852	3535	4219	**S2: 60 X 10**	3631	3728
F3.150%	3827	3791	3812	4190	3755	4055	**S3: 75 X 10**	3329	4164
							S4: 60X15	3474	4249
Mean	**3875**	**3680**	**3747**	**3861**	**3506**	**4075**		**3506**	**4075**
ANOVA	**S**	**F**	**V**	**SXF**	**SXV**	**FXV**	**SXFXV**		
SE m±	137	80.0	62	160	123	106	213		
SE d	193	114	87	226	174	150	301		
CD(P=0.05)	NS	240	180	NS	359	NS	NS		

Dharwad

The data on seed cotton yield of genotypes as influenced by planting geometry and fertilizer levels is presented in Table 24. The two tested genotypes did not differ significantly with respect to seed cotton yield. The compact genotypes were well adapted to narrow spacing of 60x10 cm (S_2) (2327kg/ha) significantly (Table 24). However, further increase in spacing to 75 x10 cm (S_3) and 90 x10 cm (S_4) observed that numerical yield increase. All interactions were found not significant. Planting geometry of 90 x 10 cm and application of 125%RDN would be optimum for pre released genotypes (G_1: DSC-1651 and G_2:ARBC-1651).

Table 24.Seed cotton yield (kg/ha)as influenced by genotypes, spacing levels and nutrient Levels

Treatment		NPK levels			
Genotypes (G)	Spacing levels	F1 : RDN	F2 : 125 % RDN	F3:150% RDN	Mean
G_1: DSC-1651	S_1: 45 X 10 cm	1896	1958	2121	1992
	S_2: 60 X 10 cm	2170	2227	2336	2245
	S_3: 75 X 10 cm	2220	2174	2443	2279
	S_4: 90 X 10 cm	2357	2396	2143	2299
	Mean	2161	2189	2261	2204
G_2:ARBC-1651	S_1: 45 X 10 cm	1934	2454	2481	2290
	S_2: 60 X 10 cm	2468	2362	2397	2409
	S_3: 75 X 10 cm	2395	2406	2598	2466
	S_4: 90 X 10 cm	2368	2452	2555	2458
	Mean	2226	2304	2384	2406
Mean of	S_1: 45 X 10 cm	1915	2206	2301	2141
	S_2: 60 X 10 cm	2319	2295	2367	2327
	S_3: 75 X 10 cm	2308	2290	2521	2373
	S_4: 90 X 10 cm	2363	2424	2349	2379
	Mean	2226	2304	2384	
For comparison of Means		S.Em±		CD @ 5%	
Genotypes (G)		87.6		NS	
spacing levels (S)		72.7		NS	
Fetilizer levels (F)		47.2		136	
G X S		102.7		NS	
G X F		66.8		NS	
S X F		94.5		NS	
G X S X F		133.6		NS	

Agronomy 1B: Evaluation of compact cultures under HDPS with different nutrient levels in South Zone (irrigated)

Raichur

The agronomic requirement study result showed significantly higher seed cotton yield with 150%RDN (2843 kg/ha) as compared to 100% RDN (2467 kg/ha) (Table 25). However, 125% RDN recorded seed cotton yield of 2637 kg/ha which was found on par with 150% RDN. The tested spacing levels did not significantly influence the seed cotton yield.

Table 25. Seed cotton yield (kg/ha) as influenced by spacing levels and nutrient levels (GISV 298)

Treatments	S1:60 X 10 cm	S2: 75 X 10 cm	S3: 90 X 10 cm	S4:75 X 30 cm	Mean	Anova	SE. d	CD (5%)
F1: 100%RDN	2354	2459	2539	2514	**2467**	Fertilizers	78.1	222.7
F2: 125% RDN	2563	2617	2659	2709	**2637**	Spacing	148.9	NS
F3: 150% RDN	2801	2767	2831	2973	**2843**	F X S	257.8	NS
Mean	**2573**	**2614**	**2676**	**2732**				

Coimbatore

The data on the effect of spacing and nutrient levels on growth and yield of compact genotype GISV 298 revealed that amongst spacing, 75 x 10 cm produced highest seed cotton yield (2788 kg/ha) which was on par with 90 x 10 cm spacing. Amongst nutrient level, application of 150 % RDN (120:60:60 NPK kg/ha) produced higher seed cotton yield of 2768 kg/ ha and it was comparable with fertilizer dose of 125 % RDN (100:50:50 NPK kg/ ha) (Table 26). The trial inferred that 125%RDN with planting of 75 x 10 cm is recommended to tested compact genotype (GISV 298).

Table26 . Seed cotton yield (kg/ha) as influenced by spacing levels and nutrient levels (GISV 298)

Treatments	**S1 -** 60 x 10 cm	**S2 -** 75 x 10 cm	**S3 -** 90 x 10 cm	Mean (Fertilizers)	Anova	SE d	CD (5%)
F1 – 100RDN	2550	2754	2660	2655	Spacing	16.95	47.06
F2 -125%RDN	2600	2822	2841	2754	Fertilizers	43.96	95.78
F3 – 150RDN	2683	2787	2833	2768	S X F	NS	
Mean (spacing)	2611	2788	2778				

AGR II: Augmenting ELS Cotton production

Preamble: The demand for the textile products made out of ELS cotton is growing exponentially. There is a mismatch in demand & supply of different staple group of cotton particularly in ELS cotton. The country is still importing ELS cotton annually from Egypt, Sudan, U.S.A and others. The demand for ELS cotton in India is about 9 lakh bales against the availability of only about 4 lakh bales. Chamrajnagar station under AICRP (cotton) is addressing the region specific problem of ELS cotton cultivation. The rainfall pattern observed is continuous rains from April to December and multi sowing dates are commonly followed by farmers. Hence, time of sowing experiment was proposed to find out optimum times of sowing of ELS cotton.

Chamrajnagar

The experiment was conducted to find out optimum sowing periods of bimodal rainfall region; where sowing of ELS cotton was taken at multi sowing dates by farmers. The experimental results on times of sowing revealed that first peak of seed cotton yield (2158 kg/ha), observed at 2nd fortnight of April and was on par with sowing at May 1st fortnight (2122 kg/ha) and sowing at May 2nd fortnight (1975 kg/ha). The first peak of the highest Gross returns (Rs. 1, 07, 883/ha), net returns (Rs. 65, 903/ha) and B:C ratio (2.57) was obtained with sowing at 2nd fortnight of April. The second peak of higher seed cotton yields was observed with sowing at July 2nd fortnight (1907 kg/ha); which was on par with Aug-1st Fortnight (1759 kg/ha) sowing. The second peak of the highest Gross returns (Rs. 95,350/ha), net

returns (Rs. 53,720/ha) and B:C ratio (2.3) was obtained with sowing at 2nd fortnight of July (Table 27). The total and effective rainfall received during the crop growth periods of different dates of sowing observed two peaks respectively at May-1st Fortnight (total rainfall 789.9 mm and effective rainfall of 588.7 mm) and second peak at July-1st Fortnight(total rainfall 706.1 mm and effective rainfall of 525.8 mm).The trial results inferred that the domain is having bimodal rainfall and having two distinct seasons respectively summer and kharif for ELS cotton cultivation. The summer sowing window of 15th April to 30th May and kharif season sowing window of 15th July to15th August were standardised.

Table27 . Growth characters, seed cotton yield (kg/ha), economics as influenced by times of sowing

Treatments	Total Rainfall (mm)	Effective rainfall (mm)	Seed cotton yield (kg/ha)	Gross return (Rs./ha)	Net return (Rs./ha)	B:C Ratio
T_1: March-2nd Fortnight	492.8	365.8	1275	63750	25269	1.66
T_2: Apirl-1st Fortnight	491.5	364.9	1572	78617	39437	2.01
T_3: April-2nd Fortnight	670.1	498.8	2158	107883	65903	2.57
T_4: May-1st Fortnight	789.9	588.7	2122	106100	64120	2.53
T_5: May-2nd Fortnight	697.7	519.5	1975	98733	58153	2.43
T_6: June-1st Fortnight	697.0	519.0	1273	63667	24837	1.64
T_7: June- 2nd Fortnight	704.6	524.7	1405	70233	30353	1.76
T_8: July-1st Fortnight	706.1	525.8	1542	77100	36170	1.88
T_9: July-2nd Fortnight	685.1	510.1	1907	95350	53720	2.29
T_{10}: Aug-1st Fortnight	572.1	425.3	1759	87967	47037	2.15
T_{11}: Aug- 2nd Fortnight	535.5	397.9	1429	71467	31587	1.79
T_{12}: Sept- 1st Fortnight	521.4	387.3	1137	56867	18387	1.48
SEd			109.50	5475.4	5475.4	0.13
CD (5%)			227.10	11355	11355	0.28

Agronomy IIIB: Enhancing Nitrogen use efficiency in Bt cotton

Adoption of Bt hybrids, enhanced fertilizer use by 2.3 times from 98 kg to 222 kg/ha. Amongst different nutrients, rate of nitrogen use increased abnormally. Hence intensive research to identify the low cost method, schedule of application and incorporation of legumes component to increase nitrogen use efficiency and reducing the quantity of inorganic nitrogen is gaining momentum in Bt cotton.

North Zone

The highest seed cotton yield of 3000 and 3253 kg/ha, as compared to rest all treatments were recorded at Faridkot and Bathinda respectively, under T8 i.e., application of 100 % of RDN (2 splits) + Foliar application of 2 % KNO_3 (4 times: at weekly intervals during flowering and boll development). N use efficiency (Kg/Kg of N) also varied significantly with the highest value (35.42 Kg/Kg of N) for T7 {i.e., 75 % of RDN + Placement (Spot application in 4 Split: Basal, Squaring, Flowering and Boll development) +Foliar application of 2 % KNO_3 (3 times: Squaring, Flowering and Boll development)} at Faridkot (Table 28). In Hisar, seed cotton yield (3437 Kg/ha), net return(Rs.29,761 /ha) and BCR (1.20) NUE (of 15.03 kg N/Kg) were significantly higher with 75 % of RDN in spot application of four Split and raising of Sunnhemp / fodder cowpea between rows incorporated before flowering (T9)(Table). At

Sriganganagar the 75 % of RDN + Placement (Spot application in 4 Split: Basal, Squaring, Flowering and Boll development) gave the highest seed cotton yield (3506 kg/ha), NUE of 35.73 kg N/Kg net return (Rs.1, 81,549/ha) and BCR (4.83) (Table 29).The results further added that the high performing treatments in most of the places were with the treatment of 75 % of RDN + Placement (Spot application in 4 Split: Basal, Squaring, Flowering and Boll development) or on par with the same, thus revealed that possibility of reducing of 25 % of N application in North Zone.

Table28. Seed Cotton Yield (SCY) (Kg/ha) and Nitrogen Use Efficiency (NUE (kg/Kg of N) as influenced by method and scheduling of nitrogen application

Treatments	Faridkot		Bathinda		Hisar		SNGR	
	SCY (kg/ha)	NUE (Kg/kg of N)	SCY (kg/ha)	NUE (Kg/kg of N)	SCY (kg/ha)	NUE (Kg/kg of N)	SCY (kg/ha)	NUE (Kg/kg of N)
T1- Control	1864	-	1760	-	1393	-	2469	-
T2 - 100 % of RDN(Band application in 2 splits at Basal & Flowering)	2620	24.95	2530	16.9	3115	9.84	3099	27.28
T3-75 % of RDN(Band application in 2 splits at Basal & Flowering)	2427	30.83	2204	19.6	2637	9.5	3012	32.35
T4-75 % of RDN +Placement(Spot application in 2 splits at Basal & Flowering)	2550	32.39	2547	22.6	2703	10.01	3222	33.13
T5 - 75 % of RDN + Placement (Spot applicationin 4 Split: Basal, Squaring, Flowering and Boll development)	2565	32.58	2612	23.2	2793	10.69	3506	35.73
T6 - T5+Foliar application of 1 % urea (3 times: Squaring, Flowering, Boll development)	2595	32.96	2818	24.1	3243	13.6	3284	35.35
T7 - T5 +Foliar application of 2 % KNO3 (3 times: Squaring, Flowering, Boll development)	2789	35.42						
T8 - 100 % of RDN (2 splits as per Univ. Recd) + Foliar application of 2 % KNO3 (4 times: at weekly intervals during Flowering and Boll development)	3000	28.57	3253	21.2				
T9- T6+raising of Sunnhemp / fodder cowpea between rows incorporated before flowering					3437	15.03	2963	32.23
SD	189.5	2.52	228	1.9	309		197	
CD (5%)	410	5.56	406	3.46	680		429	

Table 29. Net Return (Rs./ha) and Benefit Cost Ratio (BCR) as influenced by method and scheduling of nitrogen application

Treatments	Faridkot		Bathinda		Hisar		SNGR	
	NR (Rs./ha)	BCR	NR (Rs./ha)	B:C	NR (Rs./ha)	BCR	NR (Rs./ha)	BCR
T1- Control	60792	1.87	54054	1.59	-23223	0.75	122892	3.55
T2 - 100 % of RDN(Band application in 2 splits at Basal & Flowering)	92054	2.36	85411	2.07	2613	1.15	184542	4.80
T3 -75 % of RDN(Band application in 2 splits at Basal & Flowering)	84817	2.31	71703	1.86	8947	1.06	161003	4.31
T4 - 75 % of RDN +Placement(Spot application in 2 splits at Basal & Flowering)	90107	2.40	86464	2.11	10263	1.07	165781	4.44
T5 - 75 % of RDN + Placement (Spot application in 4 Split: Basal, Squaring, Flowering, Boll development)	90665	2.40	89038	2.14	20681	1.16	181549	4.83
T6 - T5+Foliar application of 1 % urea (3 times: Squaring, Flowering, Boll development)	91757	2.41	97600	2.25	24750	1.17	178514	4.67
T7 - T5 +Foliar application of 2 % KNO3 (3 times: Squaring, Flowering, Boll development)	98551	2.41						
T8 - 100 % of RDN (2 splits as per Univ. Recd) + Foliar application of 2 % KNO3 (4 times: at weekly intervals during Flowering and Boll development)	106498	2.44	114099	2.35			-	-
T9 - T6+raising of Sunnhemp / fodder cowpea between rows incorporated before flowering					29761	1.20	158597	4.07
SD	8244	0.14	9906	0.17				
CD (5%)	17853	0.31	17628	0.30				

Central Zone

The results of experiment on enhancing nitrogen use efficiency revealed that the treatment T_7 : 75% of RDN + Placement (Spot application in 4 splits at Basal, squaring, Flowering and boll development) + Foliar application of 1 % urea (3 times: squaring, Flowering and boll development) + raising of sunnhemp/fodder cowpea between rows incorporated before flowering recorded significantly higher seed cotton yield of 2591 and 1800 kg/ha and respectively at Rahuri and Khandwa (Table30). The same method calculated maximum net return of Rs.. 59,754 and 23142/ha and benefit cost ratio of1.72 and 1.30 respectively at Rahuri and Khandwa. The results of Junagadh revealed that the treatment T_6 : 75% of RDN + Placement (Spot application in 4 splits at Basal, squaring, Flowering and boll development) + Foliar application of 1 % urea (3 times: squaring, Flowering and boll development) recorded significantly higher seed cotton yield (2478kg/ha),nitrogen use efficiency (13.77 kg/kg N) net returns (Rs.. 63,756 ha^{-1}) and nitrogen use efficiency (13.77 kg/kg of N) and benefit cost ratio(1.92). In Bhawanipatna, application of 100 % of RDN(Band application in two splits at Basal & Flowering)(T_2) registered the significantly highest seed cotton yield (2101 kg/ha), nitrogen use efficiency (10.91 kg/kg of N) net returns (Rs. 70,137 ha^{-1}) and benefit cost ratio (2.51)(Table 31). The results further added that the high performing treatments in most of the places were used 75 % of RDN or on par with the same, thus revealed that possibility of reducing of 25 % of N application.

Table30. Seed cotton yield and net return (Rs./ha) as influenced by different methods of nitrogen application in Central Zone

Treatments	Rahuri		Junagadh		Bhawanipatna		Khandwa	
	SCY (kg/ha)	NUE (Kg/kg of N)	SCY (kg/ha)	NUE (Kg/kg of N)	SCY (kg/ha)	NUE (Kg/kg of N)	SCY (kg/ha)	NUE (Kg/kg of N)
T1. Control	13.37	0	1706	0	828	0	1297	0
T2.100 % of RDN(Band application in2 splits at Basal & Flowering)	20.07	5.36	2143	8.93	2101	10.91	1559	4.26
T3.75 % of RDN(Band application in2 splits at Basal & Flowering)	18.17	5.12	2169	12.05	1735	10.39	1455	3.63
T4.75 % of RDN +Placement(Spot application in 2 splits at Basal & Flowering)	19.72	6.77	2096	11.64	1308	5.64	1397	2.66
T5.75 % of RDN + Placement (Spot application in 4 Split: Basal, Squaring, Flowering, Boll development)	20.89	8.02	2391	13.28	1483	7.59	1557	5.32
T6.T5+Foliar application of 1 % urea(3 times: Squaring, Flowering, Boll development)	23.41	10.46	2478	13.77	1550	7.39	1600	5.66
T7.T6+raising of Sunnhemp / fodder cowpea between rows incorporated before flowering	25.91	9.64	2121	11.78	1365	5.57	1800	8.73
SEd	0.84	0.81	131		96.23	0.98	47	
CD (5%)	2.4	2.3	403		296.46	3.03	103	

Table 31. Net Return (Rs./ha) and Benefit Cost Ratio (BCR) as influenced by method and scheduling of nitrogen application

Treatments	Rahuri		Junagadh		Bhawanipatna		Khandwa	
	NR (Rs./ha)	BCR	NR (Rs./ha)	B:C	NR (Rs./ha)	BCR	NR (Rs./ha)	BCR
T1. Control	13304	1.22	30891	1.51	13377	1.41	3421	1.05
T2.100 % of RDN(Band application in2 splits at Basal & Flowering)	35943	1.48	45801	1.66	70137	2.51	15540	1.22
T3.75 % of RDN(Band application in2 splits at Basal & Flowering)	27723	1.38	49503	1.74	53645	2.26	10264	1.14
T4.75 % of RDN +Placement(Spot application in 2 splits at Basal & Flowering)	34810	1.47	46024	1.69	29794	1.7	7082	1.10
T5.75 % of RDN + Placement (Spot application in 4 Split: Basal, Squaring, Flowering, Boll development)	39809	1.53	59976	1.88	37478	1.83	15277	1.21
T6.T5+Foliar application of 1 % urea(3 times: Squaring, Flowering, Boll development)	50659	1.65	63756	1.92	39900	1.87	16817	1.23
T7.T6+raising of Sunnhemp / fodder cowpea between rows incorporated before flowering	59754	1.72	45316	1.66	29255	1.63	23142	1.30
SEd	3881	0.04			5398.56	0.12		
CD (5%)	10991	0.12			16632	0.37		

South Zone

The experiment was conducted with the objective to find out strategies to enhance nitrogen use efficiency in Bt cotton revealed that significantly higher seed cotton yield was obtained with Treatment,T_6 75 % of RDN + Placement (Spot application in 4 Split: Basal, Squaring, Flowering, Boll development) +Foliar application of 1 % urea(3 times: Squaring, Flowering, Boll development), which recorded seed cotton yield 2317 and 2515/ha respectively at Dharwad, and Nandyal. The same method of N application (T_6) resulted in significantly higher net returns of Rs. 58,821 and 57,415/ha and benefit cost ratio of 1.9and 2.2and at Dharwad and Nandyal respectively (Table 32). The similar method (T_6) found the highest N-use efficiency of 30.9, 9.3 and kg/kg of N at Dharwad and Nandyal respectively. In Chamrajnagar , Raichur and LAM T_7 (75 % of RDN + Placement (Spot application in 4 Split: Basal, Squaring, Flowering, Boll development + Foliar application of 1 % urea 3 times: Squaring, Flowering, Boll development + raising of Sunnhemp / fodder cowpea between rows incorporated before flowering) had recorded significantly highest seed cotton yield of 1908, 2964 and 4225 kg/ha and N-use efficiency(kg/kg N) of 16.89, 19.76 and 37.56 respectively. The results further added that the high performing treatments in most of the places were used 75 % of RDN or on par with the same, thus revealed that possibility of reducing of 25 % of N application.

Table 32 . Seed cotton yield, net return (Rs./ha) and Nitrogen Use efficiency (Kg/Kg of N) as influenced by different methods of nitrogen application in South Zone

Treatments	Dharwad				Chamrajnagar			LAM	
	SCY(kg/ha)	NUE	NR(Rs./ha)	BCR	SCY (kg/ha)	NUE (Kg/Kg of N)	NR (Rs./ha)	NR (Rs./ha)	B:C ratio
T1. Control	1156	0	4483	1.1	1112		20971	92330	2.42
T2.100 % of RDN(Band application in2 splits at Basal & Flowering)	2197	22	55480	1.9	1696	11.31	50778	144594	2.89
T3.75 % of RDN(Band application in2 splits at Basal & Flowering)	1982	26.4	45087	1.7	1491	13.25	37715	123357	2.71
T4.75 % of RDN +Placement(Spot application in 2 splits at Basal & Flowering)	2152	28.7	52821	1.8	1345	11.96	34371	121797	2.65
T5.75 % of RDN + Placement (Spot application in 4 Split: Basal, Squaring, Flowering, Boll development)	2009	26.8	44904	1.7	1723	15.33	52230	118558	2.55
T6.T5+Foliar application of 1 % urea(3 times: Squaring, Flowering, Boll development)	2317	30.9	58821	1.9	1786	15.81	54730	139719	2.73
T7.T6+raising of Sunnhemp / fodder cowpea between rows incorporated before flowering	2056	27.4	44537	1.6	1908	16.89	55214	143312	2.74
SEd	101	1.28	5531	0.08	149.8		7238.5		
CD (5%)	310	3.94	17042	0.26	326.4		15771		

Table 33 . Seed cotton yield, net return (Rs./ha) and Nitrogen Use efficiency (Kg/Kg of N) as influenced by different methods of nitrogen application in South Zone

Treatments	Raichur				Nandyal				LAM	
	SCY(kg /ha)	NUE	NR(Rs./ha)	**BCR**	SCY(kg /ha)	NUE (Kg/ Kg of N)	NR(Rs. /ha)	**BCR**	SCY(kg/ha)	NUE
T1. Control	1760	-	42051	1.73	1571	0	26452	1.6	2953	0
T2.100 % of RDN(Band application in2 splits at Basal & Flowering)	2351	13.06	72001	2.20	1989	6.1	43493	1.9	4130	27.53
T3.75 % of RDN(Band application in2 splits at Basal & Flowering)	2459	18.21	72794	2.12	2087	8.6	48794	2.1	3662	32.55
T4.75 % of RDN +Placement(Spot application in 2 splits at Basal & Flowering)	2557	15.98	77846	2.19	2107	8.6	49302	2.1	3659	32.53
T5.75 % of RDN + Placement (Spot application in 4 Split: Basal, Squaring, Flowering, Boll development)	2657	19.68	82892	2.26	2143	8.8	50173	2.1	3652	32.46
T6.T5+Foliar application of 1 % urea(3 times: Squaring, Flowering, Boll development)	2831	18.87	87994	2.32	2515	9.3	57415	2.2	4128	36.69
T7.T6+raising of Sunnhemp / fodder cowpea between rows incorporated before flowering	2964	19.76	97278	2.43	2163	8.7	49535	2	4225	37.56
SEd	**75**	--	4628		177				202	
CD (5%)	**219**	--	13454		386				454	

Agronomy IV: Technology for organic cotton Production

Preamble: India is the largest producer of organic cotton in the world. India's contribution to global organic cotton production is 51 per cent. Evolving organic nutrient management strategy is very much required to support our organic production system. Market prices of organic manures are costly. Hence evolving low cost organic nutrient management strategy is proposed by integrating different sources of nutrients.

Sriganganagar

This experiment was conducted in the field which was developed as an organic field since last nine years. It was observed that T_3: RD of Nutrient through organic based on P equivalent basis gave maximum seed cotton yield(3469 kg/ ha), which was significantly superior over rest of the treatments tested. This treatment (T_3) also gives highest gross (Rs.1,94,272/ha) and net monetary returns (1,55,447/ha) as well as B: C ratio (4.00) as compare to rest of the treatments (Table 34). The results interpreted that organic nutrient management through seed treatment and soil application of recommended bio fertilizers and foliar application of PPFM, application of Neem cake 250 kg/ha and raising of sunnhemp / fodder cowpea between rows incorporated before flowering observed higher improvement of organic carbon status also.

Table34. Seed cotton yield, organic carbon status and economics as influenced by organic nutrient management packages in Sriganganagar

Treatments	Seed cotton Yield(kg/ha)	Organic carbon (%)		CC (Rs./ha)	GR (Rs./ha)	NR (Rs./ha)	BCR
		Initial	Final				
T1 - Absolute control (No organic& inorganic)	2160	0.29	0.22	35025	120988	85963	2.45
T2 - Control (RDN through inorganic)	3062	0.22	0.29	38025	171457	133432	3.51
T3 - RD of Nutrient through organic based on P equivalent basis	3469	0.22	0.21	38825	194272	155447	4.00
T4 - Seed treatment and soil application of recommended bio fertilizers and foliar application of PPFM	2765	0.22	0.23	36925	154864	117939	3.19
T5- Neem cake 250 kg/ha	2444	0.22	0.22	37425	136889	99464	2.66
T6 -Raising of Sun hemp / fodder cowpea between rows incorporated before flowering	2259	0.26	0.28	39375	126519	87144	2.21
T7- Intercropping with green gram/black gram/ ground nut/soybean	2383	0.21	0.25	39375	133432	94057	2.39
T8- T4 + T5	2506	0.23	0.27	41275	140346	99071	2.40
T9- T4+ T6	2420	0.24	0.28	41275	135506	94231	2.28
T10 - T4+ T5 + T6	2938	0.23	0.29	43675	164543	120868	2.77
T11- T4 + T5 + T7	2012	0.20	0.25	43675	112691	69016	1.58
SEd ±	112						
CD 5%	220						

Central Zone

The result of nutrient management through organics revealed that significantly highest seed cotton yield was recorded with package includes application of 100 % RDF of nutrient through organic based on P equivalent basis(T_3) at Akola (1694kg/ha), Rahuri (1525 kg/ha), Bhawanipatna (1512 kg/ha) and Nanded(979kg/ha) (Table). The same method realised higher net return of Rs.36, 353 and 45464/ha and benefit cost ratio of 1.72 and 2.21at Rahuri and Bhawanipatna, respectively. The higher enhanced organic carbon status at Bhawanipatna (0.64%) and Surat (0.77%) estimated with package includes application of 100 % RDF of nutrient through organic based on P equivalent basis (T_3) (Table).

Soil application of recommended bio fertilizers, foliar application of **pink pigmented facultative methylotrophs (PPFM)** at flowering, soil application of neem cake @ 250 kg/ha and raising of Sunnhemp between rows incorporated before flowering (T_{10}) registered significantly higher seed cotton yield (1203 kg/ha) at Khandwa. The same package (T_{10}) registered enhanced organic carbon status(0.80) at Khandwa. The packages including Seed treatment and soil application of recommended bio fertilizers, foliar application of **pink pigmented facultative methylotrophs (PPFM)** at flowering, soil application of neem cake 250 kg/ha and intercropping with black gram(T_{11}) registered significantly higher seed cotton yield at Junagadh (1415 kg/ha). The same package (T_{11}) was observed the highest net return Rs.73,540 and 41, 781/ha and benefit cost ratio3.3 and 1.61 at Akola and Khandwa, respectively (Table 35).

Table35 .Seed cotton yield as influenced by organic nutrient management packages in Central Zone

Treatments	Surat	Bhawanipatna	Nanded	Rahuri	Junagadh	Akola	Khandwa
T1.Absolute control (No organic& inorganic)	648	880	462	690	893	1217	803
T2.Control (RDN through inorganic)	1718	1585	1147	1455	1106	1651	1056
T3.RD of Nutrient through organic based on P equivalent basis	1049	1512	979	1525	1012	1694	980
T4.Seed treatment and soil application of recommended bio fertilizers and foliar application of PPFM	936	1035	635	970	1183	1431	950
T5.Neem cake 250 kg/ha	1080	1138	622	960	1312	1507	1100
T6.Raising of Sun hemp between rows incorporated before flowering	1049	1086	539	820	1229	1537	950
T7.Intercropping with green gram	947	979	446	811	1286	1420	742
T8.T4+T5	1008	1372	650	1060	1377	1591	1150
T9.T4+T6	1060	1325	595	1030	1325	1437	1000
T10.T4+T5+T6	1049	1403	627	1240	1386	1598	1203
T11.T4+ T5 + T7	1029	1236	517	1188	1415	1434	1200
SEd	75.0	51.17	43.62	**89.9**	78.36	95	19
CD (5%)	**221**	**118.92**	128.67	**254.7**	231.16	284	39

Table36. Organic carbon status as influenced by organic nutrient management packages in Central Zone

Treatments	Surat		Bhawanipatna		Junagadh		Khandwa	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
T1.Absolute control (No organic& inorganic)	0.46	0.39	0.49	0.50	0.56	1.10	0.48	0.45
T2.Control (RDN through inorganic)	0.45	0.49	0.60	0.65	0.60	0.97	0.49	0.69
T3.RD of Nutrient through organic based on	0.47	0.77	0.60	0.64	0.58	1.12	0.50	0.70
T4.Seed treatment and soil application of recommended bio fertilizers and foliar application of PPFM	0.48	0.48	0.51	0.56	0.62	1.11	0.48	0.59
T5.Neem cake 250 kg/ha	0.40	0.76	0.53	0.60	0.67	1.22	0.49	0.70
T6.Raising of Sun hemp between rows incorporated before flowering	0.50	0.70	0.51	0.57	0.67	0.84	0.50	0.60
T7.Intercropping with green gram	0.48	0.65	0.52	0.57	0.65	1.05	0.50	0.58
T8.T4+T5	0.47	0.76	0.52	0.56	0.69	1.14	0.48	0.65
T9.T4+T6	0.47	0.73	0.58	0.60	0.69	1.15	0.51	0.70
T10.T4+T5+T6	0.44	0.70	0.54	0.60	0.73	1.07	0.52	0.80
T11.T4+ T5 + T7	0.48	0.74	0.53	0.57	0.70	0.89	0.52	0.60
SEd	0.038	0.03	0.02	0.02	0.03	0.13	0.028	
CD (5%)	**NS**	**0.10**	**0.05**	**0.05**	0.09	NS	NS	0.12

Table 37 a. Net return (Rs./ha) and BCR ratio as influenced by organic nutrient management packages in Central Zone

Treatments	Surat		Bhawanipatna		Nanded	
	Net	BCR	Net	BCR	Net	BCR
T1.Absolute control (No organic& inorganic)	10113	0.31	14065	1.41	-3551	0.88
T2.Control (RDN through inorganic)	48490	1.35	49977	2.34	25710	1.68
T3.RD of Nutrient through organic (FYM) based on P equivalent basis	8190	0.17	45464	2.21	-13296	0.80
T4.Seed treatment and soil application of recommended bio fertilisers and foliar application of PPFM	17512	0.52	21777	1.62	2767	1.08
T5.Neem cake 250 kg/ha	19436	0.54	26769	1.75	-575	0.98
T6.Raising of Sun hemp between rows incorporated before flowering	17616	0.45	23164	1.63	-1776	0.94
T7.Intercropping with green gram	18268	0.54	18424	1.52	29434	1.95
T8.T4+T5	14849	0.40	38996	2.07	-1161	0.97
T9.T4+T6	20390	0.52	35724	1.96	-1008	0.97
T10.T4+T5+T6	12307	0.29	38842	2.01	-4143	0.89
T11.T4+ T5 + T7	18612	0.49	32021	1.89	26036	1.68
SEd			2167.06	0.06	2075	0.05
CD (5%)			**6391.84**	**0.18**	6121	0.16

Table 37 b. Net return (Rs./ha) and BCR ratio as influenced by organic nutrient management packages in Central Zone

Treatments	Rahuri		Junagadh		Akola		Khandwa	
	Net	BCR	Net	MBCR	Net	MBCR	Net	MBCR
T1.Absolute control (No organic& inorganic)	6540	1.20	9158	1.24	44256	2.90	-3355	0.92
T2.Control (RDN through inorganic)	45779	2.23	11531	1.24	60420	2.94	4568	1.08
T3.RD of Nutrient through organic (FYM) based on P equivalent basis	36353	1.72	5303	1.11	16170	1.21	-16885	0.76
T4.Seed treatment and soil application of recommended bio fertilisers and foliar application of PPFM	20779	1.60	22022	1.53	46165	2.39	2376	1.04
T5.Neem cake 250 kg/ha	17131	1.46	26057	1.59	47737	2.33	3740	1.06
T6.Raising of Sun hemp between rows incorporated before flowering	9335	1.25	21877	1.50	45100	2.12	2860	1.05
T7.Intercropping with green gram	15911	1.34	25628	1.59	72223	3.32	29240	1.54
T8.T4+T5	21129	1.54	28298	1.62	47225	2.15	4081	1.06
T9.T4+T6	19623	1.50	25601	1.56	43154	2.18	451	1.00
T10.T4+T5+T6	26392	1.60	25590	1.53	44265	2.00	2321	1.03
T11.T4+ T5 + T7	33035	1.62	27976	1.58	73540	3.33	41781	1.61
SEd	6540	1.20	-	-	8974	-		
CD (5%)	45779	2.23	-	-	27101	-		

South Zone

The organic nutrient management packages including seed treatment and soil application of recommended bio fertilizers, foliar application of **pink pigmented facultative methylotrophs (PPFM)** at flowering, soil application of neem cake @250 kg/ha and intercropping of black gram (T_{11}) had registered significantly higher seed cotton yield at LAM and Raichur respectively of 959 and 1195 kg/ha. The same package observed high net return (Rs. 12,262/ha) at Raichur (Table38). The nutrient management method, application of recommended dose of nutrients through organics, based on P equivalent basis (T_3) recorded significantly higher seed cotton yield at Nandyal (2483 kg/ha). Seed treatment and soil application of recommended bio fertilisers and foliar application of PPFM , application of neem cake 250 kg/ha and raising of sunnhemp between rows and incorporated before flowering (T_{10}) recorded higher yield of 1496 and 1703 kg/ha at Srivilliputhur and Coimbatore respectively and high net return(Rs. 54, 046/ha) and soil organic carbon content (0.55 %) also at Coimbatore. The highest net return of Rs.14243 and 18384/ha were realised with T6 i.e., Raising of Sunnhemp / fodder cowpea between rows incorporated before flowering at LAM and Dharwad, respectively.

Table38 a. Seed cotton yield (Kg/ha) and Net return (Rs./ha) as influenced by organic nutrient management packages in South Zone

Treatment schedule	LAM		Srivilliputtur		Raichur	
	SCY (Kg/ha)	NR (Rs./ha)	SCY (Kg/ha)	NR (Rs./ha)	SCY (Kg/ha)	NR (Rs./ha)
T1.Absolute control (No organic & Inorganic)	666	7807	1109	-1458	838	7555
T2.Control (RDN through inorganic)	1158	16604	1633	11954	1598	30370
T3.RD of Nutrient through organic based on P equivalent basis	855	-1312	1257	-15134	852	-2343
T4. Seed treatment and soil application of rec. bio fertilisers and foliar application of PPFM	808	10468	1221	1098	874	7357
T5.Neem cake @250 kg/ha	778	3047	1238	-7056	900	5563
T6.Raising of .Sunnhemp / fodder cowpea between rows incorporated before flowering	867	14243	1255	-1910	914	8215
T7.Intercropping with green gram/black gram/ ground nut/soybean	813	11690	1198	-4176	933	9130
T8.T4+T5	848	2355	1317	-3854	998	7535
T9.T4+T6	935	13463	1408	4904	1037	11062
T10.T4+T5+T6	918	663	1496	-2252	1117	12088
T11: T4+ T5 + T7	959	2573	1428	-4536	1195	12692
SEd	94.3	4431	**74.2**		**76**	**2652**
CD at 5 %	195	9308	**166.2**		**220**	**7709**

Table38 b. Seed cotton yield (Kg/ha) and Net return (Rs./ha) as influenced by organic nutrient management packages in South Zone

Treatment schedule	**Nandyal**		**Dharwad**		**Coimbatore**	
	SCY (Kg/ha)	**NR (Rs./ha)**	**SCY (Kg/ha)**	**NR (Rs./ha)**	**SCY (Kg/ha)**	**NR (Rs./ha)**
T1.Absolute control (No organic & Inorganic)	1486	39655	470	8115	1010	26762
T2.Control (RDN through inorganic)	2495	82140	961	-3948	1805	30646
T3.RD of Nutrient through organic based on P equivalent basis	2483	78915	735	9734	1558	48493
T4. Seed treatment and soil application of rec. bio fertilisers and foliar application of PPFM	1978	65175	592	10017	1445	45020
T5.Neem cake @250 kg/ha	1719	53308	775	4766	1473	42146
T6.Raising of .Sunnhemp / fodder cowpea between rows incorporated before flowering	1703	52922	443	18384	1521	49238
T7.Intercropping with green gram/black gram/ ground nut/soybean	1836	58891	493	-5352	1454	44284
T8.T4+T5	1690	50889	653	11434	1579	48598
T9.T4+T6	1525	44318	533	14499	1619	52838
T10.T4+T5+T6	1911	60390	728	6267	1703	54046
T11: T4+ T5 + T7	2045	66087	609	-8506	1620	52875
SEd			588			
CD at 5 %			**54**			

The soil organic carbon status after four years of experimentation observed that seed treatment and soil application of recommended bio fertilizers, foliar application of **pink pigmented facultative methylotrophs (PPFM)** at flowering, soil application of neem cake @250 kg/ha and intercropping of black gram (T_{11}) had registered significantly higher soil organic carbon content at Raichur (Table 39). Application of recommended nutrients t through organic based on P equivalent basis observed higher soil organic carbon content (0.34 %) at LAM

Table 39. Organic carbon status as influenced by organic nutrient management packages in South Zone

Treatment	Soil Organic Carbon (%) SOC					
	Raichur		Coimbatore		LAM	
	Initial	Final	Initial	Final	Initial	Final
T1 : Absolute control (No organic & inorganic)	0.60	0.60	0.50	0.52	0.20	0.22
T2 : Control (RDN through inorganic)	0.60	0.60	0.48	0.52	0.25	0.27
T3 : RD of Nutrient through organic based on P equivalent basis	0.60	0.63	0.52	0.52	0.38	0.34
T4 : Seed treatment with bio fertilizers and foliar application of PPFM at flowering and Boll Development Stage	0.60	0.60	0.51	0.52	0.26	0.23
T5 : Neem cake 250 kg/ha	0.60	0.64	0.52	0.52	0.24	0.20
T6 : Raising of Sun hemp between rows incorporated before flowering	0.60	0.64	0.52	0.53	0.35	0.32
T7 : Intercropping with Green gram and crop residue application after harvest of pods	0.60	0.65	0.53	0.53	0.22	0.25
T8 : T4 + T5	0.60	0.65	0.52	0.52	0.28	0.28
T9 : T4 + T6	0.60	0.65	0.51	0.53	0.24	0.25
T10 T4 + T5 + T6	0.60	0.64	0.53	0.55	0.26	0.28
T11 : T4 + T5 + T7	0.60	0.65	0.51	0.52	0.24	0.25

Agronomy V: Conservation agriculture in cotton based cropping system

Preamble: Conservation agriculture protects the soil from erosion, conserves water and nutrients, promotes soil biological activity and contributes to integrated Nutrient Management (INM), diversification of crops in associations, sequences and rotations to enhance system resilience and controlled traffic that lessen soil compaction. Thus, CA avoids straw burning, improves soil organic carbon (SOC) content, enhances input use efficiency and has the potential to reduce greenhouse gas emissions

Rahuri

The result of conservation treatments revealed that **c**onventional tillage with no residue management (T_1) recorded significantly higher seed cotton yield (2415 kg/ha) and wheat grain yield (3357 kg/ha) , However it was at par with the treatment T_7 (Permanent bed system + Zero tillage + 100 % residue management) in case of seed cotton yield (2183 kg/ha) and wheat grain yield (3004 kg/ha).The same treatment (T_1) recorded highest gross monetary returns of Rs. 1,32,843 and 80,650 /ha of cotton and wheat respectively, but the treatment T_7recorded highest net monetary returns of

Rs. 76,318 and 37,944/ha and B:C ratio of 2.74 and 2.11 of cotton and wheat respectively . The conventional tillage with no residue management(T_1) recorded significantly highest cotton equivalent yield (4268 kg/ha) and found maximum gross monetary returns (Rs. 2, 13, 403/ha) (Table 40). The permanent bed system with zero tillage with 100 % residue management (T_7) found maximum net monetary returns (Rs. 1,14, 262 ha^{-1}) and B:C ratio (2.47) than other treatments.

Table40. Seed cotton yield (kg/ha) , wheat grain yield (Kg/ha) and economics as influenced by conservation treatments at Rahuri

Treatments	Seed cotton yield (Kg/ha)	Wheat Grain yield (Kg/ha)	Cotton equivalent Yield (Kg/ha)	Gross returns (Rs./ha)	Cost of cultivation(Rs./ha)	Net returns (Rs. ha-1)	B:C
T_1: Conventional tillage + No residue management	2415	3357	4268	213403	99675	113728	2.14
T_2: Zero tillage + No residue management	1499	2140	2676	133815	72833	60982	1.84
T_3: Zero tillage + 50 % residue management	1655	2300	2924	146199	76095	70104	1.92
T_4: Zero tillage + 100 % residue management	1757	2458	3113	155645	77345	78300	2.01
T_5: Permanent bed system + Zero tillage + No residue management	1951	2598	3393	169667	73413	96254	2.31
T_6: Permanent bed system + Zero tillage + 50 % residue management	2040	2855	3615	180738	76675	104063	2.36
T_7: Permanent bed system + Zero tillage + 100 % residue management	2183	3004	3844	192187	77925	114262	2.47
S.E. ±	86	143	90	--	-	--	--
C.D. at 5%	244	406	256	--	-	--	--

Junagadh

The results of conservation experiment conducted at Junagadh revealed that all conservation practices had expressed non-significant effects on cotton**. However,** seed cotton yield numerically higher recorded (2698 kg/ha) with permanent bed system + Zero tillage + 100 % residue management (T_7).The economic analysis showed that highest net return (Rs. 89,900 /ha) and B:C ratio (2.09) were observed with permanent bed system + Zero tillage + No residue management(T_5) but which was followed by treatment T_2 (Zero tillage+ No residue management) (Table 41).

Table 41 . Bulk density, seed cotton yield (kg/ha) , quantity of residue used, labour used and economics as influenced by conservation treatments.

Treatments	Bulk density		Seed cotton Yield (kg/ha)	Quantity of residue used (kg/ha)	Quantity of irrigation water used(cm)	Treatment Cost (Rs./ ha)	Cost of cultivation (Rs. /ha)	Gross return (Rs./ha)	Net Return (Rs./ ha)	BCR
	0-15 cm	16-30 cm								
T_1. Conventional tillage+ No residue management	1.39	1.43	2672	0	32.5	72897	91120	177224	86104	1.94
T_2. Zero tillage+ No residue management	1.35	1.38	2478	0	32.5	67709	84042	170606	86564	2.03
T_3.Zero tillage+ 50 % residue management	1.39	1.42	2513	4725	32.5	68012	85132	162715	77583	1.91
T_4.Zero tillage+ 100 % residue management	1.35	1.38	2549	9451	32.5	68315	86223	153325	67102	1.78
T_5.Permanent bed system + Zero tillage + No residue management	1.33	1.36	2619	0	32.5	68154	84487	174388	89900	2.06
T_6.Permanent bed system + Zero tillage+ 50 % residue management	1.28	1.32	2681	5267	32.5	69068	86188	170946	84759	1.98
T_7.Permanent bed system + Zero tillage+ 100 % residue management	1.34	1.37	2698	10533	32.5	69703	87611	165142	77530	1.88
SEd	0.04	0.04	145	-	-		-	-	-	-
CD (5%)	NS	NS	NS	-	-	-	-	-	-	-

South Zone

Chamrajnagar

The results of conservation experiment revealed that there was significant effect on the growth, yield parameters and seed cotton yield. Significantly higher seed cotton yield was observed in the (T_1) Conventional tillage+ no residue (2047 kg/ha), followed by T_7: Permanent bed system + Zero tillage+ 100 % residue management (1936 Kg/ha). The seed cotton yields were on par with 50% and 100% residue management in permanent bed system. Amongst the treatments the bulk density was lower in (T_7) Permanent bed system + Zero tillage+ 100 % residue management @ 1.38 g/cc at 0-15cm depth while the bulk density at 16-30 cm found to be non significant in all the treatment combinations. The gross returns (Rs. 90, 845/ha) and net returns (Rs. 54,430/ha) were maximum with permanent bed system + Zero tillage+ 100 % residue management (T_7) and it was found to be on par with conventional tillage+ no residue (T_2) (Table 42).

Table 42. Bulk density, seed cotton yield (kg/ha) , and economics as influenced by conservation treatments.

Treatments	Bulk density (0-15 cm)	Bulk Density (16-30sm)	Seed cotton yield (kg/ha)	Treatment Cost (Rs./ha)	Cost of cultivation (Rs./ha)	Gross Returns (Rs./ha)	Net Returns (Rs./ha)	B:C Ratio
T1.Conventional tillage+ No residue management	1.53	1.55	2047	-	39065	86025	46960	0.0
T2.Zero tillage+ No residue management	1.55	1.56	1185	-	29015	44192	15177	0.0
T3.Zero tillage+ 50 % residue management	1.47	1.54	1410	2575	31740	66513	34773	13.5
T4.Zero tillage+ 100 % residue management	1.45	1.56	1547	3825	31665	76153	44488	11.6
T5.Permanent bed system + Zero tillage + No residue management	1.46	1.57	1550	-	33565	72378	38813	0.0
T6.Permanent bed system + Zero tillage+ 50 % residue management	1.42	1.57	1849	2575	35790	83974	48184	18.7
T7.Permanent bed system + Zero tillage+ 100 % residue management	1.38	1.55	1936	3825	36415	90845	54430	14.2
SEd	0.04	0.05	147.62			6703.38	6703.38	
CD (5%)	0.1	NS	321.64			14605.4	14605.4	

Srivilliputhur

The results on the seed cotton yield revealed that conventional tillage without residue incorporation (T_1) registered the highest seed cotton yield of 1803 kg/ha which was followed by zero tillage with 100 % residue management(T_4) (1625 kg/ha) .The grain yield of rotation crop maize results revealed that conventional tillage without residue incorporation(T_1) recorded the highest grain yield of 3456 kg/ha, which was on par with that of zero tillage with 100 % (T4) (3186 kg/ha) and T_7 Permanent bed system + Zero tillage+ 100 % residue management (3131 kg/ha) (Table 43).The economic analysis found that conventional tillage without residue incorporation(T_1) registered the highest cotton equivalent yield 3714 kg/ha, net return(Rs.30,690/ha) and benefit cost ratio (1.28) which was followed by zero tillage with 100 % residue management(T_4)and permanent bed system + Zero tillage+ 100 % residue management in Cotton-maize cropping system (T_7). The labour use was higher in the conventional tillage system of ridges and furrows methods (489 man days/ha), where as it was lesser with other conservation treatments

Table43 . Effect of treatments on cotton equivalent yield and economics of maize - cotton cropping system

Treatments	Grain yield of maize (kg/ha)	Seed cotton yield (kg/ha)	Total cotton equivalent yield of maize - cotton cropping system (kg/ha)	Cost of cultivation (Rs./ ha)	Gross Income (Rs./ ha)	Net Income (Rs./ ha)	BCR
T_1 - Conventional tillage+ No residue management	3456	1803	3714	110400	141090	30690	1.28
T_2 Zero tillage + No residue management	2817	1526	3084	97400	117145	19745	1.20
T_3 Zero tillage + 50 % residue management	3008	1551	3214	99400	122106	22706	1.23
T_4 Zero tillage + 100 % residue management	3186	1625	3387	101400	128656	27256	1.27
T_5 Permanent bed system + Zero tillage + No residue management	2922	1517	3133	95400	119008	23608	1.25
T_6 Permanent bed system + Zero tillage + 50 % residue management	2945	1542	3171	97400	120801	23401	1.24
T_7 Permanent bed system + Zero tillage + 100 % residue management	3131	1601	3332	99400	126589	27189	1.27
SEd.	165.1	80.4	-				
CD(P=0.05)	345.5	168.1	--				
CV%		8.76	-				

Agronomy VII: Labour saving techniques in Cotton cultivation

Cotton is a labour intensive crop. Cotton is one crop whose cultivation has not been mechanized to the extent other crops like wheat, maize, sunflower, including rice. However, implements and machineries are developed and available for seed bed preparation, sowing, weeding, interculture and plant protection. The mechanization technologies available for cotton can be used in combination with chemicals for weeding and drip for irrigation to reduce the cost of cultivation and at the same time alleviate the labour problem and the same concept is attempted here.

Central Zone

The results of labour saving trial in Bt cotton revealed that significantly higher seed cotton yield were recorded with practice of having land shaping by machine with poly mulch under rainfed condition(T_7) at Akola (1804kg/ha), Surat (1554 kg/ha)and Nanded (2791kg/ha) (Table) . The same labour saving practice registered higher net return at Nanded (Rs.51,524/ha). In Bhawanipatna, the results revealed that significantly higher seed cotton yield (2897 kg/ha), net return (Rs. 1,12,733/ha) and least man days (126 man days/ha) were reported with labour saving treatment T_6, which had land shaping by machine, pre and post emergence for weed control, intercultural operation by animal drawn along with spraying by power sprayer .The same labour saving practice (T_6) had lowest labour requirement at Surat (113 man days/ha), Akola (70 man days/ha) and Nanded (115 man days/ha)also had the highest net return at Surat (Rs. 85,805/ha) and Akola(Rs.56,407/ha) (Table 44).

Table 44 a. Seed cotton yield (kg/ha), labour used (Man days/ha) and Net return (Rs./ha) as influenced by Labour saving practices in Central Zone

Treatments	Surat			Akola		
	Seed cotton Yield (kg/ha)	Labour used (No./ha)	Net Return (Rs./ha)	Seed cotton Yield (kg/ha)	Labour used (No./ha)	Net Return (Rs./ha)
T1.Control	1246	193	48987	1026	87	26723
T2.T1 +Land shaping by machine	1361	156	65509	1317	91	41240
T3.T2+ post emergence application	1427	136	71505	1425	82	47543
T4.T3+ pre and post emergence application	1416	123	76717	1486	71	50313
T5.T4+intercultural operation(harrowing/junior hoe/earthing up) by animal/tractor drawn	1433	116	84832	1585	74	55677
T6.T5+ Boom sprayer /Others sprayers(operated by tractor/power tiller/others)	1422	113	85805	1649	70	56407
T7. T2 + poly mulch (only for irrigated centres)	1554	136	60040	1804	104	54292
T8. T1+ Land shaping by animals, PE &PoE, interculture by animals		--				
SEd	**97.7**		--	65		1598
CD (5%)	**NS**		--	196		4903

Table 44 b. Seed cotton yield (kg/ha), labour used (Man days/ha) and Net return (Rs./ha) as influenced by Labour saving practices in Central Zone

Treatments	Nanded			Bhawanipatna		
	Seed cotton Yield (kg/ha)	Labour used (No./ha)	Net Return (Rs./ha)	Seed cotton Yield (kg/ha)	Labour used (No./ha)	Net Return (Rs./ha)
T1.Control	1498	139	16746	2278	194	77900
T2.T1 +Land shaping by machine	1569	149	18223	2337	183	78802
T3.T2+ post emergence application	1707	136	25177	2361	166	83628
T4.T3+ pre and post emergence application	1715	124	24136	2404	149	88185
T5.T4+intercultural operation(harrowing/junior hoe/earthing up) by animal/tractor drawn	1737	116	25142	2683	131	102350
T6.T5+ Boom sprayer /Others sprayers(operated by tractor/power tiller/others)	1705	115	25686	2897	126	112733
T7. T2 + poly mulch (only for irrigated centres)	2791	138	51524	2735	162	85843
T8. T1+ Land shaping by animals, PE &PoE, interculture by animals	1687	119	21516			
SEd	83.90	2	3818	52.19	2	2822.49
CD (5%)	254.59	6	11580	**160.78**	6	**8695.64**

South Zone

The results on labour saving techniques attempted in Coimbatore under irrigated condition found that adoption of drip fertigation (T_9) registered significantly higher seed cotton yield (2761 kg/ha), net return (Rs.89,072/ha) and the least labour required (87 man days/ha) for cotton cultivation (Table). Labour saving techniques attempted for Bt cotton cultivation under rainfed condition yielded higher seed cotton yield (3575 kg/ha)and net return (Rs.1,35,892/ha) at Raichur with Land shaping by machine with polymulch (T_7).In LAM, labour saving treatment (T_6) of land shaping by machine, pre and post emergence for weed control, intercultural operation by animal drawn with Others sprayers(operated by tractor/power tiller/others)registered significantly higher net return(Rs.1,35,323/ha) . The least labour required was calculated with (T_6) land shaping by machine, pre and post emergence for weed control, intercultural operation by animal/tractor drawn and sprayers(operated by tractor/power tiller/others) at LAM (138 man days /ha) and Raichur (98 man days /ha) (Table 45).

Table45 . Seed cotton yield (kg/ha), labour used (Man days/ha) and Net return (Rs./ha) as influenced by Labour saving practices in South Zone

Treatments	LAM			Coimbatore			Raichur		
	SCY (kg/ha)	NR (Rs./ha)	Labour (No./ha)	SCY (kg/ha)	NR (Rs./ha)	Labour (No/ha)	SCY(kg/ha)	NR (Rs./ha)	Labour (No./ha)
T1.Control	2603	66048	242	2346	58592	165	2760	92450	114
T2.T1 +Land shaping by machine	2860	80135	213	2544	69688	160	2848	97402	142
T3.T2+ post emergence application	2857	79514	207	2100	50200	140	2967	106271	114
T4.T3+ pre and post emergence application	3158	93155	208	2207	62154	120	3087	113176	104
T5.T4+intercultural operation (harrowing/junior hoe/earthing up) by animal/tractor drawn	3713	122263	206	1750	40000	109	3205	118712	98
T6.T5+ Others sprayers(operated by tractor/power tiller/others)	3832	135323	138	1946	51192	107	3389	127648	98
T7.T2+ Poly mulch (rainfed centre)	3837	101565	196				3575	135892	109
T8.T6 + drip fertigation (only for irrigated centres)				2482	76564	91			
T9.Drip fertigation+ poly mulch (only for irrigated centres)				2761	89072	87			
SEd	229	11363	5.71	38.51			113	6121	
CD at 5 %	504	25031	12.58	116.80			330	17797	

Agronomy VII: Input use pattern and Cost of cultivation

Preamble: The objective of collecting input use pattern and cost of cultivation in different region with existing cotton type to create CICR data base and also to understand input use pattern

North Zone

The details of input use and cost of cultivation for different domains of north zone was surveyed and different type of cost (Rs./ha), cost of production (Rs./Q) and net returns were calculated. The cost of cultivation (Cost C3) was arrived as Rs. 95,123, 83,833,1,17,061, 99,290 and .1,24,762/ha respectively for Faridkot (Bt hybrid), Faridkot (non Bt), Bathinda (Bt hybrid) , Bathinda (non Bt hybrid) and Hisar (Bt hybrid).The cost of agro inputs was assessed, which was 25.1,23.1,17.8,18.9 and 12.4 per cent respectively of cost of cultivation (Cost C3)of Faridkot (Bt hybrid), Faridkot (non Bt), Bathinda (Bt hybrid), Bathinda (non Bt hybrid) and Hisar(Bt hybrid). The share of labour cost in total cost of cultivation arrived in the range of 47.9,46.4,43.3,50.2 and 46.4 per cent of Cost C3 of Faridkot (Bt hybrid), Faridkot (non Bt), Bathinda (Bt hybrid), Bathinda (non Bt hybrid) and Hisar (Bt hybrid).The mean seed cotton yield of 24.0,19.6,25.8,27.6 and 24.0 q/ha was attained by survey at Faridkot (Bt hybrid), Faridkot (non Bt), Bathinda (Bt hybrid) and Hisar(Bt hybrid) respectively (Table 46). The total gross return ranged from Rs. 1,18,184, . 96,976, 1,35,042, 1,09,080 and .1,53,400/ha respectively for Faridkot (Bt hybrid), Faridkot (non Bt), Bathinda (Bt hybrid) , Bathinda (non Bt hybrid) and Hisar (Bt hybrid). The different type of costs of cultivation Viz., Cost A1, Cost A2, Cost B1,Cost B2, Cost C1, Cost C2 and Cost C3 were calculated (Table 35). The cost of cultivation per quintal on the basis of Cost C3 was arrived as Rs.3,984, 4,276, 4,543, 4,820 and 4,229 respectively for Faridkot (Bt hybrid), Faridkot (non Bt), Bathinda (Bt hybrid) , Bathinda (non Bt hybrid) and Hisar (Bt hybrid) (Table 47).The net return from cotton cultivation was ranged from arrived as Rs.23,060, 18,381, 17,074, 9,067 and 28,638/ha respectively for Faridkot (Bt hybrid), Faridkot (non Bt), Bathinda (Bt hybrid) , Bathinda (non Bt hybrid) and Hisar (Bt hybrid)

Table 46.Cost of different inputs and labours and their share in cost of cultivation

Centres	Faridkot		Faridkot		Bathinda		Bathinda		Hisar	
Genotypes	Bt hybrid		Non Bt		Bt hybrid		Non Bt hybrid		Bt hybrid	
Inputs	Value (Rs./ha)	%	Value (Rs./ha.)	%	Value (Rs./ha.)	%	Value (Rs./ha.)	%	Value (Rs./ha.)	%
i.Seeds	7225	10.1	908	1.5	4471	6.2	541	0.8	3700	5.0
ii.Fertilizers	6153	8.6	5505	9.2	6448	8.9	5344	7.7	7220	9.8
iii.Manures	4417	6.2	3708	6.2	2038	2.8	1663	2.4	0	0.0
iv.Weedicides	3292	4.6	2642	4.4	1140	1.6	953	1.4	0	0.0
v.Plant protection chemicals	2203	3.1	6046	10.1	6412	8.8	10173	14.7	4550	6.2
vi.Growth regulators/ hormones	592	0.8	571	1.0	375	0.5	138	0.2	0	0.0
Total	23882	33.5	19380	32.2	20884	28.8	18812	27.1	15470	21.1
B. Cost of labour (Rs.. /ha)		0.0		0.0		0.0		0.0		0.0
i.Field preparation	3628	5.1	3253	5.4	4161	5.7	4068	5.9	2300	3.1
ii.Sowing	3600	5.1	3444	5.7	3886	5.4	4573	6.6	3750	5.1
Total of application charges for input	6473	9.1	6625	11.0	10915	15.1	12397	17.9	11950	16.3
ix.Weeding	12500	17.5	12396	20.6	11862	16.4	12198	17.6	8750	11.9
x.Interculture	0	0.0	0	0.0	0	0.0	0	0.0	3200	4.4
xi.Picking& cleaning	16513	23.2	13147	21.9	17298	23.9	13994	20.2	24500	33.4
xii.Cotton stalk pulling/cutting	2812	3.9	0	0.0	2607	3.6	2637	3.8	3500	4.8
Total	45526	63.9	38865	64.7	50729	70.0	49867	71.9	57950	78.9
Other expenses (Rs./ha)	1820	2.6	1853	3.1	906	1.2	724	1.0	0	0.0
Grand total(Rs./ha)(C3)	71228	100.0	60098	100.0	72519	100.0	69403	100.0	73420	100.0
Seed cotton yield	24		19.62		25.8		27.6		29.5	
Gross return (Rs./ha)	118184		96973		135042	186.2	109080		153400	

Table47.Different type of costs, cost of per quintal of production and net return (Rs./ha)

Centre	Geno-types	Particulars	Cost A1	Cost A2	Cost B1	Cost B2	Cost C1	Cost C2	Cost C3
Faridkot	Bt hybrids	Total cost of cultivation (Rs./ha)	65731	65731	71955	78435	79996	86476	95123
		Cost of production (Rs./q)	2752	2752	3013	3284	3350	3622	3984
		Net Return(Rs./ha)	52453	52453	46229	39749	38188	31708	23060
	Non Bt	Total cost of cultivation (Rs./ha)	55148	55148	62064	69474	68802	76212	83833
		Cost of production(Rs./q)	2812	2812	3165	3544	3509	3887	4276
		Net Return(Rs./ha)	47403	47403	39993	32583	33472	26062	18381
Bathinda	Bt hybrids	Total cost of cultivation (Rs./ha)	74754	96504	102473	102473	106419	106419	117061
		Cost of production(Rs./q)	2901	3745	3977	3977	4130	4130	4543
		Net Return(Rs./ha)	59382	37632	31663	31663	27716	27716	17074
	Non Bt	Total cost of cultivation (Rs./ha)	71481	79648	85873	85873	90263	90263	99290
		Cost of production(Rs./q)	3470	3866	4169	4169	4382	4382	4820
		Net Return(Rs./ha)	36875	28708	22483	22483	18093	18093	9067
Hisar	Bt hybrids	Total cost of cultivation (Rs./ha)	98720	117470	108220	108220	113420	113420	124762
		Cost of production(Rs./q)	3346	3982	3668	3668	3844	3844	4229
		Net Return(Rs./ha)	54680	35930	45180	45180	39980	39980	28638

Cost A1 (Variable cost)
Cost A2: Cost A1+rent paid for leased in land
Cost B1: Cost A1 +interest on value of owned capital assets (excluding land)
Cost B2: cost B1+ rental value of owned land
Cost C1: Cost B1+imputed value of family labours
Cost C2: Cost B2+imputed value of family labours
Cost C3:Cost C2x1.10(10% for management cost)

Central Zone

The details of input use and cost of cultivation for different regions of central zone was surveyed and cost of production (Rs./q) and net returns(Rs./ha) were calculated. The cost of cultivation (Cost C3) was arrived as Rs.91,049, 75,118, 86,350, 1,22,644, 72498 and 71,986/ha respectively for Akola (Bt hybrid), Nanded (Bt hybrid), Bhawanipatna (Bt& non Bt hybrids), Rahuri (Bt hybrid (irrigated), Junagadh (Bt hybrid irrigated) and Surat (Bt hybrid). The cost of agro inputs was calculated, which was 24.6,29.4,22.3,16.2, 35.2 and 23.2 per cent of total cost of cultivation on the basis of Cost

C3 respectively for Akola (Bt hybrid), Nanded (Bt hybrid), Bhawanipatna (Bt& non Bt hybrids), Rahuri (Bt hybrid (irrigated), Junagadh (Bt hybrid irrigated) and Surat (Bt hybrid). The share of labour cost in total cost of cultivation arrived on the basis of Cost C3 are 45.1,49.3,39.0,49.6, 37.2 and 50.1 per cent respectively for Akola (Bt hybrid), Nanded (Bt hybrid), Bhawanipatna (Bt& non Bt hybrids), Rahuri (Bt hybrid (irrigated), Junagadh (Bt hybrid irrigated) and Surat (Bt hybrid) (Table 48). The mean seed cotton yield of 20.5,15.0,18.4,27.2,20.0 and 20.8 q/ha were reported by survey at Akola (Bt hybrid), Nanded (Bt hybrid), Bhawanipatna (Bt& non Bt hybrids), Rahuri (Bt hybrid (irrigated), Junagadh (Bt hybrid irrigated) and Surat (Bt hybrid)respectively. The different types ofcost of cultivation (Cost A1, Cost A2, Cost B1, Cost B2, Cost C1, Cost C2 and Cost C3) were calculated (Table 49). The cost of cultivation per quintal on the basis of Cost C3 was arrived as Rs. 6070, 5015,5264,4509, 3625 and 3465 /ha respectively with Akola (Bt hybrid), Nanded (Bt hybrid), Bhawanipatna (Bt& non Bt hybrids), Rahuri (Bt hybrid (irrigated), Junagadh (Bt hybrid irrigated) and Surat (Bt hybrid).The net return from cotton cultivation was ranged from Rs.-12040, 3797,14850,23038,29302 and 42290/ha on the basis of cost C3 in respectively with at Akola (Bt hybrid), Nanded (Bt hybrid), Bhawanipatna (Bt& non Bt hybrids), Rahuri (Bt hybrid (irrigated) , Junagadh (Bt hybrid irrigated) and Surat (Bt hybrid)

Table 48a.Cost of different inputs and labours and their share in cost of cultivation in Central zone

Centres	**Akola**		**Nanded**		**Bhawanipatna**	
Genotypes	**Bt hybrid**		**Bt hybrids**		**Bt& non Bt (rainfed)**	
Inputs	**Value (Rs./ ha.)**	**%**	**Value (Rs./ ha.)**	**%**	**Value (Rs./ha.)**	**%**
i.Seeds	3750	4.12	2907	3.87	2757	3.19
ii.Fertilizers	3650	4.01	8604	11.45	8867	10.27
iii.Manures	7500	8.24	1904	2.53	2500	2.90
iv.Weedicides	1950	2.14	256	0.34	1000	1.16
v.Plant protection chemicals	3000	3.29	7702	10.25	3800	4.40
vi.Growth regulators/ hormones	2500	2.75	683	0.91	315	0.36
Total	22350	24.55	22056	29.36	19239	22.28
B. Cost of labour (Rs. /ha)						
i.Field preparation	9500	10.43	6336	8.43	8000	9.26
ii.Sowing	3750	4.12	1674	2.23	3600	4.17
Total of application charges for input	11400	12.52	4828	6.43	5600	6.49
ix.Weeding	5400	5.93	3704	4.93	2000	2.32
x.Interculture	3000	3.29	4556	6.07	2500	2.90
xi.Picking& cleaning	6000	6.59	10916	14.53	10000	11.58
xii.Cotton stalk pulling/cutting	2000	2.20	5024	6.69	2000	2.32
Total	41050	45.09	37038	49.31	33700	39.03
Other expenses (Rs./ha)	0	0.00		0.00		0.00
Grand total(Rs./ha)(C3)	63400		59094		52939	
Seed cotton yield	20.5		15		18.4	
Gross return (Rs./ha)	111725	122.71	78915	105.05	101200	117.20
Cost of cultivation(C3)	91049	100.00	75118	100.00	86350	100.00

Table 48a.Cost of different inputs and labours and their share in cost of cultivation in Central zone (Cont)

Centres	Rahuri		Surat		Junagadh	
Genotypes	Bt hybrid (irrigated)		Bt hybrid (irrigated)		Bt hybrid (irrigated	
Inputs	Value (Rs./ha.)	%	Value (Rs./ha.)	%	Value (Rs./ha.)	%
i.Seeds	2931	3.74	3650	5.1	2920	4.03
ii.Fertilizers	6387	8.16	5268	7.3	7096	9.79
iii.Manures	4240	5.42	3010	4.2	6000	8.28
iv.Weedicides	2572	3.29	1685	2.3	1200	1.66
v.Plant protection chemicals	3219	4.11	3087	4.3	7420	10.23
vi.Growth regulators/ hormones	474	0.61	0	0.0	900	1.24
Total	19823	25.33	16700	23.2	25536	35.22
B. Cost of labour (Rs. /ha)						
i.Field preparation	6173	7.89	6297	8.7	4250	5.86
ii.Sowing	2401	3.07	1320	1.8	1000	1.38
Total of application charges for input	13936	17.80	7273	10.1	7205	9.94
ix.Weeding	5407	6.91	5040	7.0	1500	2.07
x.Interculture	3708	4.74	4500	6.3	1800	2.48
xi.Picking& cleaning	27183	34.73	10394	14.4	10000	13.79
xii.Cotton stalk pulling/cutting	2056	2.63	1263	1.8	1188	1.64
Total	60864	77.76	36087	50.1	26943	37.16
Other expenses (Rs./ha)		0.00	2064	2.9	3462	4.78
Grand total(Rs./ha)(C3)	80687		54851	76.2	52479	72.39
Seed cotton yield	27.2		20.8	0.0	20	
Gross return (Rs./ha)	145682	186.12	1E+05	158.7	1018100	
Cost of cultivation(C3)	78272	100.00	71986	100.0	72498	100

Table49. Different type of costs, cost of per quintal of production and net return (Rs./ha) Central Zone

Centre	Cost calculation	Cost A1	Cost A2	Cost B1	Cost B2	Cost C1	Cost C2	Cost C3
Akola	Total cc (Rs./ha)	51942	51942	58442	64442	76772	82772	91049
	Cost of production (Rs./Q)	3463	3463	3896	4296	5118	5518	6070
	Net Return(Rs./ha)	36257	36257	28230	20820	5592	-1818	-12040
Nanded	Total cc(Rs./ha)	62441	62441	68181	68289	73829	68289	75118
	Cost of production(Rs./Q)	4168	4168	4551	4559	4928	4559	5015
	Net Return(Rs./ha)	16474	16474	10734	10626	5086	10626	3797
Bawanipatna	Total cc(Rs./ha)	62,500	62,500	67,500	75,500	78,500	78,500	86,350
	Cost of production(Rs./Q)	3,839	3,839	4,130	4,611	4,323	4,803	5,264
	Net Return(Rs./ha)	38,700	38,700	33,700	25,700	22,700	22,700	14,850
Rahuri	Total cc(Rs./ha)	78,272	78,272	87,897	87,897	97,291	97,291	1,22,644
	Cost of production(Rs./Q)	2,878	2,878	3,232	3,232	3,577	3,577	4,509
	Net Return(Rs./ha)	67,410	67,410	57,785	57,785	48,391	48,391	23,038
Surat	Total cc(Rs./ha)	51135	51135	54662	58662	61442	65442	71986
	Cost of production(Rs./Q)	2461	2461	2631	2823	2957	3150	3465
	Net Return(Rs./ha)	63141	63141	59614	55614	52834	48834	42290
Junagadh	Total cc(Rs./ha)	60776	60776	62787	64311	65907	65907	72498
	Cost of production(Rs./q)	3039	3039	3139	3216	3295	3295	3625
	Net Return(Rs./ha)	41024	41024	39013	37489	35893	35893	29302

Cost A1 (Variable cost)
Cost A2: Cost A1+rent paid for leased in land
Cost B1: Cost A1 +interest on value of owned capital assets (excluding land)
Cost B2: cost B1+ rental value of owned land
Cost C1: Cost B1+imputed value of family labours
Cost C2: Cost B2+imputed value of family labours
Cost C3:Cost C2x1.10(10% for management cost)

South Zone

The details of input use and cost of cultivation for different domains of South zone was surveyed and different type of cost (Rs./ha), cost of production (Rs./Q) and net returns were calculated. The cost of cultivation (Cost C3) was arrived as Rs.67,650, 89,859, 1,19, 936, 1, 07,129 1,63,582 94,353 and 1,22,804/ha respectively for Chamrajnagar(Bt hybrid (HxB) -rainfed), Nandyal (Bt hybrid- rainfed), LAM (Bt hybrid- rainfed), Srivilliputhur(*hirsutum* variety –irrigated, HDPS), Raichur (Bt hybrid-irrigated), Raichur (Bt hybrid- rainfed) and Coimbatore (Bt hybrid-irrigated).The cost of agro inputs was assessed , which was 23.9, 28.9, 21.6, 12.8,21.3, 22.6 and 16.5 per cent respectively of total cost of cultivation on the basis of Cost C3 for Chamrajnagar(Bt hybrid (HxB) rainfed), , Nandyal (Bt hybrid- rainfed), LAM (Bt hybrid- rainfed), Srivilliputhur(*hirsutum* variety –irrigated, HDPS), Raichur

(Bt hybrid-irrigated), Raichur (Bt hybrid- rainfed) and Coimbatore (Bt hybrid-irrigated)(Table 50 &50A). The share of labour cost in total cost of cultivation arrived as 36.2, 48.1,49.3, 64.82, 30.6, 39.8 and 35.9 per cent of Cost C3 respectively for Chamrajnagar(Bt hybrid (HxB) rainfed), Nandyal (Bt hybrid-rainfed), LAM (Bt hybrid- rainfed), Srivilliputhur(*hirsutum* variety –irrigated, HDPS)Raichur (Bt hybrid-irrigated), Raichur (Bt hybrid- rainfed) and Coimbatore (Bt hybrid-irrigated).

The mean seed cotton yield of 17.5, 12.0, 28.2, 25.5, 28.5,22.0 and 28.0 q/ha was attained by survey at Chamrajnagar(Bt hybrid (HxB) rainfed), , Nandyal (Bt hybrid- rainfed), LAM (Bt hybrid-rainfed), Srivilliputhur(*hirsutum* variety –irrigated, HDPS).), Raichur (Bt hybrid-irrigated), Raichur (Bt hybrid- rainfed) and Coimbatore (Bt hybrid-irrigated) respectively. The different type o f cost of cultivation (Cost A1, Cost A2, Cost B1, Cost B2, Cost C1, Cost C2 and Cost C3) were calculated. The cost of cultivation per quintal on the basis of Cost C3 was arrived as Rs.3866,7488,4523, 4201, 5736, 4289 and 4385/ha respectively with Chamrajnagar (Bt hybrid (HxB) rainfed), Nandyal (Bt hybrid- rainfed), LAM (Bt hybrid- rainfed), Srivilliputhur(*hirsutum* variety –irrigated, HDPS)Raichur (Bt hybrid-irrigated), Raichur (Bt hybrid- rainfed) and Coimbatore (Bt hybrid-irrigated)(Table 51).

Table 50.Cost of different inputs and labours and their share in cost of cultivation in South zone

Particulars	Chamrajnagar		Sriviliputhur		Nandyal		LAM	
	Bt hybrid (HXB) rainfed		Variety-HDPS (irrigated)		Bt hybrid-rainfed		Bt hybrid-rainfed	
	Value (Rs./ha.)	%	Value (Rs./ha.)	%	Value (Rs./ha.)	%	Value (Rs./ha.)	%
i. Seeds	3000	4.43	2700	2.52	5374	6.0	4318	3.6
ii.Fertilizers	5180	7.66	2700	2.52	8933	9.9	7749	6.5
iii.Manures	6000	8.87	0	0.00	563	0.6	1608	1.3
iv.Weedicides	0	0.00	0	0.00	0	0.0	1213	1.0
v.Plant protection chemicals	2000	2.96	8350	7.79	10486	11.7	11028	9.2
vi.Growth regulators/ hormones	0	0.00	0	0.00	600	0.7	0	0.0
vii)Irrigation chrges	0	0.00	0	0.00	0	0.0	0	0.0
Total	16180	23.92	13750	12.83	25956	28.9	25916	21.6
B. Cost of labour inputs(Rs.//ha)								
i.Field preparation	4400	6.50	9700	9.05	9263	10.3	6193	5.2
ii.Sowing	3400	5.03	1440	1.34	3200	3.6	1289	1.1
iii)Input application charges	5520	8.16	11500	10.73	7081	7.9	7442	6.2
ix.Weeding	1400	2.07	18000	16.80	8443	9.4	2618	2.2
x.Interculture	5250	7.76	0	0.00	4029	4.5	7500	6.3
xi.Picking& cleaning	3500	5.17	28800	26.88	11223	12.5	27980	23.3
xii.Cotton stalk pulling/cutting	1000	1.48	0	0.00	0	0.0	6127	5.1
Total	24470	36.17	69440	64.82	43239	48.1	59149	49.3
Other expenses							0	0.0
Grand total(Rs./ha)	40650	60.09	83190	77.65		0.0	85065	70.9
Seed cotton yield	17.5		25.5		12	0.0	28.2	0.0
Gross return (Rs./ha)	87500		94350		74100		144718	
Cost of cultivation(C3)	67650		107129		89859		119936	

Table 50 A. Cost of different inputs and labours and their share in cost of cultivation in South zone (Cont)

Particulars	Raichur	Raichur	Coimbatore

	Bt hybrid irrigated		Bt hybrid irrigated		Bt hybrid- irrigated	
	Value (Rs./ha.)	%	Value (Rs./ha.)	%	Value (Rs./ha.)	%
i. Seeds	4000	2.4	4000.00	4.2	4380	3.6
ii.Fertilizers	8186	5.0	6324.00	6.7	3333	2.7
iii.Manures	10625	6.5	6250.00	6.6	6400	5.2
iv.Weedicides	1020	0.6	0.00	0.0	2985	2.4
v.Plant protection chemicals	5415	3.3	4395.00	4.7	1359	1.1
vi.Growth regulators/ hormones	0	0.0	360.00	0.4	0	0.0
vii)Irrigation chrges	5535	3.4	0.00	0.0	1750	1.4
Total	34781.0	21.3	21329.0	22.6	20207.0	16.5
B. Cost of labour inputs(Rs.//ha)						
i.Field preparation	7500	4.6	3500.00	3.7	6700	5.5
ii.Sowing	3550	2.2	3240.00	3.4	3600	2.9
iii)Input application charges	11760	7.2	7280.00	7.7	12250	10.0
ix.Weeding	11380	7.0	9720.00	10.3	7500	6.1
x.Interculture	3390	2.1	2670.00	2.8	0	0.0
xi.Picking& cleaning	12435	7.6	11100.00	11.8	14000	11.4
xii.Cotton stalk pulling/cutting	0	0.0		0.0	0	0.0
Total	50015.0	30.6	37510.0	39.8	44050.0	35.9
Other expenses	0	0.0		0.0		0.0
Grand total(Rs./ha)	84796.0	51.8	58839.0	62.4	64257.0	52.3
Seed cotton yield	28.52	0.0	22.00	0.0	28	0.0
Gross return (Rs./ha)	163582	100.0	94353	100.0	122804	100.0
Cost of cultivation(C3)	138778		112770.00	119.5	151200	123.1

Table 51. Different type of costs, cost of per quintal of production and net return(Rs./ha) South Zone

	Cost estimation	Cost A1	Cost A2	Cost B1	Cost B2	Cost C1	Cost C2	Cost C3
Chamraj Nagar(Bt-HxB(rainfed)	Total cost of cultivation (Rs../ha)	40650	40650	40650	61500	40650	61500	67650
	Cost of Production (Rs./q)	2323	2323	2323	3514.28	2323	3514.28	3865.71
	Net Return (Rs./ha)	46850	46850	46850	26000	46850	26000	19850
NandyalBt hybrid (rainfed)	Total cost of cultivation (Rs../ha)	64822	64822	65193	80702	66181	81690	89859
	Cost of Production (Rs./q)	5402	5402	5433	6725	5515	6808	7488
	Net Return (Rs./ha)	9278	9278	8907	-6602	7919	-7590	-15759
LAM Bt hybrid (rainfed)	Total cost of cultivation (Rs../ha)	86168	106810	107791	107791	109033.7	109033.7	119936.3
	Cost of Production (Rs./q)	3056	3788	3822	3822	3866	3866	4253
	Net Return (Rs./ha)	58550	37908	36927	36927	35684	35684	24782
SVPR-hirsutum variety (irrigated) HDPS	Total cost of cultivation (Rs../ha)	63490	63490	68392	78490	87292	97390	107129
	Cost of Production (Rs./q)	2490	2490	2682	3078	3423	3819	4201
	Net Return (Rs./ha)	38510	38510	33608	23510	14708	4610	-5129
Raichur Bt hybrid (irrigated)	Cost of Production (Rs./q)	90211	90458	101838	141976	148711	148711	163582
	Net Return (Rs./ha)	3163	3172	3571	4978	5214	5214	5736
	Cost of Production (Rs./q)	48567	48320	36940	-3198	-9933	-9933	-24804
Raichur Bt hybrid (rainfed)	Cost of Production (Rs./q)	61218	61218	61588	83306	64058	85776	94353
	Net Return (Rs./ha)	2783	2783	2799	3787	2912	3899	4289
	Cost of Production (Rs./q)	51553	51553	51182	29465	48712	26995	18417
Coimbatore Bt hybrid(rainfed)	Cost of Production (Rs./q)	76839	92839	99332	115332	105332	121332	122804
	Net Return (Rs./ha)	2744	3315	3547	4119	3761	4333	4385
	Cost of Production (Rs./q)	74361	58361	51868	38868	45868	29868	28396

Agronomy VIII: Strategies to mitigate/minimize soil crust formation in cotton in North zone

Preamble: Soil aggregates are easily dispersed in soils of low organic matter under the impact of rain drops, thus forcing a thin layer of dispersed soil (clay) on the soil surface which on drying develops high strength and form crust and is common problem in North zone. This reduces the exchange of gases between soil and atmosphere and also injures the tips of emerging seedlings, resulting in drastic reduction in plant population and thus forcing farmers for resowing. The repeated sowing and irrigation favoured for high weed infestation. Hence breaking of soil crust is attempted here.

Faridkot

The results indicated that super absorbent and GoondKatira(local polymer) observed higher performance in checking the crust formation issues in cotton. However, PVA, water spray and phosphoric acid could not show any improvement as evidenced from final emergence count. The germination percentage counted revealed that 94.8, 92.7 and 85.4 per cent respectively with Super Absorbent Polymer @100 kg/ha (T_4), Goond Katira@150 kg/ha (T_{18}) and Goond Katira@100 kg/ha (T_{17}).The result on seed cotton yield is concerned, highest yield was recorded under super absorbent polymer application @100 kg/ha^{-1} (3367 kg/ha) and absolute control (without crust) treatment (3319 kg/ha). The economic analysis found that, the cost of super absorbent is Rs. 450/ kg and about 100 kg of material is required for one ha under Punjab conditions. This is costing around Rs.45000/ha, which is exceptionally high. However, Goond Katira@100 kg/ha-1 is much cheaper and costs approximately 50 % lower than Super absorbent Polymer but still an amount of Rs.22500/ is too high for this purpose. However, refining of studied treatments needs to be further investigated to make it feasible and economical for practical utility.

Bathinda

The soil crust management studies results revealed that germination percentage was significantly highest under absolute control (94.4 %) which was statistically at par with chopped crop residue (88.9 %) followed by FYM(86.1%), GoondKathira@ 50 Kg/ha (79.6%) and running of peg/spike tooth weeder (79.6%). Significantly least germination percentage was recorded under control (39.8%) and application of gypsum@2.5 t/ha(T5) (34.3%). The significantly highest seed cotton yield registered under FYM (3662 kg/ha) , which was statistically at par with absolute control (3481 kg/ha) and chopped crop residue (3382 kg/ha) (Table 52). Application of super absorbent @ 50 kg/ha (3122 kg/ha) and GoondKathira@ 25 kg/ha (3159 kg/ha) were also produced statistically similar seed cotton yield as compared to that of absolute control.

Sriganganagar

The soil crust management studies revealed that germination percentage was significantly highest under absolute control (100 %) followed by Running of peg/spike tooth weeder (two days after crust) (80.2%) .The least plant population observed was recorded under control (9.46 %) .The significantly highest seed cotton yield registered with absolute control (4074 kg/ha) followed by running of peg/spike tooth weeder (two days after crust) (3123 kg/ha) and chopped crop residue/wheat bhusa 3 t/ha (2938 kg/ha)

ICAR- CICR,Sirsa

The results revealed highest values of plant height, yield attributes as well as seed cotton yield were obtained under Farm yard manure @ 3 t/ ha in seed rows followed by water spray equal to 10-15 mm rain fall 3-4 DAS**(T5)** which were followed by Chopped crop residue/wheat bhusa 3 t/ha in seed rows followed by water spray equal to 10-15 mm rain fall 3-4 DAS(T6)

The studies indicated that soil crust could be economically overcome by application of Chopped crop residue/wheat bhusa@ 3 t/ha , Farm yard manure @ 3 t/ ha in seed rows ,running of peg/spike tooth weeder (two days after crust)) , application of super absorbent @ 50 kg/ha orGoondKathira@ 25 kg/ha.

Table 52: Germination percentage, plant population and seed cotton yield (kg/ha) as influenced by soil crust management strategies in North Zone

Treatments	SNGR		Bathinda		Faridkot		SIRSA	
	Germination (%)	Yield kg/ha	Germination (%)	SCY (kg/ha)	Germination(%)	SCY (kg/ha)	Germination (%)	SCY (kg/ha)
T1 : Absolute control (without soil crust)	100	4074	94.4	3481	97.9	3119	88.5	2972
T2 : Control (with soil crust)	9.46	2012	39.8	1851	39.6	1030	10.4	555
T3 : Super Absorbent Polymer @50 kg/ha-1 *			75.9	3122	76	2994	84.3	2861
T4 : Super Absorbent Polymer @100 kg/ha	13.51	1790	77.8	2850	94.8	3367	86.4	2920
T5 : Gypsum @ 2.5 t/ha in seed rows	4.95	741	34.3	1205	56.3	1624	83.3	3180
T6 : Farm yard manure @ 3 t/ ha in seed rows	11.71	1543	86.1	3662	64.6	2075	87.5	3358
T7 : Chopped crop residue/wheat bhusa 3 t/ha	50.0	2938	88.9	3382	53.1	1525	73.9	3189
T8 : Spray of phosphoric acid@100 l/ha (Before making Soil crust)	9.91	1222	67.6	2668	28.1	767	40.6	931
T9: Spray of polyvinyl alcohol @0.5% (Before making Soil crust)	22.07	1864	65.7	2475	37.5	892	53.1	990
T10 : Spray of phosphoric acid@100 l/ha (After making Soil crust)	6.31	963	75.0	2822			13.5	833
T11: Spray of polyvinyl alcohol @0.5% (After making Soil crust)	12.16	1840	74.1	2509			38.5	972
T12 : Running of peg/spike tooth weeder (two days after crust))	80.16	3123	79.6	2978	64.6	2159	83.3	2997
T13: Water spray 2-4 days by power sprayer	81.53	2605	67.6	2491	54.2	2042	79.1	2912
T14:Gaund Kathira@12.5 Kg/ha	9.46	1222	71.3	2817			79.1	2811
T15:Gaund Kathira@25 Kg/ha	9.01	1321	78.7	3159			81.2	2867
T16 : GoondKathira@ 50 Kg/ha *			79.6	3007	71.9	2626	82.2	2963
T17: Goond Katira@100 kg/ha-1					85.4	2824	84.3	2996
T18 : Goond Katira@150 kg/ha-1					92.7	2885	86.4	3083
T19:Soaking seeds with the MC solution at 30oC for 12 h @ 500 ppm							84.3	3290
SEm		287	6.42	246		181.6	3.8	140.4
CD at 5%		592	10.7	410	-	366	10.9	398.5

Agronomy IX: Standardisation of geometry for Bt varieties

Preamble: Bt-cotton technology is only expected to protect the cotton crop from bollworm attacks. Clearly the yield benefits should come from the genetic potential of hybrids or varieties. For best yield benefits, it is important that the hybrids or varieties must be ideally suited for specific agro-eco-zones. For example the best options for rainfed regions would be early-maturing short duration straight varieties, which are amenable for high-density planting system also. The newly released Bt varieties are taken for evaluation and suitability and geometry requirement

Central Zone

The results on geometry requirement of newly released Bt varieties were tested in multi location revealed that G2.PKV 081 registered significantly higher performance at Akola(1584 kg/ha) and Rahuri(2667 kg/ha) which was on par with G3.Rajat Bt (1572 kg/ha) at Akola. The significantly higher net return(Rs.56,602/ha) and benefit cost ratio (2.8) were calculated with G2.PKV 081 at Akola. The genotype,G3.Rajat Bt registered significantly higher seed cotton yield at Surat(2185 kg/ha), Nanded (1848 kg/ha), Khandwa(1115 kg/ha) and Junagadh (2136 kg/ha). Significantly higher net return of Rs.45839 and 46555/ha were observed with G3.Rajat Bt at Nanded and Junagadh respectively. Amongst different spacing tested planting of 60 x 15 cm registered significantly higher seed cotton yield of 1592, 2401, and 1259 respectively at Akola, Surat and Khandwa ; which was on par with 60 X 30 cm spacing at Akola(1538 kg/ha) and Surat(2379 kg/ha), Nanded (1550 kg/ha) and Junagadh (1674 kg/ha) (Table 53 &54). The non significant performance was observed at Nanded, and Junagadh. Planting of Bt varieties at the spacing of 60x15 cm registered significantly higher net return at Akola (Rs.55,738/ha) and Nanded (Rs.35,338/ha). The study inferred that suitable geometry of 60 x 30 cm at Akola, Surat and Nanded and 90 X 15 cm at Rahuri were optimum

Table 53. Seed cotton yield (kg/ha) and economics of Bt varieties as influenced by spacing

Treatment	Akola			Nanded		
Genotypes	Seed cotton yield (kg/ha)	Net Return (Rs./ha)	Benefit Cost ratio	Seed cotton yield (kg/ha)	Net Return (Rs./ha)	Benefit Cost ratio
G1. Suraj Bt	1444	49861	2.65	1425	26598	1.53
G2. PKV 081 Bt	1584	56602	2.81	1491	29589	1.59
G3. Rajat Bt	1572	55993	2.79	1848	45839	1.86
G4. GJHV374 Bt	1454	50337	2.66	1514	30649	1.61
Mean	1514	53198	2.73	1569	33169	1.65
SE d	24	1347	0.04	39.82	3113	0.03
CD (5%)	84	4662	NS	116.06	N.S.	0.09
Spacing						
S1.60 X 15 cm	1592	55738	2.71	1635	35338	1.67
S2.60X 30 Cm	1538	54722	2.78	1550	31802	1.62
S3.90 X 15 cm	1489	51787	2.68	1600	35305	1.7
S4.90 X30 cm						
S3.90 X 60 cm	1423	50546	2.74	1493	30230	1.6
S4.90 X 90 cm						
Mean	1511	53198	2.73	1569	33169	1.65
SE d	21	1190	0.04	68.41	1812	0.05
CD (5%)	63	3472	NS	N.S.	5280	N.S.

Table 54. Seed cotton yield (kg/ha) and economics of Bt varieties as influenced by spacing

Treatment	Rahuri	Surat	Khandwa	Junagadh		
Genotypes	SCY (kg/ha)	SCY (kg/ha)	SCY (kg/ha)	SCY (kg/ha)	Net Return(Rs./ha)	Benefit Cost ratio
G1. Suraj Bt	2473	1835	924	1660	24016	1.37
G2. PKV 081 Bt	2667	1853	1052	1526	18054	1.28
G3. Rajat Bt	2475	2185	1115.2	2136	46555	1.68
G4. GJHV374 Bt	2700	2082	1071	1476	16319	1.24
Mean	2579	1989	1041	1700	26236	1.4
SE d	52.88	85.53	12.54	65	3326	0.05
CD (5%)	154.36	250	25.36	189	9606	0.15
Spacing						
S1.60 X 15 cm	2459	2401	1259	1790	27375	1.39
S2.60X 30 Cm	2636	2379	1058	1674	25638	1.37
S3.90 X 15 cm	2667	2138	1093	1725	28026	1.42
S4.90 X30 cm		1037		1608	23904	1.38
S3.90 X 60 cm	2554		969			
S4.90 X 90 cm			825			
Mean	2579	1989	1041	1699	26236	1.4
SE d	31.09	71.49	11.03	65	3326	0.05
CD (5%)	107.61	247	25.45	NS	NS	NS

Agronomy X: Physiological Manipulation of Morphoframe, growth and development of cotton by PGRs

Preamble: Plant growth and development are regulated by natural plant hormones, these processes may be influenced either by altering the plant hormone level or by changing the capacity of the plant response to natural hormones. Bt cotton, the plant morphoframe doesn't develop fully due to early switch over to reproductive phase under resource constraints condition. Modification of morphoframe by agrochemicals could greatly help in dispensing away these limitations

Central Zone

The plant growth regulator study conducted with objective to physiological manipulation of Morphoframe, growth and development of cotton revealed that between genotypes, genotypes having Bt background performed significantly higher performance in all locations includes Rahuri, Khandwa and Nanded except Surat and , Junagadh where equal performance of Bt and non Bt genotypes were observed. Amongst PGR treatments found that ethrel @45 ppm at40DAS followed by mepiquatchloride@100ppm at 90 DAS registered significantly higher seed cotton yield of 2573,1755 and 1632 kg/ha respectively at Rahuri, Khandwa and Nanded which were 8.1,35.0 and 21.4 per cent respectively higher than control (Table 55)

Table 55.Seed cotton yield of Bt and non Bt Genotypes as influenced by PGR application

Genotypes	Rahuri	Surat	Junagadh	Khandwa	Nanded
Bakti BG II	2721				
PhuleYamunae	2221				
G.Cot.Hy12BG II		1451			
GN.cot 32		1145			
GT HH49BGII			1875		
G.Cot.38			1170		
RCH659 BG II				1733	
Suraj				1333	
ACH 55 BG II					1683
NH615					1362
SEd	32.9	28.4	56	6.1	42.8
CD (5%)	96.6	86.1	170	13	129.7
Plant Growth Regulators					
B1.Ethrel@45 ppm at 40 DAS	2541	1368	1483	1455	1515
B2.Mepiquat chloride @100ppm at 90 DAS	2390	1281	1509	1620	1595
B3.Ethrel @45 ppm at40DAS+Mepiquatchloride@100ppm at 90 DAS	2573	1229	1633	1755	1632
B4.Control (water spray)	2381	1312	1466	1300	1344
SEd	57	40.2	79	8.58	60.5
CD (5%)	167.3	NS	NS	18.4	183.5

South Zone

The plant growth regulator study conducted with objective to physiological manipulation of Morphoframe, growth and development of cotton revealed that between genotypes, genotypes having Bt background performed significantly higher performance in all locations includes LAM, Dharwad, Raichur, Sriviliputhur and , Coimbatore except Chamrajnagar. Amongst PGR treatments found that ethrel @45 ppm at40DAS followed by mepiquatchloride@100ppm at 90 DAS registered significantly higher seed cotton yield of 3502, 1654, 2547, 2515 and 2580 kg/ha respectively at LAM, Dharwad, Raichur, Srivilliputhur and Coimbatore which were 15.4,3.32,10.7,14.4, and 16.7 per cent respectively higher than control(water spray) (Table 56).

Table 56.Seed cotton yield of Bt and non Bt Genotypes as influenced by PGR application

Genotypes	LAM	Dharwad	Raichur	Sriviliputhur	Coimbatore	Chamrajnagar
H1. Jaadoo BG II	3888		2559	2449		
H2 NDLH 1938	2675					
Ajeet -199 BG II		1814				
Sahana		1430				
BGDS-1063			2274			
SVPR-6				2226		
RCH659 BG II					2538	
Co 14					2354	
RCH 625 BG II						1803
DCH 32						1910
SEd	59	5.2	5.71	76.7	77.2	55.16
CD (5%)	128	15.5	26.5	182.6	186.4	NS
Plant Growth Regulators						
B1.Ethrel@45 ppm at 40 DAS	3314	3314	2417	2271	2341	2133
B2.Mepiquat chloride @100ppm at 90 DAS	3276	3276	2482	2366	2414	2022
B3.Ethrel @45 ppm at40DAS+Mepiquatchloride@100ppm at 90 DAS	3502	3502	2547	2515	2580	1793
B4.Control (water spray)	3034	3034	2301	2199	2210	1479
SEd	83	7.3	129.7	88.6	89.4	78.01
CD (5%)	181	21.8	NS	187.6	189.8	168.95

PHYSIOLOGY and BIOCHEMISTRY

PHY1	Canopy management in HDPS cotton
PHY2	Preparing for climate change - Growth and development of *arboreum* cotton in response to growth regulators
PHY 3	Moisture Stress management through use of different Osmo-protectants
BIO CHEM1	Screening of Cotton genotypes for abiotic stress tolerance and estimation of for seed oil
BIO CHEM1A	Screening of Cotton genotypes for drought and salinity tolerance
BIO CHEM1B	Estimation of seed oil, gossypol and protein
BIO CHEM.2	Effect of PGRs on host plant resistance and influence of sucking pest in cotton
BIO.CHEM.3	Evaluation of Bt hybrids for biochemical basis of tolerance to sucking pests

PHY 1 Canopy management in HDPS cotton

Preamble: Closer row spacing and enhanced plant populations in HDPS lead to more rapid canopy closure than in conventionally spaced cotton. Rapid canopy closure, in turn, leads to higher leaf area index which enhanced sucking pest problem, boll rot and improper boll bursting due to change in the micro-climate. The excess growth should be arrested and checked by using growth retardant for harnessing the benefits of HDPS.

North Zone

Sriganganagar

The experimental results of the canopy management in HDPS revealed that mepiquat chloride application @ 20 g a.i./ ha at 60 and 75 DAS gave significantly higher number of bolls and seed cotton yield ie., 2686 kg/ha than control However, which was on par with mepiquat chloride application 20 g a.i./ ha at 60 DAS (2634 kg/ha) (Table 57).

Table 57. Growth characters and Seed cotton yield (kg/ha) as influenced by growth retardant and nutrient levels at Sriganganagar

Nutrient dose	Plant height (cm)	Boll weight (g)	Sym pod /plant	No Boll /plant	Mono pods /plant	Yield (kg/ha)
N1.100% RDN	142	2.32	18.91	37.7	2.1	2702
N2.125% RDN	146	2.21	18.49	28.4	2.8	2510
N3.150% RDN	159	2.21	17.8	39.6	3.0	2469
SE d	10	0.21	0.12	6.6	0.4	32
CD (5%)	30	NS	0.25	13.7	NS	65
PGR spray						
G1.Control	163	2.11	18.27	33.9	3.1	2364
G2.Mepiquat chloride application 20 g a.i./ha. at 60 DAS	144	2.21	18.72	32.1	2.4	2634
G3.Mepiquat chloride application 20 g a.i./ha. at 60 and 75 DAS	140	2.43	18.21	39.7	2.3	2684
SE d	10	0.21	0.12	6.6	0.4	32
CD (5%)	30	NS	0.25	13.7	NS	65

Central Zone

Surat

The results on PGRs spray found that plant height, number of sympodia at harvest, mean length of sympodia, number of monopodia and plant width showed non significant deviation due to mepiquat chloride application. The results further add that bolls per sqrmtr, boll weight, seed cotton yield (kg/ha) were non significant due to mepiquat chloride application . Application of 150% RDN showed significantly higher no of bolls per sqrmtr, seed cotton yield than 100% RDN however it was at par with 125% RDN. Mepiquat treatment was not showed significant effect in this experiment (Table 58). The genotype, GISV-272 and GSHV-180 showed higher seed cotton yield when nitrogen was applied 125 % RDN in HDPS (60X 10 cm) at Surat

Table58. Mean sympodial length (cm), and Seed cotton yield (kg/ha) as influenced by growth retardant and nutrient levels at Surat

	G-1 : Control		G2.Mepiquat chloride application 20 g a.i./ha. at 60 DAS		G3.Mepiquat chloride application 20 g a.i./ha. at 60 and 75 DAS			ANOVA	CD @ 5%
	V-1: GISV-272	**V-2: GSHV-180**	**V-1: GISV-272**	**V-2: GSHV-180**	**V-1: GISV-272**	**V-2: GSHV-180**	**mean**		
Seed Cotton Yield (Kg/ha)									
N1.100% RDN	1526	1444	1634	1272	1555	1458	1482	N:Nitrogen	185.6
N2. 125% RDN	2148	2138	1744	1626	1715	1751	1854	Genotypes	NS
N3. 150 % RDN	1836	2024	2342	1605	2001	2197	2001	G:Mepiquat	NS
mean	1837	1869	1907	1501	1757	1802	1779		
Mean Length of sympodia at harvest									
N1.100% RDN	26.0	26.0	27.5	18.3	23.2	25.2	24.4	N:Nitrogen	2.4
N2. 125% RDN	31.2	28.2	26.5	24.2	25.7	23.2	26.5	Genotypes	1.9
N3. 150 % RDN	29.5	29.8	31.8	25.8	24.2	25.5	27.8	G:Mepiquat	NS
Mean	28.9	28.0	28.6	22.8	24.4	24.6	26.2		

Junagadh

The canopy management in HDPS cotton at JAU, Junagadh revealed that LAI found significantly highest in control. The chlorophyll content also increased with increased nutrient level and application of Mepiquat chloride @20g a.i./ha at 60 & 75 DAS. The biomass was reduced significantly highest with application of Mepiquat chloride @20g/ha at 60 & 75 DAS whereas biomass increased with increased nutrient level. The application of Mepiquat chloride was inhibit vegetative growth of plants and it divert the photosynthate towards development of reproductive organs i.e. no. of bolls and boll weight were increased altimetry biomass was reduced at harvest. The seed cotton yield (2895 kg/ha) was found significantly higher in application of mepiquat chloride @20g/ha at 60 and 75 (Table 59).

Table59.Leaf area index and Seed cotton yield (kg/ha) as influenced by growth retardant and nutrient levels

Treatments	Leaf Area Index				Seed cotton yield (kg/ha)			
	N1.100 %RDN	N2.125 %RDN	N3.150 %RDN	Mean	N1.100 %RDN	N2.125 %RDN	N3.150 %RDN	Mean
G1.Control	7.30	7.00	7.12	**7.14**	2685	2577	2594	**2619**
G2.Mepiquat chloride @ 20 g a.i./ha. at 60 DAS	6.23	6.52	7.14	**6.63**	2692	2586	2832	**2704**
G3.Mepiquat chloride @ 20g a.i./ha. at 60 & 75 DAS	6.01	6.33	6.23	**6.19**	2935	29309	2841	**2895**
Mean	**6.51**	**6.62**	**6.83**		**2771**	**2691**	**2756**	
ANOVA	**GR**	**N dose**	**GRXN**		**GR**	**N dose**	**GRXN**	
S.Em.±	0.21	0.21	0.37		71.83	71.83	124.43	
CD (5%)	0.63	NS	NS		215.4	NS	NS	

Khandwa

The growth retardant was also found significant effect on plant height. The maximum (70.20cm) plant height was observed with G_1(control) as compare to growth retardant G_2 and G_3.while the minimum (62.57 cm) plant height was observed significantly with the growth retardant G_3.The growth retardant was also found significant influence on mean length of sympodia. The growth retardant had found significant influence on number of bolls per square metre. The maximum (110.10/sqm) number .of bolls per square metre were found significantly with Mepiquat chloride application 20 g a.i./ha. at 60 and 75 DAS (G3) while the minimum (100.0) no. of bolls per square metre was found significantly with the G_1 (control). The maximum (1340 kg/ha) seed on cotton yield was obtained significantly with the growth retardant G_3 (mepiquat chloride 20g a.i./ha at 60 and 75 DAS (Table 60).

Table 60. Plant height (cm) ,number of bolls/SQM and seed cotton yield(Kg/ha) as influenced by growth retardant and nutrient levels at Khandwa

Treatments	Plant height (cm) at harvest				No of bolls/square metre				Seed cotton yield (kg/ha)			
	N1.100%RDN	N2.125% RDN	N3.150% RDN	Mean	N1.100% RDN	N2.125%RDN	N3.150%RDN	Mean	N1.100%RDN	N2.125%RDN	N3.150%RDN	Mean
G1.Control	67.5	72.2	70.9	70.2	100.0	98.0	102.0	100	1264.0	1292.0	1295.0	1284
G2.Mepiquat chloride application 20 g a.i./ha. at 60 DAS	63.4	68.7	67.9	66.7	105.5	107.0	108.0	107	1301.0	1329.0	1330.0	1320
G3.Mepiquat chloride application 20 g a.i./ha. at 60 and 75 DAS	58.0	65.2	64.5	62.6	109.2	110.8	110.3	110	1319.0	1350.0	1350.0	1340
Mean	63.0	68.7	67.8		104.9	105.3	106.8		1295.0	1323.0	1325.0	
ANOVA	GR	N dose	GRXN		GR	N dose	GRXN		GR	N dose	GRXN	
SE d	1.2	1.2	2.0		1.2	1.2	2.0		0.7	0.7	1.2	
CD (5%)	2.5	2.5	NS		2.5	NS	NS		1.5	1.5	2.5	

South Zone

Dharwad

Application of growth retardant-mepiquat chloride (20g ai /ha) at 60 and 75 DAS, recorded reduction in plant height (123.99 cm) as compared to control (141.2 cm). The number of sympodia at harvest recorded maximum in application of growth retardant, mepiquat chloride 20g ai/ha at 60 and 75 DAS (23.7) compared to control (20.5). The combined application of 150% RDN with mepiquate chloride at 60 DAS and 75 DAS recorded higher bolls per square meter (214.7/sqm), single boll weight(5.5g), and seed yield (2221kg/ha) and lowest was recorded in control (1677 kg/ha). The results indicated that application of 150% RDN along with foliar application of mepiquate chloride at 60 and 75 DAS, brought out higher seed cotton yield (2221 Kg/ha) as compared to control (1677 Kg/ha) (Table 61).

Table61. Plant height (cm) , number of sympodia and seed cotton yield(Kg/ha) as influenced by growth retardant and nutrient levels at Dharwad

Treatments	Plant height (cm) at harvest				No. of sympodia at harvest				Seed cotton yield (kg/ha)			
	N1.100%RDN	N2.125%RDN	N3.150%RDN	Mean	N1.100%RDN	N2.125% RDN	N3.150%RDN	Mean	N1.100 %RDN	N2.125% RDN	N3.150%RDN	Mean
G1.Control	138.7	139.2	145.7	141.2	19.7	20.8	20.9	20.5	1677.0	1878	1822	1792
G2.Mepiquat chloride application 20 g a.i./ha. at 60 DAS	130.5	132.5	135.5	132.8	20.3	21.5	23.6	21.8	1719.0	1918	1988	1875
G3.Mepiquat chloride application 20 g a.i./ha. at 60 and 75 DAS	113.9	120.1	128.5	120.8	21.9	23.3	25.9	23.7	1813.0	1992	2221	2009
Mean	127.7	130.6	136.5		20.7	21.9	23.5		1736.0	1930	2010	
ANOVA	**GR**	**N dose**	**GR x N**		**GR**	**N dose**	**GR x N**		GR	N dose	GR x N	
SE d	0.6	0.9	1.1		0.4	1.0	0.6		8.0	14.0	13.5	
CD (5%)	1.9	2.8	3.4		1.1	2.9	1.8		24.0	42.0	40.5	

LAM

The significantly higher seed cotton yield was recorded under 150% RDN coupled with mepiquat chloride application @ 20g ai/ha at 60 DAS and 75 DAS (3500 kg/ha) and on par with 150% RDN coupled with mepiquat chloride application @ 20g ai/ha at 60 DAS (3287 kg/ha) and 125% RDN coupled with Mepiquat Chloride application @ 20g ai/ha at 60 DAS and 75 DAS (3258 kg/ha) (Table 62).

Table62. Effect of Mepiquat Chloride on morphological, yield and yield attributing Characters in HDPS Cotton under different fertilizer regimes

Name of the treatment		Plant height (cm)	Sympodia per plant	Sympodial length (cm)	Bolls Per sqm	Boll Weight(g)	SCY(kg/ha)
100% RDN	Control	108.7	13.85	24.95	146.3	3.94	2945
	Mepiquat Chloride @ 20g ai/ha at 60 DAS	91.7	16.60	26.15	147.0	4.29	2827
	Mepiquat Chloride @ 20g ai/ha at 60 DAS and 75 DAS	1013	16.89	18.51	149.7	4.14	3124
125%RDN	Control	118.3	14.77	20.70	140.7	4.37	2821
	Mepiquat Chloride @ 20g ai/ha at 60 DAS	100.0	17.17	23.32	156.3	3.69	3061
	Mepiquat Chloride @ 20g ai/ha at 60 DAS and 75 DAS	97.7	18.62	23.88	161.3	3.78	3258
150% RDN	Control	112.3	17.24	23.04	156.3	3.25	3130
	Mepiquat Chloride @ 20g ai/ha at 60 DAS	95.7	18.34	23.96	164.0	3.28	3287
	Mepiquat Chloride @ 20g ai/ha at 60 DAS and 75 DAS	98.0	18.51	22.83	175.32.30	3.69	3500
SEm±		2.1	0.55	1.45	6.89	0.18	36
CD@ 0.05		6.15	1.16	NS	14.14	NS	108

PHY 2. Preparing for Climate Change: Effect of environment on crop phenology development & yield.

Preamble: Desi cotton is known for tolerance of abiotic stress. However, the land races are known for photo and thermo sensitive characters. Delay sowing observed excessive vegetative growth with less or no flowering. The vagaries of nature exposes the crop to various stresses- especially drought. Hence the experiment was proposed to induce flowering by spraying PGRs in desi cotton under delay sowing situation

Surat

The experimental results revealed that number of bolls per square metre, boll weight (g) and plant yield (g) were non significantly for the growth regulator, however the number of bolls per square metre, boll weight (g) and plant yield (g) were significantly responded to times of sowing. Delayed sowing showed significant reduction in number of bolls, boll weight and plant yield. Application of salicylic Acid @ 0.5 mM at 45 &60 DAS (G3) sprayed in D1+20 days delay sowing showed significantly higher plant yield. Seed cotton yield was not affected due to growth regulators. The seed cotton yield (kg/ha) was significantly affected due to time of sowing only. D2+20 days delay sowing was showed significantly lower seed cotton yield than Normal sowing and D1+20 days delay(Table 63). Days required for 50% squaring, first flowering and 50% flowering was significantly reduced by application of G3-Salicylic Acid @ 0.5 mM at 45 &60 DAS.

Table 63. Seed cotton yield as influenced by delay sowing and PGRs application

Treatments	Seed cotton yield (kg/ha)			
	D1.Normal sowing	D2.D1+20 days delay	D3.D2+20 days delay	Mean
G1.Control	1,048	645	423	705
G2.Mepiquat Chloride @ 20 g a.i. / ha at 45 &60 DAS	759	778	365	634
G3.Salicylic Acid @ 0.5 mM at 45 &60 DAS	656	926	505	696
G4.1-Methyl cyclo propene @10g ai /ha at 45 &60 DAS	813	724	374	637
G5.2,3,5, Tri iodo benzoic acid (TIBA) @ 100 ppm at 45 &60 DAS	1,070	705	477	751
G6.Triacontanol @0.1 mg/l at 45 &60 DAS	950	721	262	644
Mean	883	750	401	
ANOVA	**GR**	**D**	**GRXD**	
SE d	85.0	84.1	158.6	
CD (5%)	NS	232.1	NS	

Junagadh

The results highlighted that highest seed cotton yield (1938 kg/ha) was produced by timely sown crop (D_1=21st June) as compare to 20 days late (D2=11th July) or 40 days late (D_3=31st July) sown crop. Growth regulators treatment of Salicylic Acid @ 0.5 mM at 45 & 60 DAS (G3) produced significantly higher yield (1542 kg/ha) and it was at par with Triacontanol @0.1 mg/l at 45 &60 DAS (G_6) as compared to other PGR treatment & control (Table 64). LAI was found highest in timely (D_1) sown crop followed by D_2& D_3 shown crop. Minimum time was taken for first squaring, 50 % squaring and first flowering in timely(D_1) sown crop followed by 20 days late (D_2) and 40 days late (D_3) sown crop. The number of flower counted at 30 days after 50% flowering was found highest in PGRs treatments of G_3, G_2 and G_6 as compared to other treatments and control.

Table 64. Leaf area index and Seed cotton yield as influenced by delay sowing and PGRs application

Treatments	Leaf Area Index				Seed cotton yield (kg/ha)			
	D1.Normal sowing	D2.D1+ 20 days delay	D3.D2+ 20 days delay	Mean	D1.Normal sowing	D2.D1+ 20 days delay	D3.D2+ 20 days delay	Mean
G1.Control	2.95	3.07	1.65	**2.56**	2012	1341	680	**1344**
G2.Mepiquat Chloride @ 20 g a.i. / ha at 45 &60 DAS	2.94	3.06	2.54	**2.85**	1667	1481	756	**1301**
G3.Salicylic Acid @ 0.5 mM at 45 &60 DAS	3.38	2.81	2.19	**2.79**	1970	1789	866	**1542**
G4.1-Methyl cyclo propene @10g ai /ha at 45 &60 DAS	2.83	2.66	2.08	**2.53**	1902	1544	788	**1411**
G5.2,3,5, Tri iodo benzoic acid (TIBA) @ 100 ppm at 45 &60 DAS	3.08	2.42	2.19	**2.56**	1953	1466	829	**1416**
G6.Triacontanol @0.1 mg/l at 45 &60 DAS	3.18	3.04	2.25	**2.82**	2125	1576	857	**1519**
Mean	**3.06**	**2.85**	**2.15**		**1938**	**1533**	**796**	
ANOVA	**GR**	**D**	**GRXD**		**GR**	**D**	**GRXD**	
SEd	0.11	0.10	0.19		49.04	56.83	84.94	
CD (5%)	NS	0.39	NS		141.62	223.12	NS	

LAM

The results showedthat normal sowing yielded 1352 kg/ha, as compared to delay sowing (D2 - 600 kg/ha and D.3-556.9 kg/ha). Application of Growth Regulator overcame the effect of delayed sowing and increased the seed cotton yield when compared to control. Amongst PGR treatments, significantly higher mean seed cotton yield was recorded by foliar application of 2,3,5 Triiodo benzoic acid (TIBA) @ 100 ppm at 45 & 60 DAS (876 kg/ha)followed by Triacontanol @ 0.1mg/l at 45 & 60 DAS (875 kg/ha) (Table 65).

Table 65. Seed cotton yield as influenced by delay sowing and PGRs application

Treatments	SCY (kg/ha)			
	D1	D2 =D1+15 DAS	D3 =D2+15 days	Mean
G1.Control	1183	472	431	695
G2.Mepiquat chloride @20g a.i./ha at 45 and 60 DAS	1325	646	612	861
G3.Salicylic acid @ 0.5mM at 45 & 60 DAS	1330	678	553	854
G4.1- Methyl Cyclo propene @ 10g a.i./ha at 45 & 60 DAS	1362	584	629	858
G5.2,3,5 (TIBA) @ 100 ppm at 45 & 60 DAS	1503	599	526	876
G6.Triacontanol @ 0.1mg/l at 45 & 60 DAS	1412	623	591	875
Mean	1352	600.2	556.9	837
ANOVA	SEm	CD@0.05	CV (%)	
Main	30.2	118.7	10.85	
Sub	51.6	149		
Interaction	63.2	182.5		

Dharwad

The results revealed that physiological parameters like days to squaring, flowering, boll bursting were early in normal date of sowing with G3- Salicylic Acid @ 0.5 mM at 45 &60 DAS followed by G6-Triacontanol @0.1 mg/l at 45 &60 DAS. Yield components like number of bolls, boll weight were responded positively to the growth regulators and observed higher response withG3- Salicylic Acid @ 0.5 mM at 45 &6 and comparatively lower yield attributes were observed in control condition in all date of sowing. Significant difference for number of bolls per square meter, bolls weight and seed cotton yield (kg/ha) was recorded with sowing dates. Amongst the treatments, G3- Salicylic Acid @ 0.5 mM at 45 &60 recorded significantly more number of bolls per square meter (213.00) followed by G6-Triacontanol @0.1 mg/l at 45 &60 DAS (197.20) and least was recorded by control (116.8). Single plant yield was high in normal date of sowing D1(69.02 g) than in late sown D2 (66.22 g) and D3 (63.39 g). Days to squaring, days to flowering and days to boll bursting were early in normal date of sowing compare to D2 and D3.Seed cotton yield kg/ha showed significantly higher in D1 with G3-Salicylic Acid @ 0.5 mM at 45 &60 DAS (1428.44 Kg/ha) and lowest was recorded in control (951.21Kg/ha) (Table 66).

Table 66. No. of Bolls/square metre and Seed cotton yield (kg/ha) as influenced by growth regulators and times of sowing

Treatments	No. of Bolls/squaremetre				Seed cotton yield (kg/ha)			
	D1.Normal sowing	D2.D1+ 20 days delay	D3.D2+ 20 days delay	Mean	D1.Normal sowing	D2.D1+20 days delay	D3.D2+20 days delay	Mean
G1.Control	169.6	135.2	116.8	140.5	1387	1202	916	1168
G2.Mepiquat Chloride @ 20 g a.i. / ha at 45 &60 DAS	185.2	143.8	129.5	152.8	1433	1206	967	1202
G3.Salicylic Acid @ 0.5 mM at 45 &60 DAS	213.0	205.6	201.6	206.7	1491	1268	1011	1257
G4.1-Methyl cyclo propene @10g ai /ha at 45 &60 DAS	181.6	159.1	136.2	159.0	1404	1212	942	1186
G5.2,3,5, Tri iodo benzoic acid (TIBA) @ 100 ppm at 45 &60 DAS	197.2	165.2	142.7	168.4	1394	1247	921	1187
G6.Triacontanol @0.1 mg/l at 45 &60 DAS	205.6	195.8	187.5	196.3	1461	1231	998	
ANOVA	GR	D	GR x D		GR	D	GR x D	
SE d	12.3	17.4	24.5		9.0	15.2	21.7	12.3
CD (5%)	0.6	0.5	2.4		27.2	45.6	65.1	0.6

PHY 3. Stress management through use of different Osmo-protectants (irrigated trial)

North Zone

The crop which received no water after first irrigation exhibited the least values for various growth, yield attributes and seed cotton yield as compared to normal/conventional cultivation at Faridkot and Sriganganagar. The conventional irrigation without imposing stress registered significantly higher seed cotton yield at Faridkot and Sriganganagar(Table).However, the imposed moisture stress treatments were not varied at Bathinda and Hisar

The result on moisture stress management strategies revealed that under normal irrigation without moisture stress along with application of 2% KNO3 - four sprays registered the significantly highest seed cotton yield at Faridkot(3715 kg/ha), Bathinda (3672 kg/ha), Hisar (3393 kg/ha) and Sirsa (3906 kg/ha). Even though no moisture stress imposed; however the crop responded significantly for 2% KNO3 - four sprays because of fact that KNO3 is not only osmoprotectant, which also supply both N & K through foliar. The moisture stress imposed by providing one supplementary irrigation at five weeks after sowing could be managed by the application of Salicylic acid @ 100 ppm at Faridkot (2565 kg/ha), 2% KNO3 - four sprays at Bathinda (2963 kg/ha) and Sirsa (3148 kg/ha), and PPFM@1 % at Hisar (3185 kg/ha) (Table 67). The stress imposed by providing limited moisture supply to crop plants interacted with osmoprotectants and the significantly highest seed cotton yield was harvested with PPFM@1 % at Hisar (3763 kg/ha) 2% KNO3 - four sprays at Bathinda (3115 kg/ha)and Sirsa (2789 kg/ha), Salicylic acid @ 100 ppm at Faridkot (3158 kg/ha) , and Sriganganagar (3627 kg/ha)

Table 67. Seed cotton yield (Kg/ha) as influenced by moisture stress and osmoprotectant

Treatments	Control	2% Urea – 4 spray	2% KNO3 - 4 sprays	1 % Thio urea	Salicylic acid @50 ppm	Glycine Betaine @100 ppm	Salicylic acid @ 100 ppm	PPFM @1 %	Mean	ANOVA	CD5 %
Faridkot											
1. Control (irrigation as per recommendation)	3380	3539	3715	2803	3452	3349	3389	3352	3372	Stress	217
2. Only one irrigation at 5 weeks after sowing	1798	2023	2050	1639	2438	2252	2565	2058	2103	Mgt	222
3. Limited water supply (just enough to keep crop plants alive)	2391	2638	2584	1929	2953	2847	3158	2659	2645	SxM	NS
Mean	2523	2733	2783	2123	2948	2816	3037	2689			
Bathinda											
1. Control (irrigation as per recommendation)	2671	3101	3672	2942	2759	3081	2978	2940	3018	Stress	180
2. Only one irrigation at 5 weeks after sowing	2529	2590	2963	2848	2671	2929	2697	2606	2729	Mgt	210
3. Limited water supply (just enough to keep crop plants alive)	2528	2804	3115	2739	2730	3074	2815	2730	2817	SxM	NS
Mean	2576	2832	3250	2843	2720	3028	2830	2759			
Hisar											
1.No water stress / Control/	3392	3289	3393	1245	3289	3259	3319	3304	3304	Stress	NS
2.No water after first irrigation	3437	2993	3081	1422	2504	2963	3156	3185	3185	Mgt	332
3.Limited water supply	3867	3348	2889	1630	2474	2696	3170	3763	3763	SxM	NS
Mean											
SNGR											
1.No water stress / Control/	3719	3993	4009	3749	4298	3780	4085	3719	3919	Stress	38
2.No water after first irrigation	2911	3368	2881	3399	3003	3338	3201	2911	3126	Mgt	102
3.Limited water supply	3064	3749	3734	3582	3948	3475	3597	3064	3527	S x M	306
Mean	3231	3704	3541	3577	3749	3531	3627	3231	3524		
Sirsa											
1.No water stress / Control/	2031	2855	3906	2225	2575	3469	3691	2103	2856.8	Stress	150.5
2.No water after first irrigation	1868	2377	3148	2010	2207	2675	2989	1937	2401.3	Mgt	142.5
3.Limited water supply	1231	2147	2789	1826	1938	2461	2661	1578	2078.7	S x M	264.6
Mean	1710	2460	3281	2020	2240	2868	3113	1872			

Central Zone

Surat

The results found that significant difference in physiological and biochemical responses due to treatments. SLW (1.56, (mg/cm-2)),Chlorophyll stability index (93.81) and proline content (0.9 mg/g) recorded significantly higher with Salicylic acid @ 100 ppm . The yield attributes boll weight (3.98 g) and number of bolls per square meter(77.5/plant) and seed cotton yield (2588 kg/ha) were higher with2% KNO3 - 4 sprays in weekly interval. The moisture stress by providing only one irrigation after 5 weeks, registered seed cotton yield (2444 kg/ha) with 2% KNO3 - 4 sprays in weekly interval . The moisture stress (without supplementary irrigation) treatment harvested better seed cotton yield when 2% Urea – 4 spray (2159 kg/ha) (Table 68). Amongst irrigation water treatments control (recommended irrigation) registered significantly higher seed cotton yield (2844 kg/ha) and yield reduction of 25.7 % was observed with providing single irrigation five week after sowing. The interaction results revealed that significantly higher specific leaf weight(1.53(mg/cm-2)) recorded under rainfed condition with foliar application of 2% Urea- 4 spray at weekly intervals and significantly higher proline content (0.95 mg/g) with foliar application of 2% KNO3- 4 spray at weekly intervals

Table 68 . Physiological parameters and seed cotton yield as influenced by moisture stress with osmoprotectant

Treatments	Control	2% Urea – 4 spray	2% KNO3 - 4 sprays	1 % Thio urea	Salicylic acid @50 ppm	Glycine Betaine @100 ppm	Salicylic acid @ 100 ppm	PPFM @1 %	Mean	ANOVA	SEd	CD @5%
Relative water content (%)												
W1.RD Irri.	87.3	91.4	90.7	84.8	88.7	85.3	89.4	86.2	88.0	W	0.3	1.2
W2.One Irri5WAS	78.1	84.3	84.5	82.7	84.9	86.5	77.8	86.8	83.2	T	0.3	0.8
W3.Limited	90.7	87.3	79.4	88.3	81.3	80.7	85.0	79.4	84.0	WxT	0.6	1.6
Mean	85.4	87.7	84.9	85.3	85.0	84.2	84.1	84.1	85.1			
Specific leaf weight (mg/cm-2)												
W1.RD Irri.	1.4	1.4	1.4	1.2	1.3	1.4	1.5	1.5	1.4	W	0.0	0.1
W2.One Irri5WAS	1.8	1.7	1.6	1.6	1.4	1.6	1.9	1.7	1.7	T	0.0	0.0
W3.Limited	1.3	1.5	1.2	1.5	1.5	1.3	1.3	1.4	1.4	WxT	0.0	0.1
Mean	1.5	1.5	1.4	1.4	1.4	1.4	1.6	1.5	1.5			
Chlorophyll stability index (%)												
W1.RD Irri.	88.7	91.5	91.4	95.4	91.1	94.7	94.3	87.4	91.8	W	0.3	1.4
W2.One Irri5WAS	85.2	92.8	88.8	88.8	88.7	77.6	94.4	95.6	89.0	T	0.5	1.3
W3.Limited	87.9	90.0	93.6	94.1	92.0	93.6	92.7	92.7	92.1	WxT	0.9	2.6
Mean	87.3	91.5	91.2	92.8	90.6	88.6	93.8	91.9	91.0			
Proline content (mg/g of tissue)												
W1.RD Irri.	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	W	0.0	0.0
W2.One Irri5WAS	0.8	1.0	0.9	0.7	0.8	0.9	0.9	0.8	0.9	T	0.0	0.0
W3.Limited	0.7	0.9	1.0	0.8	1.0	0.9	0.9	0.9	0.9	WxT	0.0	0.0
Mean	0.8	0.9	0.9	0.8	0.9	0.9	0.9	0.8	0.9			
boll weight												
W1.RD Irri.	3.6	3.8	3.8	3.8	3.7	3.7	3.6	3.6	3.7	W	0.1	NS
W2.One Irri5WAS	3.4	3.7	4.1	3.6	3.8	3.3	3.9	4.0	3.7	T	0.1	NS
W3.Limited	3.6	4.1	4.1	3.6	3.4	3.5	3.7	4.2	3.8	WxT	0.3	NS
Mean	3.6	3.9	4.0	3.7	3.7	3.5	3.7	3.9	3.7			
bolls per square meter												
W1.RD Irri.	74.3	73.3	83.0	75.2	72.1	71.5	76.5	74.8	75.1	W	2.9	11.2
W2.One Irri5WAS	78.4	83.8	78.1	78.8	64.8	75.4	80.0	70.9	76.3	T	2.6	NS
W3.Limited	69.5	62.7	71.5	77.0	70.4	60.9	63.7	54.7	66.3	WxT	5.2	NS
Mean	74.1	73.3	77.5	77.0	69.1	69.3	73.4	66.8	72.6			
Seed cotton yield												
W1.RD Irri.	2905.9	3201	3169	2840	2631	2675	2789	2542	2844	W	30	118
W2.One Irri5WAS	1998.8	2215	2440	2221	2141	1855	2121	1910	2113	T	66	189
W3.Limited	1989.3	2159	2155	2081	1820	1806	2015	1909	1992	WxT	132	NS
Mean	2298.0	2525	2588	2381	2197	2112	2308	2120	2316			

South Zone

Dharwad

Physiological parameters like photosynthesis, transpiration, total chlorophyll content and proline showed high in 2% KNO3 - 4 sprays followed by Glycine Betaine @100 ppm and lower were observed in control or water spray treatment (1402 kg/ha).The effect of osmo-protectants on cotton showed significant difference under rainfed condition. Among the treatments, foliar application of KNO_3 at 2% at weekly interval shows a positive response followed by foliar application of glycine betaine @ 100 ppm compare to control condition.RWC responded well to all the treatments, in that KNO_3 (77.15%) followed by glycine betaine (76.60%) compare to control condition (71.06%). In the same pattern as RWC specific leaf weight also observed. Bolls per square meter was higher in 2% KNO_3 spray (176.67) followed by glycine betaine (172.67) compare to control (145.00).Seed cotton yield also high in treatment of

KNO_3 spray (1513.10kg/ha) followed by glycine betaine (1501kg/ha) compare to control (1402kg/ha) (Table 69).

Table 69 . Physiological parameters and seed cotton yield as influenced by moisture stress with osmoprotectant

Treatments	Photosynthesis (µmol m-2 sec-1)	Transpiration (mmol m-2 sec-1)	Chlorophyll stability mg/gm of fresh leaves	Proline content (%)	RWC (%0-	SLW (mg/cm2)	Boll per sq meter	Boll weight (g)	Seed cotton yield (kg/ha)
Control	24.6	3.4	36.4	2.4	71.1	6.6	145.0	4.1	1402
2 % urea spray	26.9	3.8	39.4	2.8	74.6	7.4	148.9	4.5	1443
2% KNO3	31.0	5.2	44.1	2.9	77.2	9.2	176.7	4.6	1513
1% Thiourea	25.4	3.8	40.3	2.6	73.9	7.7	142.0	4.1	1412
Salicylic acid @ 50 ppm	26.5	3.9	41.2	2.6	74.5	8.1	149.3	4.4	1406
Glycine Betaine @100 ppm	29.3	4.6	42.9	2.8	76.6	9.0	172.7	4.6	1501
Salicylic acid @ 100ppm	28.3	4.3	41.6	2.7	74.9	8.9	152.3	4.1	1416
PPFM@1 %	28.9	4.4	43.1	2.8	75.2	8.7	150.3	4.1	1402
SE d	0.4	0.1	0.3	0.2	0.6	0.3	0.6	0.1	14.2
CD (5%)	1.2	0.6	1.0	0.6	1.8	0.9	1.9	0.2	42.5

LAM

The results revealed that foliar sprayings were given, when the soil moisture is depleted to 50% available soil moisture. Of all the treatments tested, Foliar application of 2% KNO_3 – 4 sprays at weekly interval (2874 kg/ha) recorded significantly superior yield followed by foliar application of Glycine Betain @ 100 ppm in single spray (2797 kg/ha) and the rest of the treatments except control and foliar application of Urea @2% - 4 sprays at weekly interval (Table 70).Seed cotton yield is associated with higher number of bolls per plant, and boll weight.

Table70.Effect of osmoprotectants on growth, seed cotton yield (kg/ha) andphysiological characters of cotton under stress conditions at LAM

Treatment	RWC(%)	CSI(%)	SLW(mg/cm2)	Bolls/plant	boll Weight(g)	SCY(kg/ha)
Control	72.34	66.87	7.99	38.07	4.54	2281
Foliar application of 2% urea – 4 sprays at weekly interval	71.51	64.27	8.14	40.33	5.16	2447
Foliar application of 2% KNO3 – 4 sprays at weekly interval	83.13	75.77	8.72	49.67	5.48	2874
Foliar application of 15 Thio urea – Single spray	70.39	66.89	8.68	43.7	4.89	2779
Foliar application of Salicylic acid @ 50 ppm – Single spray	73.3	66.93	8.61	42.58	5.13	2649
Foliar application of Glycine Betain @ 100 ppm – Single spray	83.78	76.31	8.94	52.63	5.54	2797
Foliar application of Salicylic acid @ 100 ppm – Single spray	71.83	65.56	8.18	37.33	5.16	2780
Foliar application of PPFM @1% - 3 sprays at 10 days interval	73.51	63.79	8.18	39.96	4.92	2726
SEm+	1.61	2.42	0.143	2.49	2.49	92.13
CD @ 0.05	4.89	7.37	0.435	7.58	7.58	279.5

BIO CHEM1.Screening of Cotton genotypes for abiotic stress tolerance and estimation of for seed oil

BIO CHEM1a. Screening of Cotton genotypes for drought tolerance and estimation of for seed oil, gossypol and protein (Hisar)

Hisar

The proline content and specific leaf weight (SLW) increased in most of genotypes, whereas, the relative water content (RWC) was found to decrease in rainfed condition as compared to irrigated condition (Table). The highest and lowest proline content was observed in H 1528 and H 1566 genotype, respectively, under rainfed condition. The genotypes RS 2827, RS 2818, H 1569, H 1527, H 1529 & H 1530 showed maximum increase in proline content, and genotypes RS 2827, H 1566, H 1520, H 1521, H 1567 & H 1530 for the specific leaf weight under rainfed condition as compared to irrigated control (Table 71).The results revealed that soluble protein showed significant increase under rainfed condition in most of the genotypes except H 1568 and H 1533. The photosynthetic rate was highest in H 1530 genotype followed by H 1569 and H 1567. The transpiration was recorded highest in H 1569 genotypes.

The genotypes H 1567 and H 1569 showed highest seed cotton yield under irrigated and rainfed conditions, respectively (Table 71). Cotton seed yield under irrigated condition differ significantly from rainfed condition, however, least decrease in seed cotton yield was observed in H 1564, H 1569, H 1527, H 1529, H 1530 and H 1533 genotypes. The crude oil content decreased significantly under drought condition in most of the genotypes except H 1489, H 1567 and H 1530, and gossypol content found to decrease under drought condition (Table 72).However, the genotypes, H 1567, H 1569 and H

1530 were screened for drought tolerance because of high degree indices for YSI, CHI, SLW and proline content and very less reduction in RWC and seed cotton yield under rainfed condition.

Table 71 Physiological and biochemical parameters as influenced by water stress tolerance genotypes (Biochemistry)

Genotypes	RWC (%)		SLW (mg/cm²)		Proline content (µmoles/g) of tissue		Protein (%)		Seed cotton yield (kg/ha)	
	IR (A)	RF(A)	IR (A)	RF(A)	IR (A)	RF(A)	IR (A)	RF(A)	IR (A)	RF(A)
RS 2827	60.5	55.2	5.4	7.5	1.3	3.0	1.7	1.8	2,435	1,629
H 1564	64.2	60.0	5.3	5.8	1.2	2.6	2.5	2.8	2,812	2,778
H 1489	55.6	55.3	5.3	6.9	1.4	3.2	2.2	2.2	3,018	2,812
RS 2818	56.0	61.2	4.6	5.6	0.4	1.8	2.2	2.3	2,435	2,263
H 1518	56.0	50.0	4.5	5.3	1.5	2.3	2.1	2.3	3,944	2,846
H 1566	56.1	55.8	4.6	7.8	1.5	1.5	2.3	2.4	3,326	2,366
H 1520	53.9	52.1	5.7	7.4	1.4	1.6	2.5	2.6	3,738	2,675
H 1521	63.6	48.2	5.5	7.3	1.7	3.1	2.4	2.6	3,189	2,743
H 1567	56.9	55.3	5.9	9.3	1.6	1.9	2.5	2.6	4,527	3,292
H 1568	55.2	53.5	6.0	6.4	1.5	2.6	2.8	2.1	3,978	3,326
H 1569	60.3	58.2	5.6	5.9	1.1	3.1	2.5	2.6	4,321	4,252
H 1527	64.2	58.6	5.7	6.1	1.1	3.2	2.2	2.4	2,965	2,881
H 1528	62.6	61.0	4.5	5.6	1.6	3.3	2.1	2.3	3,189	2,915
H 1529	61.8	53.7	5.3	6.8	1.0	2.8	2.1	2.2	3,635	3,601
H 1530	57.3	55.9	4.7	6.2	1.1	2.7	2.1	2.3	4,287	4,218
H 1533	64.2	62.2	6.0	7.1	1.2	1.9	2.5	2.5	2,641	2,572
H 1098i	56.9	55.7	5.2	6.4	1.6	2.0	2.3	2.5	3,464	3,189
Mean	59.1	56.0	5.3	6.7	1.3	2.5	2.3	2.4	3,406	2,962
CD (5%)										
A	1.025		0.13		0.071		0.04		25.363	
B	2.989		0.379		0.206		0.116		73.945	
Factor(A X B)	4.227		0.536		0.292		0.164		104.574	

Table 72. Biochemical seed quality parameters as influenced by water stress tolerance genotypes (Biochemistry)

Genotypes	Crude Oil (%)		Crude Protein (%)		Total Gossypol (%)	
	IR (A)	RF(A)	IR (A)	RF(A)	IR (A)	RF(A)
RS 2827	20.40	17.90	26.39	25.56	0.47	0.38
H 1564	17.00	15.25	25.05	24.04	0.61	0.51
H 1489	18.10	18.25	25.38	25.05	0.55	0.50
RS 2818	18.40	18.10	24.54	25.05	0.45	0.37
H 1518	20.85	17.05	26.06	24.71	0.42	0.36
H 1566	18.05	17.95	24.54	22.69	0.45	0.34
H 1520	17.75	16.30	26.56	22.69	0.42	0.31
H 1521	20.35	19.05	28.07	26.06	0.56	0.43
H 1567	20.15	20.55	23.03	27.57	0.52	0.37
H 1568	18.90	17.00	20.51	25.22	0.47	0.32
H 1569	18.35	18.05	25.05	25.05	0.41	0.21
H 1527	21.45	17.00	23.87	25.38	0.34	0.22
H 1528	21.50	19.95	27.23	27.40	0.41	0.26
H 1529	20.05	19.10	19.67	25.55	0.35	0.30
H 1530	17.75	17.90	25.05	24.38	0.48	0.38
H 1533	21.80	19.15	19.84	24.71	0.49	0.38
H 1098i	19.05	18.20	23.70	26.06	0.54	0.43
Mean	19.41	18.04	24.38	25.13	0.47	0.36
CD (5%)						
A	0.231		0.53		0.024	
B	0.674		1.544		0.07	
Factor(A X B)	0.953		2.183		NS	

Surat

Seed cotton yield was found significantly higher in genotypes GJHV-566 in rainfed and irrigated conditions (Table 73). Root/shoot ratio was differed significantly in both condition, it was found higher in G.Cot-16 and GJHV-557 under rainfed condition, while genotypes LRA-5166 and GISV-323 showed higher ratio an irrigated condition. Seed cotton yield was found significantly higher in genotypes,GJHV-566 under rainfed and irrigated conditions (Table 73). Nutrient uptakes were significantly differed in all genotypes under rainfed and irrigated conditions.

Reducing sugar was found highest in genotype LRA-5166 (9.83 mg/g of tissue) and lowest in RHC-1217 (2.80 mg/g of tissue) under rainfed and irrigated condition. Chlorophyll stability index was found significantly highest in GJHV-557, G.Cot-16 and Suraj under rainfed condition. Significantly higher oil content was observed in GISV-323 (18.95%) followed by GJHV-566 (18.50%) in rainfed condition while in irrigated condition, highest oil content was found in GJHV-566 (19.96%) and LRA-5166

(19.73%)(Table 74). Gossypol content ranges from 0.38 to 0.74% in different genotypes in both conditions. Lowest gossypol content was observed in G.Cot-16 and GISV-323 (0.38%)) in irrigated condition. Higher gossypol content was found in GISV-319 (0.74%) in irrigated condition. Highest protein content was observed in RHC-1217 (19.93%) in rainfed condition.

Table 73.Physiological parameters as influenced by genotypes

Genotypes	Seed cotton yield (kg/ha)		RWC (%)		SLW(mg/cm2)		SLA (cm2/mg)		Root/shoot ratio	
	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated
G.Cot-16	1724	2119	71.4	84.1	1.16	0.79	0.87	0.78	0.198	0.106
GJHV-557	2182	2436	71.0	84.8	1.23	0.87	0.81	0.75	0.168	0.103
RHC-1217	2348	2671	71.6	87.9	0.98	1.07	1.02	0.62	0.116	0.161
GISV-319	2149	2551	73.6	84.5	0.84	0.79	1.19	0.85	0.129	0.103
GJHV-566	2574	3070	74.9	92.0	1.01	0.77	0.99	0.87	0.144	0.146
GISV-323	1695	2544	70.7	86.5	1.11	0.79	0.9	0.83	0.126	0.211
LRA-5166	1422	1557	64.5	87.8	1.13	0.64	0.89	1.05	0.182	0.214
Suraj	1408	1790	70.6	91.4	0.98	0.73	1.02	0.91	0.146	0.159
SE d	330	72	0.3	2.9	0.012	0.05	0.01	0.013	0.011	0.006
CD (5%)	714	156	0.9	N.S.	0.036	0.15	0.031	0.039	0.035	0.019

Table74.Physiological parameters as influenced by genotypes

Genotypes	Reducing Sugar (mg/g of tissue)		Chlorophyll stability index (%)		Protein (mg/g of tissue)		Oil content (%)		Protein content (%)		Total Gossypol (%)	
	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated
G.Cot-16	7.4	6.35	87.02	82.06	3.36	4.94	18.21	18.53	17.53	19.28	0.71	0.38
GJHV-557	7.19	3.35	89.48	83.78	4.44	4.45	16.73	18.62	19.14	14.69	0.64	0.42
RHC-1217	6.42	2.8	77.84	76.05	3.63	2.93	18.12	18.88	19.93	16.85	0.51	0.65
GISV-319	8.35	2.52	79.83	80.73	3.26	3.87	14.36	17.57	18.77	18.74	0.62	0.74
GJHV-566	8.63	2.81	80.12	81.08	4.94	5.84	18.5	19.96	19.18	16.48	0.64	0.64
GISV-323	7.52	3.39	78.69	81.2	3.83	4.66	18.95	18.41	16.76	14.55	0.64	0.38
LRA-5166	9.83	6.1	76.27	83.83	5.76	5.36	18.38	19.73	14.9	15.24	0.66	0.46
Suraj	8.47	3.91	80.41	82.98	4.6	3.15	17.77	17.82	17.66	17.53	0.43	0.61
SE d	0.041	0.021	0.12	1.5	0.017	0.013	0.02	0.12	0.092	0.045	0.01	0.01
CD (5%)	0.125	0.063	0.36	4.55	0.052	0.04	0.067	0.37	0.279	0.136	0.031	0.03

Junagadh

The seed cotton yield was found significantly higher in GJHV-566 (3106 kg/ha) as compared to Yamuna Phule and Suraj respectively. The yield attributes number of bolls/sqm also found significantly highest in GJHV-557 followed by GJHV-566 as compared to Yamuna Phule . The RWC (%) was found

significantly highest in GJHV 566 as compared to Yamuna Phule (ZC). In case of SLW was found significantly highest in GJHV 566 as compared to all the three checks. The highest root length was found in Suraj (QC) whereas among all genotype shoot length was found significantly highest in GISV-323 as compared to Suraj (QC). The total dry matter production significantly highest in GJHV 557 as compared to all the checks. The root: shoot ratio was found highest in GISV-319 as compared to all the checks. LAI was found significantly highest in GJHV 566 as compared to Yamuna Phule (ZC) and Suraj (QC). In case of total chlorophyll the genotype GJHV 566 was produce highest chlorophyll content as compared to Suraj (QC). CSI was found highest in GJHV 566 and GN.Cot 22(LC) as compared to Suraj (QC) (Table 75). The highest oil % (18.9 %) was found in GISV-319. The highest proline content was found in GN.Cot.22 (LC) (Table 76). The highest protein content (20.1) was found in GISV-323 where also west one(17.9) with GJHV 566.

Table 75 .physiological parameters as influenced by genotypes

Genotype	Gossypol(mg/g of tissue)	Chlorophyll Stability Index	Total Chlorophyll mg/gm of fresh leaves	RWC(%)	SLW(mg/cm2)	Proline content µmoles/gm tissue
GISV-319	0.87	69.00	10.50	77.90	7.20	0.17
GISV-323	0.82	65.50	9.40	74.70	7.40	0.19
GJHV 557	0.83	48.50	8.50	78.40	7.70	0.21
GJHV 566	0.82	77.20	12.70	83.80	8.90	0.22
RHG-121T	0.76	66.50	10.00	69.00	7.70	0.21
Yamuna Phule(ZC)	0.83	65.70	10.90	75.80	7.80	0.20
GN.Cot.22 (LC)	0.85	77.90	11.90	81.60	7.30	0.25
Suraj (QC)	0.84	57.10	8.90	81.60	7.60	0.24
SE d	0.02	5.83	0.88	2.38	0.28	0.01
CD (5%)	0.05	17.68	2.66	7.22	0.85	0.04

Table 76 .Physiological parameters as influenced by genotypes

Genotype	Oil content (%)	Protein(mg/g of tissue)	Root/shoot ratio	Boll per sq meter	Seed cotton yield (kg/ha)
GISV-319	18.9	19.4	0.108	79.6	2517
GISV-323	18.8	20.1	0.093	76.7	2629
GJHV 557	18.7	18.2	0.073	99.9	2571
GJHV 566	18.8	17.9	0.074	98.9	3106
RHG-121T	18.7	18.3	0.068	70.9	2472
Yamuna Phule(ZC)	18.7	19.5	0.085	74.6	2171
GN.Cot.22 (LC)	18.8	18.8	0.065	88.5	2591
Suraj (QC)	18.6	19.2	0.057	91.5	2140
SE d	0.041	0.422	0.006	5.825	176.8
CD (5%)	0.125	1.28	0.017	17.67	536.32

Dharwad

In the present study, mean seed cotton yield per hectare was higher in irrigated (796 kg/ha) than in rainfed (755 kg/ha) condition but the difference was non-significant. Genotypes ARBC1651, DSC-1651 and PA810 were high yielding under both the conditions among all the genotypes and their mean yield was 1286, 1077 and 1211 kg/ha, respectively. The genotypes *viz.,* GISV-298, DB-1601 DB-1602, SCS-1061, CPD-1652, PA-810 exhibited least percent yield reduction (-26, -5, -27, -21, -15, -28%) negative values for DSI (-5.07, -1.07, -5.23, -11.87, -4.11, -2.99, -5.41) (Table 77). Based on biplot analysis of drought susceptibility index (DSI) and mean yield of genotypes, it was evident that five genotypes viz., ARBC1651, ARBH813, DSC1651, CPD1652, LAHB-1 fall in fourth quadrant with least DSI and high mean yield and therefore are said to be drought tolerant genotypes (Fig. 1).

Mean oil content was high across the irrigated condition (15%) compared to the rainfed condition (13%). The mean oil content was observed to be high in ARBC-1651 (20%) and GISV-298 (17%).Mean protein content was found to be high under irrigated conditions (21%) compared to rainfed condition (17%). High levels of mean protein content at both the conditions was observed to be 22% in PA810, ARBH-1601 and CPD-1652 followed by 21% in DSC-1651 and ARBC-1651 (Table 78). Mean gossypol content was found to be about 5 mg/g tissue in all genotypes.

Table 77.Seed cotton yield and yield-related parameters as influenced by soil moisture stress in cotton genotypes

S. No.	Genotypes	Seed Cotton Yield (kg/ha)			%Yield reduction	DSI
		Rainfed	Irrigated	Mean		
1	GISV298	627.78	496.83	562.30	-26.36	-5.07
2	DSC1651	1076.19	1079.76	1077.98	0.33	0.06
3	ARBC1651	1088.89	1483.73	1286.31	26.61	5.12
4	Suraj (LC/ZC)	1137.70	1427.38	1282.54	20.29	3.91
5	DB1601	543.65	515.08	529.37	-5.55	-1.07
6	DB1602	484.92	381.35	433.13	-27.16	-5.23
7	Suvin(LC/ZC)	90.48	55.95	73.21	-61.70	-11.87
8	SCS1061	715.08	589.29	652.18	-21.35	-4.11
9	CPD1652	834.92	722.62	778.77	-15.54	-2.99
10	ARBH813	684.92	712.70	698.81	3.90	0.75
11	Sahana (LC/ZC)	713.89	748.81	731.35	4.66	0.90
12	DLSa17 (LC/ZC)	1144.05	1323.02	1233.53	13.53	2.60
13	JLA110	969.05	1190.48	1079.76	18.60	3.58
14	PA810	1360.71	1062.30	1211.51	-28.09	-5.41
15	ARBH1601	409.13	589.68	499.40	30.62	5.89
16	LAHB-1	312.30	777.38	544.84	59.83	11.51
17	DCH 32 (LC/ZC)	649.60	390.87	520.24	-66.19	-12.74
	Mean	755.49	796.90			
		MP	**Genotype(S)**	**Interaction**		
	SEm	15.74	40.44	57.68		
	CD (5%)	282.95	116.52	166.17		

Table 78. Evaluation of seed oil, gossypol and protein content in cotton genotypes as influenced by moisture stress:

S. No.	Genotypes	Oil content (%)			Protein content (%)			Total gossypol (mg/g tissue)		
		Rainfed	Irrigated	Mean	Rainfed	Irrigated	Mean	Rainfed	Irrigated	Mean
1	GISV298	17.30	17.28	17.29	14.42	20.60	17.51	5.54	5.33	5.43
2	DSC1651	16.00	16.02	16.01	19.85	23.82	21.83	5.59	5.41	5.50
3	ARBC1651	20.10	20.45	20.27	19.82	23.17	21.49	5.52	5.34	5.43
4	Suraj (LC/ZC)	14.35	18.76	16.56	18.03	18.37	18.20	5.60	5.35	5.47
5	DB1601	13.20	13.25	13.22	18.67	20.45	19.56	5.67	5.54	5.60
6	DB1602	13.17	13.34	13.25	14.53	21.15	17.84	5.52	5.25	5.39
7	Suvin (LC/ZC)	12.00	11.55	11.78	14.43	16.57	15.50	5.80	5.38	5.59
8	SCS1061	13.25	14.98	14.11	16.82	18.22	17.52	5.31	5.54	5.42
9	CPD1652	14.75	14.44	14.60	20.80	25.17	22.98	5.32	5.45	5.38
10	ARBH813	13.60	15.45	14.52	17.07	24.13	20.60	6.08	5.68	5.88
11	Sahana (LC/ZC)	12.05	17.15	14.60	16.42	20.40	18.41	5.45	5.57	5.51
12	DLSa17 (LC/ZC)	10.50	14.55	12.52	17.62	15.43	16.53	5.24	5.66	5.45
13	JLA110	15.55	15.50	15.53	17.78	20.72	19.25	5.41	5.40	5.40
14	PA810	12.75	15.75	14.25	20.82	24.87	22.84	5.59	5.19	5.39
15	ARBH1601	11.95	14.84	13.39	23.05	22.52	22.78	5.22	5.02	5.12
16	LAHB-1	10.40	15.01	12.71	15.98	21.85	18.92	5.64	5.44	5.54
17	DCH 32 (LC/ZC)	9.25	14.87	12.06	19.48	20.98	20.23	5.50	5.38	5.44
	Mean	13.54	15.48		17.98	21.08		5.53	5.41	
		MP	Genotype(SP)	Interaction	MP	Genotype(SP)	Interaction	MP	Genotype(SP)	Interaction
	SEm	0.015	0.045	0.063	0.003	0.052	0.072	0.065	0.109	0.163
	CD (5%)	0.28	0.13	0.18	0.06	0.15	0.21	1.17	0.31	0.47

BIO CHEM1B: Screening of Cotton genotypes for salinity stress tolerance and estimation of for seed oil, gossypol and protein (Hisar)

The results revealed that boll weight, and seed cotton yield under salt stress condition were differ significantly amongst the genotypes. The genotype, H 1564 showed highest seed cotton yield followed by H 1518 and H 1569. The genotypes H 1569 had highest potassium to sodium ratio followed by H 1564, H 1520, H 1521 and H 1567. The genotype H 1564 showed highest gossypol content followed by H 1489 and H 1521. The highest crude oil and protein content were observed in the H 1567 and H 1528 genotypes, respectively. Amongst all the genotypes screened for salt drought tolerance, H 1564 and H 1569 genotypes performed best (Table 79).

Table 79. Growth characters and seed cotton yield (kg/ha) of genotypes as influenced by salinity level

Genotypes	Crude Oil (%)	Crude Protein (%)	Total Gossypol (%)	Boll wt (g)	Seed Cotton Yield (kg/ha)	K/Na
RS 2827	17.40	26.06	0.370	2.53	2172	2.32
H 1564	14.85	24.38	0.490	3.09	2858	3.11
H 1489	17.95	24.04	0.480	3.01	2629	2.45
RS 2818	17.80	24.38	0.365	2.92	2286	2.38
H 1518	16.55	24.88	0.355	3.44	2743	2.33
H 1566	17.45	21.85	0.325	3.33	2515	2.18
H 1520	15.80	22.69	0.280	3.53	2629	2.93
H 1521	18.60	24.54	0.410	3.00	2515	2.59
H 1567	20.05	26.23	0.360	3.21	2629	2.84
H 1568	16.00	24.55	0.310	3.14	1829	1.78
H 1569	17.85	24.88	0.195	2.92	2743	3.62
H 1527	17.00	24.88	0.210	2.98	2287	2.54
H 1528	19.55	26.73	0.245	2.99	1601	1.70
H 1529	18.75	24.38	0.275	2.71	2172	2.24
H 1530	17.40	23.20	0.360	3.17	2401	2.33
H 1533	18.80	24.71	0.365	3.39	2629	2.20
CD (5%)	1.838	NS	0.098	0.469	569.335	0.881
SE (m)	0.604	1.052	0.032	0.162	196.175	0.29

Evaluation of cotton genotypes for seed oil, gossypol and protein

The seeds of test entries of Br 02 trial were evaluated for crude protein, oil and total gossypol content (Table 80). The highest oil content (21.65 %) was observed in RS 2915. The highest crude protein content (25.39 %) was observed in PBH 86. The highest total gossypol content (0.65 %) was observed in ZC (F 2228) (Table 80). The entry H 1520 had lowest total gossypol (0.26 %).

Table 80. Evaluation of cotton genotypes for seed oil, gossypol and protein (bio chemistry)

Genotypes	Crude Oil (%)	Crude Protein (%)	Total Gossypol (%)
RS 2915	21.65	20.27	0.495
F 2685	18.50	22.40	0.535
HS 304	20.95	21.76	0.595
LC	18.15	21.38	0.455
CSH 1715	20.20	23.28	0.450
H 1528	18.50	24.15	0.330
PBH 56	18.35	21.18	0.390
Quality Check (CSH 3129)	18.30	23.30	0.350
RS 2920	19.40	19.86	0.455
F 2720	18.70	21.72	0.330
H 1520	17.45	22.87	0.255
CSH 1725	17.35	20.28	0.455
PBH 86	19.55	25.39	0.625
ZC (F 2228)	18.40	24.59	0.645
CD (5%)	0.457	1.16	0.035
SE (m)	0.148	0.376	0.011

Bio Chem2. Effect of PGRs on Insect Resistance in Cotton

Hisar

The effect of plant Growth Regulators (PGRs) on growth, yield and jassid population were evaluated. PGRs, α-naphthyl acetic acid (NAA) and mepiquat chloride (MC), individually, and in combination were sprayed as per the recommended dosages on two cotton genotypes viz., RS-2013 (Resistant) and Ganganagar Ageti (Susceptible). The results found that sucking pest population (3rd day after PGR spray), seed cotton yield (kg/ha) malondialdehyde (MDA), total phenolic content, tannin, flavonoid , total soluble protein and hydrogen peroxide (H_2O_2) significantly different between genotypes RS-2013 and Ganganagar Ageti, under protected and unprotected condition in all treatments.

The results further revealed that application of mepiquat chloride @ 50 ppm foliar spray at 90 DAS(S3) registered significantly the least population of Jassid (9.46/plant) , highest of MDA content (0.475 mg/g) , phenolic contents (1.062 mg/g) , flavanoids content (0.873mg/g),total gossypol content (0.925%) and total sugar content (2.81%) (Table 81, 82 &83).The results of seed cotton yield 1063kg/ha) and tannin content (0.358g/100g) significantly highest with - NAA @ 20 ppm foliar spray at 60 DAS (S_2)

Table 81. Sucking pest population before and 3rd after of PGR spray (No. of leafhopper nymphs/3 leaves) as influenced by genotypes under protected and unprotected condition with growth regulators

Treatments	M_1 - Protected		M_2 - Unprotected		M1	M2	G1	G2	F
	G_1– Leafhopper-resistant	G_2– Leafhopper - susceptible	G_1– Leafhopper-resistant	G_2– Leafhopper-susceptible					
Sucking pest population (No. of leafhopper nymphs/3 leaves) before the day of PGR Spray									
S_1– Control (No PGR foliar sprays)	10.8	11.6	11.6	11.7	13.8	13.2	13.3	13.7	13.5
S_2- NAA @ 20 ppm foliar spray at 60 DAS	10.6	11.3	11.3	11.6	13.6	12.5	13.6	12.5	13.1
S_3 – MC @ 50 ppm foliar spray at 90 DAS	9.5	9.9	10.6	11.1	13.5	11.9	12.8	12.6	12.7
S_4 – NAA @ 20 ppm foliar spray at 60 DAS followed by MC @ 50 ppm foliar spray at 90 DAS	10.0	10.0	11.4	11.5	13.0	12.2	12.2	13.0	12.6
Mean	13.4	13.6	12.6	12.3	13.5	12.5	13.0	12.9	
ANOVA	M	G	S	MxG	MxS	SxG	MxSxG		
SE(m)	0.0	0.1	0.1	0.1	0.2	0.2	0.3		
CD (5%)	0.0	0.3	0.4	NS	0.6	NS	NS		
Sucking pest population (No. of leafhopper nymphs/3 leaves) at 3 days after PGR Spray									
S_1– Control (No PGR foliar sprays)	9.8	10.0	9.9	10.6	9.9	10.3	9.9	10.3	10.1
S_2- NAA @ 20 ppm foliar spray at 60 DAS	9.4	9.6	9.9	9.9	9.5	9.9	9.7	9.8	9.7
S_3 – MC @ 50 ppm foliar spray at 90 DAS	9.3	9.4	9.5	9.6	9.4	9.6	9.4	9.5	9.5
S_4 – NAA @ 20 ppm foliar spray at 60 DAS followed by MC @ 50 ppm foliar spray at 90 DAS	9.4	9.6	9.8	9.9	9.5	9.8	9.6	9.7	9.7
Mean	9.5	9.6	9.8	10.0	9.6	9.9	9.6	9.8	
ANOVA	M	G	S	MxG	MxS	SxG	MxSxG		
SE(m)	0.1	0.1	0.1	0.1	0.1	0.1	0.2		
CD (5%)	NS	NS	0.3	NS	NS	NS	NS		

Table 82 Seed cotton yield(kg/ha) and Tannin content (g/100g) of tissue as influenced by genotypes under protected and unprotected condition with growth regulators

Treatments	M_1 - Protected		M_2 - Unprotected		M1	M2	G1	G2	F
	G_1– Leafhopper-resistant	G_2– Leafhopper-susceptible	G_1– Leafhopper-resistant	G_2– Leafhopper-susceptible					
Seed Cotton Yield (kg/ha)									
S_1– Control (No PGR foliar sprays)	908.8	943	901.3	924.5	926	913	905	934	919
S_2- NAA @ 20 ppm foliar spray at 60 DAS	1059	1090	1047	1056	1075	1052	1053	1073	1063
S_3 – MC @ 50 ppm foliar spray at 90 DAS	989.2	1002	974.2	993.1	996	984	982	998	990
S_4 – NAA @ 20 ppm foliar spray at 60 DAS followed by MC @ 50 ppm foliar spray at 90 DAS	1021	1050	1018	1030	1035	1024	1019	1040	1030
Mean	995	1021	985	1001	1008	993	990	1011	
ANOVA	M	G	S	MxG	MxS	SxG	MxSxG		
SE(m)	12.15	5.17	11.73	7.313	16.59	16.59	23.46		
CD (5%)	NS	17.8	33.66	NS	NS	NS	NS		
Tannin content (g/100g) of tissue									
S_1– Control (No PGR foliar sprays)	0.24	0.2	0.267	0.25	0.221	0.259	0.254	0.226	0.24
S_2- NAA @ 20 ppm foliar spray at 60 DAS	0.37	0.3	0.451	0.315	0.334	0.383	0.411	0.306	0.358
S_3 – MC @ 50 ppm foliar spray at 90 DAS	0.261	0.25	0.279	0.262	0.257	0.271	0.27	0.258	0.264
S_4 – NAA @ 20 ppm foliar spray at 60 DAS followed by MC @ 50 ppm foliar spray at 90 DAS	0.369	0.26	0.438	0.283	0.316	0.361	0.404	0.273	0.338
Mean	0.31	0.25	0.359	0.278	0.282	0.318	0.334	0.266	
ANOVA	M	G	S	MxG	MxS	SxG	MxSxG		
SE(m)	0.007	0	0.01	0.004	0.014	0.014	0.019		
CD (5%)	NS	0.02	0.03	NS	NS	0.042	NS		

Table 83. Total gossypol content (%) of tissueand Total sugar content (%) of tissueas influenced by genotypes under protected and unprotected condition with growth regulators.

Treatments	M_I - Protected		M_2 - Unprotected		M1	M2	G1	G2	F
	G_1– Leafhopper-resistant	G_2– Leafhopper-susceptible	G_1– Leafhopper-resistant	G_2– Leafhopper-susceptible					
Total gossypol content (%) of tissue									
S_1– Control (No PGR foliar sprays)	0.69	0.62	0.735	0.71	0.655	0.723	0.713	0.665	0.689
S_2- NAA @ 20 ppm foliar spray at 60 DAS	0.94	0.89	0.97	0.905	0.913	0.938	0.955	0.895	0.925
S_3 – MC @ 50 ppm foliar spray at 90 DAS	0.74	0.68	0.84	0.775	0.71	0.808	0.79	0.728	0.759
S_4 – NAA @ 20 ppm foliar spray at 60 DAS followed by MC @ 50 ppm foliar spray at 90 DAS	0.885	0.84	0.93	0.855	0.863	0.893	0.908	0.848	0.878
Mean	0.814	0.76	0.869	0.811	0.785	0.84	0.841	0.784	
ANOVA	M	G	S	MxG	MxS	SxG	MxSxG		
SE(m)	0.004	0.01	0.009	0.007	0.013	0.013	0.019		
CD (5%)	NS	0.03	0.029	0.042	NS	NS	NS		
Total sugar content (%) of tissue									
S_1– Control (No PGR foliar sprays)	3.03	3.11	2.92	2.95	3.07	2.93	2.98	3.03	3
S_2- NAA @ 20 ppm foliar spray at 60 DAS	1.75	2.05	1.05	1.46	1.9	1.25	1.4	1.75	1.58
S_3 – MC @ 50 ppm foliar spray at 90 DAS	2.82	2.88	2.72	2.84	2.85	2.78	2.77	2.86	2.81
S_4 – NAA @ 20 ppm foliar spray at 60 DAS followed by MC @ 50 ppm foliar spray at 90 DAS	2.52	2.65	2.47	2.49	2.58	2.48	2.49	2.57	2.53
Mean	2.53	2.67	2.29	2.43	2.6	2.36	2.41	2.55	
ANOVA	M	G	S	MxG	MxS	SxG	MxSxG		
SE(m)	0.017	0.04	0.089	0.053	0.126	0.126	0.178		
CD (5%)	NS	NS	0.273	NS	NS	NS	NS		

BIO.CHEM.3: Evaluation of Bt hybrids for biochemical basis of tolerance to sucking pests

Surat

The results on 30 DAS revealed that jassid population (No/3 leaves) was significantly differed among Bt hybrids under unprotected condition . Protein content was found in range of 2.25 to 8.75 mg/g of fresh leaf tissue under unprotected condition while phenol content was in range of 2.41 to 4.45 mg/g of fresh leaf. The highest phenol content was recorded in AJIT -199 BG-II and lower phenol content and higher reducing sugar was found in G.Cot.Hy-8 BG-II. The tannin content was found highest in ANKUR-3028 BG-II followed by AJIT-155BG-II while it was lowest in RHC-II BG-II. The flavanoid and gossypol content were significantly differed amongst Bt hybrids under unprotected condition.

The observation on 60 DAS showed that jassid population (No/3 leaves) was significantly differed among Bt hybrids under unprotected condition. The highest Jassid population was found in RHC-II BG-II (2.80/3 leaves). Protein content was found in range of 5.72 to 8.12 mg/g of fresh leaf tissue under unprotected condition while phenol content was in range of 5.18 to 8.49 mg/g of fresh leaf. The highest phenol content was recorded in AJIT -199 BG-II and lower phenol content was recorded in RHC-II BG-II. Higher reducing sugar was found in G.Cot.Hy-8 BG-II. Tannin content was found highest in AJIT -199 BG-II followed by AJIT-155BG-II. Flavanoid and Gossypol content were significantly differed among Bt hybrids under unprotected condition.

The results on 90 DAS showed that Jassid population (no/3 leaves) was significantly differed among Bt hybrids under unprotected condition. Highest Jassid population was found in RHC-II BG-II (3.51/3 leaves). Protein content was found in range of 7.33 to 8.94 mg/g of fresh leaf tissue under unprotected condition while phenol content was in range of 5.89 to 10.49 mg/g of fresh leaf. The highest phenol content was recorded in GTHH-49 BG-II followed by AJIT -155 BG-II and lower phenol content was recorded in RHC-II BG-II. Lower reducing sugar was found in AJIT -199 BG-II. Tannin content was found highest in AJIT -155 BG-II followed by BUNNY NCS-145 BG-II (Table 84). Flavanoid and Gossypol content were significantly differed among Bt hybrids under unprotected condition. Higher gossypol content was found in AJIT-199 BG-II. While it was lower in AANKUR-3028 BG-II. . Seed cotton yield (kg/ha) was significantly higher for AJIT -199 BG-II followed by AJIT -155 BG-II and JAY BT under unprotected condition.

Table 84. Jassid population (No/3 leaves), primary and secondary metabolites level of genotypes at 90 DAS

Treatments	Jassid population (No/3 leaves)TV*	Protein(mg/g of tissue)	Phenol (mg/g of tissue)	Tannin(mg/100g dry weight)	Flavanoid(mg/g of tissue)	Gossypol (%)
G.Cot.Hy-8 BG-II	1.74	8.65	6.86	13.85	7.35	0.58
G.Cot.Hy-10 BG-II	2.69	7.96	9.75	19.71	8.14	0.56
G.Cot.Hy-12 BG-II	1.89	7.36	9.90	15.89	6.81	0.62
GTHH-49 BG-II	2.57	8.58	10.90	24.23	8.18	0.37
RHC-II BG-II	3.51	7.45	5.89	29.85	6.72	0.62
ANKUR- 3028 BG-II	3.18	7.33	7.67	30.45	7.36	0.36
AJIT -155 BG-II	2.92	8.12	10.46	46.54	8.51	0.56
AJIT -199 BG-II	3.15	8.94	9.22	39.86	7.80	0.72
BUNNY NCS-145 BG-II	2.84	7.38	8.20	46.07	6.84	0.61
JAY BT	2.25	8.38	6.86	26.24	5.93	0.66
SEd	2.67	0.022	0.047	0.28	0.027	0.019
CD (5%)	0.10	0.047	0.099	0.59	0.056	0.040

TV* = transformed values

BIO.CHEM.3:Evaluation of Bt hybrids for biochemical basis of tolerance to sucking pests

Dharwad

The experiment on biochemical basis of tolerance/susceptibility of Bt hybrids were investigated at Dharwad with intra hirsutum and inter specific Bt hybrids.

The result on testing of intra hirsutum hybrids found that **a**mongst the HxH hybrids, Ajeet155, NCS-954-Raju, Jadoo, were found to be high yielding hybrids (>1100 kg/ha). Carbohydrate content was found to be high in Jadoo and MRC7351 (261, 249 mg/g tissue) at 30 DAS, Jadoo and MRC7373 (112, 94 mg/g tissue) at 60 DAS, and Rasi-Neo-RCH578 and MRC7351 (96, 88 mg/g tissue) at 90 DAS respectively. Protein content was found to be high in Ajeet-155 (186 mg/g tissue) at 30 DAS, MRC-7373 (58 mg/g) at 60 DAS, Ajeet-155 and Jadoo (123 mg/g) at 90 DAS. Jassid infestation data indicated that least incidence was observed in Ajeet155 and MRC7351 (0.07 and 0.2 nymphs/3 leaves) at 30 DAS, Ajeet155 and Drona 118-2 (3.53, 3.59 nymphs/3 leaves) at 60 DAS, and Ajeet155 and NCS954-Raju (3.40, 3.87 nymphs/3 leaves) respectively, among the HxH hybrids. Ajeet-155 exhibited least jassid infestation throughout the developmental stages and exhibited phenol (6.59, 1.11, 6.92 mg/g tissue), tannins (164, 36, 53 mg/g), flavonoids (31, 14, 35 mg/g) and gossypol content (17, 15, 17 mg/g) at 30, 60, 90 DAS respectively.

The result on interspecific hybrids revealed that amongst the HxB hybrids, Bio6188-2, DCH32 and SP904were found to be high yielding hybrids (>900 kg/ha). Carbohydrate content was found to be high in DCH32 and MRC-7918 (359, 356 mg/g tissue) at 30 DAS, Bio-6188-2, Puli, MRC-7918 (109, 108, 108 mg/g tissue) at 60 DAS, SP-904 and DCH-32 (109, 108 mg/g tissue) at 90 DAS. Protein content was found to be high in Bio-6188-2 (174 mg/g) at 30 DAS, MRC-7918 (67 mg/g) at 60 DAS, and Puli, SP-904, Bio-6188-2 (88 mg/g) at 90 DAS. Least jassid incidence was observed in SP904, Bio6188-2 (0.13, 0.20 nymphs/3 leaves) at 30 DAS, MRC7918, DCH-32-NBT, Puli (4.40, 5.67, 5.67 nymphs/3 leaves) at 60 DAS and DCH-32, MRC-7918 (4.33, 4.40 nymphs/3 leaves) at 90 DAS respectively, among HxB hybrids. All the HxB hybrids exhibited high sucking pest damage throughout the stages of plant development due to high levels of carbohydrates and protein content. The mean carbohydrate (298, 103, 91 mg/g tissue) and protein content (151, 50, 83 mg/g) in HxB hybrids was found to be high compared to mean carbohydrate (218, 78, 65 mg/g) and protein content (147, 48, 85 mg/g) in Hx H hybrids at 30, 60, 90 DAS respectively (Table 85). SP-904 exhibited least jassid infestation throughout the developmental stages of the crop.

In conclusion, Ajeet-155 among HxH and SP-904 among HxB hybrids were promising hybrids with least sucking pest infestation.

Table 85.Jassid population (No/plant) , primary and secondary metabolites level of genotypes at 90 DAS

Treatments	Jassid population		Carbohydrates	Proteins	Tannins	Polyphenols	Flavonoids	Gossypol
	Original value	Transformed value						
	No. of nymphs/ 3 leaves		(mg/gfr. wt.)					
H x H hybrids								
Ajeet 155	3.40	2.94	76.79	123.20	53.20	6.92	35.37	15.49
MRC 7351	4.80	3.45	88.73	56.00	35.33	5.59	33.13	15.46
MRC 7373	4.33	3.30	37.46	55.73	87.07	5.04	29.37	11.64
NCS 954 Raju	3.87	3.13	41.34	78.40	126.93	4.27	24.53	16.80
Jadoo	4.27	3.26	48.37	124.53	98.27	5.53	30.87	17.94
Rasi Neo RCH 578	4.47	3.34	96.19	93.87	104.00	6.74	24.93	17.29
Drona 118-2	4.67	3.41	70.98	65.07	97.73	5.74	28.37	15.81
Mean	**4.26**	**3.26**	**65.69**	**85.26**	**86.08**	**5.69**	**29.51**	**15.78**
SEM		**0.10**	0.95	3.21	7.81	0.19	1.47	0.05
CD (5%)		**0.31**	2.94	9.88	24.06	0.57	4.53	0.15
H x B hybrids								
Puli	5.20	3.57	81.64	88.27	123.73	4.85	27.50	18.12
Bio 6188-2	4.60	3.37	75.58	87.20	132.13	4.98	29.33	18.98
RCH 708 Rasi	4.53	3.36	87.40	74.67	85.87	4.57	25.73	14.74
SP 904	4.67	3.40	109.95	88.53	85.73	6.93	45.17	18.86
MRC 7918	4.40	3.31	89.34	81.07	92.93	7.94	41.40	23.51
DCH 32	4.33	3.29	107.40	84.27	69.40	4.94	21.53	15.09
DCH 32 (NBT)	4.47	3.34	108.61	80.00	71.60	4.51	34.17	15.17
Mean	**4.60**	**3.38**	**91.42**	**83.43**	**93.96**	**5.53**	**32.12**	**17.78**
SEM		**0.08**	0.72	4.11	4.89	0.21	0.77	0.07
CD (5%)		**0.25**	2.23	12.67	14.86	0.66	2.36	0.20

AICRP on COTTON

ANNUAL REPORT:2019-20

Results of Entomology Trials

Photo: M. Sabesh

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CROP PROTECTION

ENTOMOLOGY

The following experiments were conducted in the discipline of Entomology under All India Coordinated Research Project (AICRP) on Cotton, in five centers of North Zone (Faridkot, Bathinda, Hisar, Sirsa, Sriganganagar), eight centers in Central Zone (Akola, Nanded, Rahuri, Surat and Bharuch, Junagadh, Khandwa, Bhawanipatna and Banswara) and seven centers in South Zone (Lam Guntur, Nandyal, Dharwad, Raichur, Chamrajanagara, Coimbatore (TNAU) and Srivilliputhur).

Project No.	**Title of the project**	**Participating Centers**
Ent 1(a)	Screening of breeding material for resistance to insect pests (National and Zonal Trials)	All centers of North, Central & South zones
Ent 1(b)	Advanced screening of promising entries for development of repository for sucking pests	Sriganganagar, Hisar, Faridkot, Sirsa and Bathinda
Ent 2	Seasonal dynamics to develop suitable forecasting model	All centres
Ent 3	Survey for key and emerging pests in cotton in farmers fields for weekly advisory	All centres
Ent 4a	Determination of nymphal based ETL estimation of yield losses for cotton for whitefly	Sriganganagar, Hisar, Faridkot, Sirsa and Bathinda
Ent 4b	Estimation of yield loss and management of cotton pink bollworm.	All centers of South & Central zone
Ent 5	Management of thrips through biorational approaches	All centres of North Zone
Ent 6	Enhancing the efficacy of yellow sticky trap using essential oils against sucking pests of cotton	All centres of North Zone
Ent 7a	Evaluation of new Bt formulation against bollworm complex of cotton	All centres of North Zone
Ent 7b	Evaluation of new microbial formulations against bollworm complex of cotton	Central Zone : Surat, Nanded, Junagadh, Rahuri South Zone : Nandyal, Warangal, Dharwad, Raichur
Ent 8a	Validation of IPM module for cotton Pink bollworm	Sriganga Nagar
Ent 8b	Validation of IPM module for cotton insect pests	All centers of South & Central zone
Ent 9	Evaluation of an BVG Agro Safe (a product from Plant extracts) on cotton pest complex – Paid up trial by BVG Life Sciences Ltd.,	Irrigated – Junagadh, Rahuri, Khandwa Rainfed - Akola, Nanded, Surat

Ent. 1 (a): Screening of breeding material for resistance to insect pests (National & Zonal Trials)

NORTH ZONE

The results obtained from North Zone screening trials are presented in Table 1- 8. The following genotypes were identified as tolerant/ moderately tolerant to leafhopper as indicated below.

Trial No.	Moderately tolerant cultures – Leaf hopper
Br02a (NT)	H 1528, F 2720
Br06a (NT)	F 2757
Br04a (ZT)	F 2596
Br06a (ZT)	RS 2913

NT, National trials; ZT, Zonal trials

CENTRAL ZONE

The results obtained from Central Zone screening trials are presented in Table 9 – 32. The following genotypes were identified as tolerant/ moderately tolerant to leafhopper as indicated below.

Trial No.	Moderately tolerant cultures – Leaf hopper
Br02a (NT)	TSH 363, RHC 1409, GJHV 566
Br02b (NT)	NDLH 2051-3, CNDTS 283, AKH 2013-2, BGDS 1047, TSH 356, GTHV 15/36, RHC 1409, BS 7-19, NH 701, CNH 134
Br02a/b CC (NT)	CCHC 19-2, CNH 18529
Br06a (NT)	CCH 9-4, RAHC 1902, RAHC 1901
Br 03a (ZT)	TSH 367, GJHV 554
Br 04a (ZT)	RAH 1071
Br 06a (ZT)	GJHV 534
Br 03b (ZT)	NDLH – 2035-5, NDLH – 2057-1
Br 04b (ZT)	CNH 11-11
Br 06a (ZT)	AKH 1302, DSC 1851, RHC HD 1433, RAHC 1029, AKH 1301, GISV 312, RHC HD 1406

NT, National trials; ZT, Zonal trials

SOUTH ZONE

The results obtained from South Zone screening trials are presented in Tables 9 – 18, 33 – 46. The following genotypes were identified as tolerant/ moderately tolerant to leafhopper as indicated below.

Trial No.	Moderately tolerant cultures – Leafhopper
Br02a (NT)	TSH 363, RHC 1409, GJHV 566, GISV 319, GJHV 557, GISV 323
Br02b (NT)	TSH 375, ARBH 1951, RHC 1419, TVH 007, NH 703, CNH 2077, NDLH 2056-4, NDLH 2051-3, NH 701, CNH 134
Br02a/b CC (NT)	CCHC 19-2, CNH 18529
Br06a (NT)	RHC –HD 1312
Br06b (NT)	GTHV 18/19, CNH 09-45, RAHC 1902, CCH 19-5
Br 03a (ZT)	BS 4-18, GSHV 208, CPD 1701, GISV 322, GJHV – 554, RAH 1076
Br 04a (ZT)	GSHV 185, SIMA – 5, TSH 325
Br 05a (ZT)	BGDHH 697, LAHH 36, DHH 1901
Br 06a (ZT)	RHC HD 1433, DS C 1801
Br 03b (ZT)	BGDS 1033, RAH 1075, GBHV – 193, BS 6 – 18, NDLH – 2035 – 5
Br 04b (ZT)	RAH 1071, NDLH 20511, BGDS 1072, GSHV 191
Br 05b (ZT)	BGDHH 697, DHH 1952, RAHH 1951
Br 06b (ZT)	AKH 1302, DSC 1851, RAHC 1029, GISV 312, AKH 1301
Br. CC Hir (ZT)	LHCC 3, LHCC 4, 16301 DB, 16315 LB

NT, National trials; ZT, Zonal trials

Ent. 1 (b): Advanced screening of promising entries for development of repository for sucking pests (Leafhopper) (Table 47 - 49)

Zone	Centres	Leaf hopper cultures – Tolerant/ Moderately tolerant
North Zone	Bathinda, Faridkot, Hisar, Sriganganagar	F 2462, F 2596, F 2662, H 1519, HS 297, L 1534, PBH 42
Central Zone	Junagadh, Surat, Akola, Nanded and Rahuri	AKH 09-5, AKH 2006-2, GISV – 319, GISV – 267, GJHV – 497, GJHV - 516, GSV – 173, JK – 4, JK – 5, Khandwa – 2
South Zone	Dharwad and Raichur	AKH 13-51, AKH – 13-01, BGDS 1033, GISV – 272, GISV 319, GSHV 185, KC 3, RACH 1039

Ent.2: Seasonal dynamics to develop suitable forecasting model (Table 50 - 53).

Data were recorded for both sucking pests and bollworms from RS 2013, Ganganagar Ageti, HS-6, BG and BG-II respectively for North India.

Sl. No	States	Genotypes for sucking pests	Genotypes Bollworm		Centres
			Non Bt	BG-II hybrids	
1	Rajasthan	Ganganagar Ageti, RS 2013	HS6	Any popular Bt hybrid	Sriganganagar
2	Punjab	Ganganagar Ageti, RS 2013	HS6	RCH 650 BG-II	Faridkot, Bathinda
3	Haryana	Ganganagar Ageti, RS 2013	HS6	RCH-650 BG-II	Hisar

NORTH ZONE

LEAFHOPPER : In **Bathinda,** maximum population of leafhopper was observed during 33rd SW. In **Faridkot**, leafhopper infestation was found to be maximum from 30th to 31st SMW. In **Hisar,**peak of leafhoppers, was observed during 30th SMW. In **Sirsa,**leafhopper population was noticed during 22nd SMW with a peak activity during 33rd SMW. In **Sriganganagar,** leafhopper infestation was started during 24th and 25th SMW with a peak during 31st SMW.

WHITEFLY : In Bathinda, maximum population of whitefly adults was observed during 33-34thSMW. **In Faridkot,** whitefly population did not cross Economic Threshold Level (ETL) throughout the season. In **Hisar,** whitefly was at its peak during 33 SW. In **Sirsa**, population of whitefly was observed during 22nd SMW, with **peak** activity during **30th SMW**. In **Sriganganagar,** whitefly appeared during 24th and 25th SMW and reached its peak during 27th to 29th SMW.

THRIPS : In **Hisar,** thripswas at its peak during28th SMW. In **Sirsa**, thrips population was ranged from 0.00 – 31.70thrips /3 leaves with peak activity during 27th SMW. In **Sriganganagar**, thrips population started during 24thand 25th SMW with a peak activity during 27th SMW.

NATURAL ENEMIES: In **Bathinda**, population of predators varied from 0.00 to 5.00/ plant. In **Faridkot,** predator numbers per plant were maximum (4.0-4.4/plant) in the 32nd and 33rd week. In **Hisar**, population of predators varied from 0.20 to 0.73 per plant with maximum in 36 SMW.

BOLLWORMS on NBt: In Bathinda, PBW damage on green bolls and open locules was observed from 39th SMW onwards .In Faridkot fruiting body damage was recorded due to *Earias*sp from 33rd week with a peak during 38th week. PBW larval infestation was ranging from 2.0- 6.0. In Hisar bollworm infestation varied from 0.00 to 42.00% with maximum in 37 SMW. In Sirsa infestation of bollworm was observed during 36th SMW which ranged from 0.00 to to 8.16.

BOLLWORMS on Bt : In Bathinda, American and spotted bollworms were absent, infestation of Pink boll worm was observed in green bolls and open bolls after 42nd SMW till the end of the cropping season. **In Faridkot**, Bt cotton recorded nil population of all bollworms. **In Hisar,**bollworm infestation varied from 0.00 to 14.00% with maximum in 43rd SMW. **In Sirsa,** Bollworm infestation was not observed in Bt. In **Sriganagnagar**, spotted bollworms started from square formation stage and remained active at boll formation stages with a peak activity during 42nd SMW. Minimum population of Pink bollworm larvae was recorded, *Spodopteralitura*and *Helicoveraarmigera*were not observed in all varieties throughout the cropping period.

PHEROMONE TRAP CATCHES: In **Faridkot,** pheromone trap catches of *Earias* were maximum in 34 - 41st SMW.

Among the bollworms *Helicoverpaarmigera*moths trapped in least number, catches of spotted bollworm moths were started from 27th SMW and continued till crop harvest (46th SMW) with a peak catch during 42nd SMW. *Spodoptera,* moth catches were started from 25th SMW with maximum catches was reported during 27th SMW. The pink bollworm moths appeared in 29th SMW with a maximum moth catches during the 45th SMW.

Natural enemies: In Sriganaganagar natural enemies' *viz.,* spider, *Chrysoperla spp.,* Coccinellid and Syrphidfly peak activities were recorded from 27th to 43rd standard week.

Data presented for both sucking pests and bollworms from and DCH32 and BG-II for Central and South India (54-57).

S.No	States	Genotypes for sucking pests	Genotypes Bollworm		Centres
			Non BG	BG-II hybrids	
1.	Rajasthan	DCH32	DCH32	RCH-2BG-II	Banswara
2.	Gujarat	DCH32	DCH32	RCH-2BG-II	Surat (I), Junagadh, Bharuch
3.	MP	DCH32	DCH32	RCH-2 BG-II	Khandwa
4.	Maharashtra	DCH32	DCH32	Ajeet 155 BG II	Nanded, Akola, Rahuri
5.	Odisha	DCH32	DCH32	----------	Bhawanipatna
6.	Karnataka	DCH32	DCH32	Jadoo BG II Bahubali BG II	Dharwad, Raichur, Chamarajnagara
7.	AP	DCH32	DCH32	Jadoo BG II	Guntur, Nandyal
8.	Tamil Nadu	DCH32	DCH32	Jadoo BG II	Coimbatore, Srivilliputhur

CENTRAL ZONE

LEAFHOPPER : In **Banswara**infestation of leafhopper was noticed from 28th to 48th SMW with peak infestation during 34th SMW. **In Junagadh** infestation of leafhopper was observed throughout the season but it was severe from 33rd to 47th standard week. **In Surat**Leafhopper appeared throughout the crop season with peak population during 42th SMW. **In Bharuch** leafhopper appeared from 32nd to 52nd SMW and the population remained above ETL level except 32nd and 33rd SMW with a peak during 49th SMW and 52nd SMW.

In Nanded, peak incidence of Jassids was ranged from (3.00 to 10.80 jassids / 3 leaves) during 33rd to 46th SMW. **In Rahuri**the first incidence of jassids was noticed during 28 MW. The higher infestation level of 12.40 to 18.86 leaf hoppers/3 leaves was observed from 31 to 37 MWs. **In Akola** infestation of leaf hoppers was noticed from 34th SMW and continued throughout the crop season and reached its peak during 36 to 38 SMW. **In Khandwa** sucking pests population was negligible. **In Bhawanipatna** leafhopper appeared during 33rd SW and damaged the crop till the end of the cropping season with a peak during 41-42SMW.

APHIDS:In Junagadh aphid incidence was started from 37th standard week, reached its peak during 51st SW and continued up to end of the season. **In Akola,** peak incidence of aphids (16.20/plant on 3 leaves) was observed during 2nd SMW. **In Rahuri**The first incidence of aphids was noticed during 28 MW. The higher infestation level of 104.20 to 112.64 aphids/3 leaves were observed from 32 to 48 MWs. **In Surat**Aphid was observed from 30th SMW and remained throughout the season with peak population in 50th standard week. In **Bhawanipatna,** high infestation of aphid was observed from 32nd to 33rd SMW. In **Bharuch** aphid was observed initially from 37th SMW and remained throughout the season with negligible population.

WHITEFLY: In Banswara, incidence of white flies was observed from 34th to 48th SMW with peak infestation from 41st to 43rd SMW. **In Junagadh,** whitefly population occurred throughout the season, but it was below ETL. **In Rahuri,** infestation was appeared during 29th SMW and the population remained low upto 48th SMW.**In Surat,**whitefly activity noticed from 30th SMW and occurred throughout the season. In **Akola,** infestation of white fly was low to medium observed from 35thSMWand continued throughout the crop season. In **Bhawanipatna,** population of whitefly was very low throughout the cropping season.

THRIPS : In Junagadh, thrips population started on 30th SMW, and continued upto the end of the season with moderate level of infestation. **In Rahuri,**the first incidence was observed during 28 SMW and high population level of 108.62 to 118.62 thrips/3 leaves was noticed during 31 to 35 MW. In **Akola** infestation of thrips was observed at low level. In **Bhawanipatna**thrips appeared during 33rd SMW to 50th SMW with a peak during 37SMW. In **Bharuch** infestation of thrips and whitefly was remained below ETL with minimum activity during entire crop period.

NATURAL ENEMIES: In Junagadh population of *Coccinellids*,*Chrysoperla*and Spiders was noted throughout the season. **In Rahuri** the population of natural enemies *viz.*, *Coccinellids, Chrysopids, Apanteles, Anagyrus, Cryptolaemus,* syrphids and spiders varied from 0.78 to 5.64 predators/plant In **Surat**activity of natural enemies namely lady bird beetle, *Chrysoperla* and spider was observed with a total predator population ranged from 0.10 to 4.00 predators/ plant. In **Bhawanipatna** population was low due to the availability of host insects in less number. In **Bharuch** activity of lady bird beetle and Spider was recorded from 32nd to 50th SMW.

BOLLWORMS on NBt: In Banswara infestation and damage of spotted bollworm and American bollworm was observed as negligible. Pink bollworm damage was also not observed during whole cropping season. In **Junagadh** population of *Helicoverpa* and *Earias* was observed low throughout the season. Pink bollworm was observed from 41st SW and continued up to end of season, with a peak from 39thSWto 52nd SW. In **Surat**Incidence of *H. armigera*wasstarted from 36th SMW and remained up to 48th SMW with a peak observed in 44thSMW. *E. vittella*larval population was observed from 35th SMW and remained up to 44th SMW with peak activity in 40th SMW. Incidence of *S. litura* was observed during 37th to 49th SMW and the population ranged from 0.20 to 2.00 larvae/5 plants. Pink bollworm recorded during 41st standard week and continued till crop end with population ranging from 2.00 to 9.00 larvae/20 green bolls. In **Nanded**, *H. armigera* (1.00 to 4.00 larvae / 5 plants) was observed 35th to 48th MW, SBW range (1.00 to 8.00 larvae / 5 plants) was observed during 33rd to 45th MW, PBW (2.00 to 6.00 larvae / 20 green bolls) was observed during 44th to 52nd MW and *S.litura* (2.00 to 6.00 larvae / 5 plants) was observed during 33rd to 47th MW. In Bharuch, low infestation of *H. armigera, Earias*and*Spodoptera*was noticed from 42to 52nd SMW. Pink bollworm was recorded during 37th to 51st SMW with 0.25 to 1 larvae/20 green bolls. **In Akola** maximum of 0.20 larvae/5 plants was observed during 51st SMW (17-23, Dec.). In Akola population of bollworms was negligible except *P. gossypiella,* larvae of which in green bolls were observed from 46thSMW and continued at increasing trend till the end of crop season with a peak during 49SMW with 22.00 larvae/20 green bolls. In **Khandwa,** PBW larvae were recorded as 7-17 lar/20 bolls with 35-85%damage. In Bhawanipatna bollworm infestation was minimum. **In Rahuri** the number of *Helicoverpa* eggs recorded on cotton crop varied from 0.25 to 1.75 eggs/5 plants during the season. The larval population varied from 1.40 to 6.30 larvae/5 plants. The number of spotted bollworm larvae varied from 0.56 to 1.85 larvae/5 plants during 34th to 37th SMW. The number of pink bollworm larvae observed in 20 infested green bolls varied from 2.82 to 41.70 larvae. The higher incidence of 2.82 to 141.70 PBW larvae/20 infested green bolls was observed during 40 to 48 MW during the season. *S.litura* incidence of larvae was not observed in cotton field throughout the season.

BOLLWORMS on Bt : **In Junagadh** infestation of *Helicoverpa* and *Earias* was very meager and pink bollworm occurred during 41th SW and continued up to end of season, with a peak from 43rd SW to 52nd SW. **In Surat**Bt hybrid was free from larval population of *Helicoverpa*, *Earias* and *Spodoptera*, however, the pink bollworm larvae in green bolls was observed from 41st standard week till crop end with

population ranging from 2 to 6 larvae/20 green bolls**. In Bharuch** infesation of *Helicoverpa, Earias* and *Spodoptera* larvae was noticed during 46th ,48th and 38th to 49th SMW respectively. Presence of pink bollworm larvae in green bolls was observed from 48th to 51st SMW with minimum population ranging from 0.25 to 0.75 /20 green bolls. **In Nanded,** PBW was observed during 43rd to 52nd MW ranging from 1.30 to 8.30 larvae /20 green bolls and *S.litura* ranging from 0.10 to 0.95 larvae /5 plants during 40th to 50th SMW. In Khandwa PBW larvae were recorded as 3-14 larvae/20 bolls with 25-70% damage.

Pheromone trap catches: Activity ofmoths ofAmerican bollworm, *Spodoptera* and pink bollwormwere noticed throughout the crop period. Spotted bollworm moth activity was observed in 32nd to 49th SMW. The peak catches of *H. armigera* moth was recorded during 44th SMW, *E. vittella*during 40th SMW (13.50 moths/trap/week, *S. litura*moths during 42nd SMW (225.50 moths/trap/week). The peak catches of pink bollworm moth was noticed during 50th SMW (308.00 moths/trap/week).**In Baswara** minimum moth catches of *H. armigera,Earias*sp and PBW were recorded and *Spodoptera* recorded two peak catches during 35th and 41st MSW. **In Bharuch***Helicoverpa* moth catch was high on 52nd SMW (21), highest moths of *Spodoptera* (46) *Earias*(30) and*Pectinophora*(101) were during 48th , 52nd and 52nd SMW, respectively. **In Rahuri** the *Helicoverpa* moth catches varied from 1 to 14 adults/trap during 29 to 42 MW. The population of pink bollworm moth varied from 5 to 178 adults/trap during 34 to 48 MW. With a peak catch noticed during 43 to 48 MW. The catches of spotted bollworm adults varied from 2 to 15 moths/ trap during 28 to 42 MW. The *Spodoptera*adult catches varied from 8 to 70/ trap during the season but higher catch was noticed during 32 to 47 MW.

SOUTH ZONE

LEAFHOPPER

In Lam Guntur, leafhopper incidence was observed thorough out crop growth period. Population ranged from 0.6 to 22.12 per three leaveswith peak population during 39th and 49th SMW. **In Nandyal, infestation of leafhopper** was noticed throughout the cropping period and crossed ETL from 39th to 45th SMW week with a peak during 43rd MSW. In **Dharwad,**incidence of leaf hopper was noticed from 31st SMW onwards and crossed ETL at 35th SMW. **In Raichur** leafhopper population reached maximum during 46th SMW. **In Chamrajnagara,** infestation of leafhopper was moderate and observed from last week of July to last week of August. **In Coimbatore,**infestation of leafhopper was noticed during the early cropping season and continued to exist throughout the cropping season with a higher incidence from 36th to 45th SMW.In **Srivilliputhur,** leafhopper population was recorded throughout the cropping period with peak activity during 40th to 46th SMW.

WHITEFLY: **In Lam Guntur**, whitefly were peak during 3rd week of November to 2nd week of December.**In Chamrajnagara** moderated population of whiteflies was observed second week of August to December. Whitefly was below ETL throughout the season.

THRIPS: In Lam, Guntur, thrips were at peak during 1st week of September to 3rd week of September.In **Dharwad**, incidence of thrips was noticed from 31st standard week and continued to exist in severe form up to 40th standard week. **In Raichur,**population of thripswas severe during July-Sept. **In Chamrajnagara,** thrips was noticed in the early stage of the crop with maximum population during the first week of September. **In Coimbatore,** infestation of thrips population was noticed from third week of September with a peak during fourth week of November. In **Srivilliputhur**, infestation of thrips was noticed throughout the cropping period and the peak activity was noticed during in43 to 49th SMW.

APHIDS: In Lam Guntur,aphid was at peak during 3rd week of September and 1st week of December to end of January. In **Dharwad**, aphid incidence was noticed from 32st SMW to 37th standard SMW. **In Chamrajnagara,** aphid population was medium to high during the season which was observed from last week of July and attained its peak during 36th SMW. **In Coimbatore,**population of aphids during the

early cropping period was below threshold and gradual buildup was noticed with the advancement of cropping season.

MIRID BUG:In Dharwad, mirid bug incidence was noticed from 34th SMW with peak incidence coincided with peak formation of tender bolls. Incidence of flower bud maggot was noticed from 30th SMW and it never crossed ETL during the cropping season. **In Chamrajnagara,** mirid bug incidence was reported from last week of August and reached its peak during 41st standard week. Predatory population was also recorded along with pest population as they are density dependent, activity was noticed up to fortnight November month.

STEM WEEVIL:In Coimbatore, infestation of stem weevil coincided with a peak square formation stage and the population increased with the advancement of cropping season and reached its peak incidence during 44th to 48th SMW.

NATURAL ENEMIES : In **Dharwad,** population of beneficial fauna comprising Coccinellids, Chrysoperla and spiders were observed from 31st SMW till harvest. In **Raichur**, predator population was moderate. In **Chamrajnagara,** activity of predatory population was noticed from the early stage of the crop up to November. In Coimbatore population of beneficial fauna comprising Coccinellids, Spider and *Syrphids* were observed more during November and December months.

BOLLWORMS on NBt: In Lam Guntur, Severe incidence of pink bollworm was observed and no. of larvae per 20 green bolls ranged from 2 to 52 (3rd week of November to last week of January). Peak incidence (52 larvae per 20 green bolls) was observed during 2nd SMW, *Helicoverpaarmigera* and *Spodopteralitura* were at low level. **In Nandyal, t**he incidence of *Helicoverpaarmigera, Eariasinsulana and Spodopteraexigua* was negligible throughout the cropping period. Pink bollworm larvae per 20 green bolls crossed ETL from 46th std week and remained above ETL upto 2nd std week. PBW larvae per 20 green bolls were noticed during 1st std week with 68% of fruiting body damage.

In **Dharwad**, infestation of *Helicoverpa*andspotted bollwormwas moderate and noticed from 32nd to 39th SMW, and 41st SMW respectively. Infestation of PBW was noticed in both DCH 32 and RCH-2 BG II hybrids from 31st SMW to 51st SMW.In **Raichur**, *Helicoverpaarmigera* population was low during the season and peak incidence was recorded during October and decreased thereafter. Pink bollworm incidence was severe and peak incidence was recorded from October to December**. In Chamrajnagara,** population of *Eariasspp and Spodoptera*was not noticed throughout the season. Mean percentage of green boll, open boll and locule damages in green bolls and open boll locule damage were 17.05%, 37.25%, 24.85% and 43.50%, respectively.

In Coimbatore infestation of pink bollworm was noticed from third week of November and continued to exist till the end of the cropping season with peak during 49th and 50th SMW**. In Srivilliputhur**, number of spotted bollworm larvae were ranging from 0.00 to 3.00/5 plant and the peak activity was found during 40th SMW.Maximum number of***Helicoverpaarmigera*** larvae was ranged from 0.00 to 3.00/ 5 plant. The peak activity was found during 49th SW (3.00 larvae/5 plants).

BOLLWORMS on BT:. : In Lam Guntur, Incidence of *Spodopteralitura* was noticed during 38th to 43rdStdw and no. of larvae per five plants ranged from 0.1 to 0.7 during that period (3rd week of September to last week of October). No. of *Heliverpaarmigera* larvae / 5 plants reached nearly one during 40thStdw (first week of October). Peak (0.92 larvae/ 5 plants) was observed during 40thStdw (1st week of October). Severe incidence of Pink bollworm was observed and no. of larvae per 20 green bolls ranged from 2 to 48 (3rd week of October to 4th week of January). Peak incidence (48 larvae per 20 green bolls) was observed during 52nd standard week (4th week of December). **In Nandyal,** pink bollworm larvae per 20 green bolls crossed ETL from 46th std week and remained above ETL upto 2nd std

week. PBW larvae per 20 green bolls were noticed during 51st std week with 56% of fruiting body damage.

In Coimbatore, infestationof pink bollworm was noticed on Bt hybrid from third week of November(46th SMW) and continued to exist till the end of the cropping season with peak during second week of December(49th SMW).In **Srivilliputhur**, spotted bollworm was observed in Bt as 4.00 larvae/plant, *Helicoverpaarmigera* was recorded as 2.00 larvae/plant during 49th SW.

PHEROMONE TRAP CATCHES: In Lam Guntur, *Helicoverpaarmigera* moth catch never crossed ETL. Maximum moth catch of *Spodopteralitura* 68.20 moths/trap/week was recorded during 39th SMW. Heavy moth catches of PBW was recorded and the catch was ranging from 1.75 to 121.25 moths per trap/week. Peak moth catch (121.25 moths per trap/week) was recorded during 3rd SMW. **In Nandyal,** *Spodopteralitura* peak trap catches was recorded during 39th std week (30.57/trap/std week). Peak trap catches of pink bollworm was noticed during 48th std week (15.10/trap/week)

In Dharwad, peak moth trap catches of *Helicoverpaarmigera*, spotted bollworm, *Spodopteralitura*andpink bollworm *were* 8.47, 0.20 to 4.30, 0.88 to 14.90 and 0.90 to 15.45 moths /trap/night respectively. **In Chamrajnagara**,pink bollworm moths were trapped from 36th std week and maximum moths were catched during the month of October (20.30 to 25.25 moths/trap/week). In **Chamrajnagara**, catches of adult moths were very minimum.

Ent 3 : Survey for key and emerging pests in cotton in farmers fields for weekly advisory – All centres(Table 58)

North Zone

In Bathinda,a total of **203**villages were surveyed and 973 locations were visited for surveillance of insect pests of cotton in Bathinda region of Punjab starting from May to November of kharif, in which leafhopper, thrips and pink bollworm crossed ETL in 22, 33and 1 locations respectively. **In Faridkot,** 501 locations were surveyed in **176**villages in which thrips crossed ETL in 8 locations, leafhopper crossed ETL in 33 locations mainly during July. whitefly was above ETL in 19 locations during May - October.**InHisar**, during the survey, a total of 203 locations of **100**villages were surveyed from July to September, 2019. A sum of 33, 9 and 19 locations were found to cross ETL of whiteflies, leafhoppers and thrips, respectively. **InSirsa**, total **185** locations of **96** villages were surveyed, out of these 15, 4 and 6 locations were crossed ETL for **whitefly,** leafhopper and thrips respectively.**InSriganganagar,**total number of**70**villages and 263 locations were surveyed during Kharif 2019-2020 for infestation of insect pests, whitefly, leaf hopper and thrips crossed ETL in 6, 4 and 61 locations respectively.

CENTRAL ZONE

In Banswara, 141 loactions of 45 villages were surveyed in which only leaf hopper crossed ETL 61 loactions.**In Junagadh, out of 185** locations of 185 villages surveyed whitefly, leafhopper, thrips, aphids and PBW crossed ETL in 2, 39, 78, 44 and 74 locations respectively. **In Surat,** 585 locations of134 villages were surveyed in which leaf hopper, thrips, mealybugs, aphids and PBW were crossed ETL in 55, 31, 4, 55 and 11 locations respectively. **In Akola,** 249 locations of 91 villages were surveyed in which whitefly, leaf hopper, thrips, aphids and PBW crossed ETL in 28, 69, 27, 14 and 61 locations respectively. **In Nanded,** out of 700 locations of 140 villages surveyed whitefly, leaf hopper, thrips, mealybugs, aphids, *H. armigera, E. vittella* and PBW crossed ETL in 50, 110, 38, 58, 37, 10, 10 and 154 respectively.**In Rahuri,** a total number of 146 locations of 50 villages were surveyed for pest infestation in which whitefly, leafhopper, thrips, aphids and PBW crossed ETL in 12, 97, 40, 22 and 57 locations respectively. **In Bhawanipatna,** 214 locations of 44 villages were surveyed in which leafhopper, thrips, aphids, *H. armigera*, *E. vittella*and *S. litura*crossed ETL in 87, 32, 7, 5, 10 and 13 locations respectively.

SOUTH ZONE

In Lam Guntur, whitefly, leafhopper, thrips, aphids and PBW crossed ETL in 11, 19, 6, 3 and 25 locations out of 115 locations surveyed at 30 villages. **In Nandyal,** 58 locations of 23 villages were surveyed in which whitefly, leaf hopper, thrips, mealy bug and PBW crossed ETL in 21, 49, 18, 2 and 17 locations respectively.**In Dharwad,** 389 locations of 106 villages were surveyed for pest infestation in which whitefly, leafhopper, thrips, mealybug, aphids, mirid bug and PBW crossed ETL in 3, 48, 52, 2, 68, 9 and 17 locations respectively.**In Raichur,** 680 locations of 44 villages were surveyed in which leafhopper, thrips and PBW crossed ETL in 105, 174 and 244 locations respectively. **In Chamarajanagar,** out of 476 locations of 90 villages surveyed leafhopper, aphids and PBW crossed ETL in 40, 53 and 59 locations respectively.**In Coimbatore**,out of 59 locations of 22 villages surveyed leafhopper, aphids and PBW crossed ETL in 1, 1 and 3 locations respectively. **In Srivilliputtur,** 98 locations of 31 villages were surveyed for pest infestation in which leafhopper, thrips, aphids, *S. litura* and stem weevil crossed ETL in 32, 14, 42, 17 and 17 locations respectively.

Ent 4a : Determination of nymphal based ETL estimation and yield losses for cotton whitefly *Bemisiatabaci*. (Table 59)

Cultivar: ABCH 2099-BG-II Hybrid
Locations: Bathinda, Faridkot, CICR Sirsa, HAU Hisar, ARS Sriganganagar
Replications: Three

Experiment was conducted only in CICR Sirsa.

S. No	Treatment	Observation	Additional Observation		
			Nymphs to be observed	Additional Observations	Required level
1	30 or more live red eyed nymph (select & tag 30 plants)	Nymphal counts from one (uniformly fixed) leaf of middle/lower strata of 30 tagged plants	5th main stem internodes leaf of each 30 plant (randomly selected and tagged)	Observe three leaves from upper/ middle /lower strata for total number of nymphal and adults counts only from 3 plants of each plot other than the selected 30 tagged plants	Observe/counts the number of ants/3 leaves in all treatments
2	60 or more livered eyed nymph (select & tag 30 plants)				
3	120 or more livered eyed nymph (select & tag 30 plants)				
4	180 or more livered eyed nymph (select & tag 30 plants)				
7*.	Honey dew symptoms on 20 per cent of the plants	Count on plot basis			
8	Honey dew symptoms on 30 per cent of the plants				
9	Honey dew symptoms on 40 per cent of the plants				
10	Honey dew symptoms on 50 per cent of the plants				
11	6-8 adults//leaf(Treated control)				
12	Untreated control				

As sufficient population was not observed in the trial plots of Bathinda, Faridkot, Hisar and Sriganganagar, the experiment was not conducted.

Results - SIRSA

- After sowing, plots were regularly monitored (twice a week) for whitefly nymphal and adult population. Total 30 plants were observed and one leaf between 5th -7th main stem was observed for total number of red eyed nymphs on it. From each plot plants having desired level of nymphal count/leaf were fixed. Whitefly adults and Ants count was also recorded at each observation.

- In **treatment-1** (30 or more live red eyed nymph) when average population of 30 leaves was 30 nymphs or above/, treatment in the form of interventions started..

- In **treatment-2** (60 or more live red eyed nymph) when average population of 30 leaves was 60 nymphs or above, treatment in the form of interventions started.

- In **treatment-3** (120 or more live red eyed nymph) when average population of 30 leaves observed was 120 nymphs or above, treatment in the form of interventions started.

- In **treatment-4** (180 or more livered eyed nymph) when average population of 30 leaves observed was 180 nymphs or above, treatment in the form of interventions started.

  These plants were observed twice a week and whenever the level of 180 nymphs/30 leaves arrived, plot was sprayed.

- In **treatment -5**, plants were observed and whenever Honey dew symptoms on 20 per cent of the plants were observed, treatment initiated.

- In **treatment -6**, plants were observed and whenever Honey dew symptoms on 30 per cent of the plants were observed, treatment initiated.

- In **treatment -7**, plants were observed and whenever Honey dew symptoms on 40 per cent of the plants were observed, treatment initiated.

- In **treatment -8**, plants were observed and whenever Honey dew symptoms on 50 per cent of the plants were observed, treatment initiated.

  The population of nymphs and adults from upper/middle /lower canopy of the plant was also recorded.

- In **treatment -9**, adults population /3 leaves was observed and whenever the counts reached to 6-8 adults//leaf (Treated control) interventions were applied.

- All the observations were recorded with 8x magnification lens and special care was taken to determine if the nymphs are dead due to predators (i.e., shrunken, deflated, or ghost-like in appearance), parasites [i.e., golden, black, or possessing asymmetrical or insecticides (i.e., discolored or distorted in body-shape). Dead nymphs were excluded from counts.

- An untreated control was also maintained.

- The Insect growth regulators Lano 10EC (pyriproxyfen) @ 500 ml/acre was applied when desired level of nymphal number /adult number /honey dew percent observed in a particular treatment.

- In case of treatment-9, if the desired level of adult (above ETL) arrived diafenthiuron or pyriproxyfen were applied at recommended rates.

- At the end yield data was also recorded and yield loss over treated control was calculated.

The observations of nymphal counts from one leaf of upper/middle /lower strata of 30 tagged plants and adult count were recorded. In the treatment (T_1 -30 or more live red eyed nymph/30 plants) the average nymphal count/leaf on tagged plant was 0.61-2.51 and on 5th main stem leaf was 3.37-7.67 followed by 0.69-2.81 and 2.50-8.80 in treatment (T_2 -60 or more live red eyed nymph/30 plants). The whitefly adults/3leaves ranged between 4.00-11.88 and 4.11-11.22 and there is no yield reduction in treatment (T_1) and T_2. In treatment T_3 (120 or more live red eyed nymphs/30plants) and T_4 (180 or more live red eyed nymph/30plants), average nymph/ leaf was 2.13-5.02 and 3.34-6.35 , respectively. The yield reduction in these treatments as compared to control was 7.14 & 8.93% respectively. In treatment T_5-T_8 honey dew symptoms (20%, 30%, 40%, 50% honey dew symptoms) except treatment (T_5) which have 20 % honey dew symptoms, none of the treatment reached to the desired level. In the treatment (T_9 treated control) average adult population of whitefly /3leaves was 5.34 (3.67 to 13.11). The treatment (T_{10}) was an untreated controlin which the population of adult whitefly was ranged 4.67-18.33/3 leaves and yield reduction was maximum (24.38%).

In BATHINDA, FARIDKOT and HISAR : The experiment was laid out in the field but was not conducted because of there is very low whitefly population in the field during the season.

Ent 4b. Estimation of yield losses and management of cotton pink bollworm (Central and South zone) (Table 60 – 61)

Treatments	9
Hybrid	Ajeet 155 BG II(Central) and Jadoo BG II(South), (Bahubali-BGII Chamrajnagara
Replications	3
Design	RBD

Method:

- Applications of recommended insecticides at various stages of the cotton crop starting from 45-50 DAS
- An untreated control will ensure maximum PBW infestation
- PBW infestation will be recorded on 10 randomly selected and tagged plants in each of the treatment plot at weekly/ fortnightly intervals beginning from 45-50 DAS until crop maturity/ harvesting
- Damage (%) to different fruiting bodies viz., flowers and bolls will be estimated based on proportion of infested units to the total units.

S. No	Treatment details
T1	Neem based insecticide spraying at 45 DAS followed by Thiodicarb spraying at 60 DAS
T2	Neem based insecticide spraying at 45 DAS followed by Thiodicarb spraying at 60 DAS, Chloropyriphos spraying at 90 DAS
T3	Neem based insecticide spraying at 45 DAS followed by Chloropyriphossprayingat 90 DAS and Lambda-Cyhalothrin at 120 DAS
T4	Thiodicarb spraying at 60 DAS, Chloropyriphos spraying at 90 DAS
T5	Thiodicarb spraying at 60 DAS Lambda-Cyhalothrin at 120 DAS
T6	Thiodicarb spraying at 60 DAS, Chloropyriphos spraying at 90 DAS andLambda- Cyhalothrin at 120 DAS
T7	Chloropyriphos spraying at 90 DAS and Lambda-Cyhalothrin at 120 DAS
T8	Neem based insecticide spraying at 45 DAS followed by Thiodicarb spraying at60 DAS, Chloropyriphos spraying at 90 DAS and Lambda-Cyhalothrin at 120 DAS.
T9	Control

For sucking pests apply Flonicamid/ Dianoteferon, Diafenthurion based on ETL in all treatments

Results :

CENTRAL ZONE (All centres)

BANSWARA

The infestation of PBW was not recorded during whole cropping season. Therefore, the trial was not conducted.

JUNAGADH

In all the treatments the significant per cent of damage was recorded. However, significantly lower damage per cent green, open boll and locules was observed in T_2, T_3 and T_5 followed by the rest of the treatments. More or less similar trends observed in 45, 60, 90, 120 and 150 days, respectively. While in the case of yield the highest production found in the T_2 (2657 kg/ha), T_3 (2623 kg/ha) and T_5 (2579 kg/ha). Minimum per cent yield losses over control was recorded in T_2, T_3 and T_5.

SURAT

Based on the results minimum rosette flower recorded in T_6, which was statistically at par with $T_8$and T_4. Damage to green boll on boll basis showed was significantly lower damage in T_6(5.00%) and was statistically at par to with T_8 (5.56%)whereas minimum green boll damage on locule basis T_6(1.53%) which was statistically at par to with T_8 (1.94%).

Open boll damage at harvest was recorded below ETL in T_6 and T_8 (6.67 and 8.33%) and these treatments statistically at par with each other. Minimum locule damage recorded in T_6 (1.76%) which was statistically at par with T_8 (2.08%). The lowest seed cotton yield loss (0.37%) was recorded in T_6 along with maximum net profit of Rs. 72,648/ha followed by T_8 recorded second higher net profit (Rs. 69,515/ha) with 0.51 per cent yield loss due to pink bollworm.

The highest seed cotton yield was found in T6 (3004 kg/ha) which was statistically at par with T_8, T_4, T_2 and T_5 (2963 to 2675 kg/ha).

AKOLA

Minimum green boll damage, green boll loculi, open boll and open boll loculi damage was recorded in the T8 which was at par with T6 and T3. Highest seed cotton yield (16.19 Q/ha) was obtained from treatment T8 followed by T6. Lowest seed cotton yield (5.29 Q/ha) was recorded in unsprayed control. An average 57.48 per cent yield loss due to pink bollworm in cotton crop was observed.

NANDED

Maximum PBW incidence was noticed in untreated control plot, Rosette flower damage (6.47%), green boll damage (25.00%), locule damage (20.32%), open boll damage boll basis (10.80%) and locule basis (12.63%) and maximum yield loss due to PBW (64.63%). The treatment T_8 recorded lowest pink bollworm damage followed by treatment T_6.

RAHURI

The treatment T_8 spraying of achook 1500ppm 5ml/lit of water at 45 days. Thiodicarb 2gm/lit of water at 60 DAS chlorpyriphos 20EC 2.5 ml/lit of water and Lamda cyhalothrin 2gm/lit of water showing lowest pink bollworm damage.

KHANDWA

This trial was vitiated

BHAWANIPATNA

Rosette flower %:

The infestation by pink bollworm was very low during 2019-20 and there was no significant difference between the treatments.

SOUTH ZONE (All centres)

LAM GUNTUR

Treatments T8, T7, T6 and T3 were found to be superior to other treatments on the basis of % green boll damage, locule damage, open boll damage on boll basis and locule basis. Highest yield was observed in T8 (17.85 q/ha) and lowest in T9 (16.73 q/ha), no significant difference among the treatments with respect to yield. Highest yield loss was observed in treatments T9, T1 and T2.

NANDYAL

At 150 DAS lowest green boll damage was recorded in **T3** (16.0%) which was on par with T5, (17.333%) T6 (18.67%), T7,(20.0%) T8 (24.0%). Regarding open boll damage lowest open boll damage was recorded in treatment T7 (19.23%) which was on par with remaining all other treatments except T1 and T2 . Regarding locule damage lowest damage was recorded in T7 (25.86%) which was on par with treatments T6,(32.13%) Highest yield was recorded in treatment T7 (2965kg/ha) which is significantly superior over all other treatments. Regarding yield loss lowest yield loss due to PBW was recorded in treatment T7 i.e 212 kg/ha highest yield loss was recorded in control plot i.e 775 kg/ha

DHARWAD

At 150 DAS, the treatment T8 recorded lowest percent of green boll and open boll damage of 3.73 and 5.63%, respectively. Yield was highest (19.86 q/ha) and yield loss was lowest (1.30 q/ha) in the plot sprayed with the Achook 1500 ppm @ 1.0 L/ac at 45 DAS, Thiodicarb 75 WP @ 2.0 g/L at 60 DAS, Chlorpyriphos 20 EC @ 2.5 mL/L at 90 DAS and Lambda Cyhalothrin 5.0 EC @ 0.5 mL/L at 120 DAS.

RAICHUR

Per cent rosette flowers were lowest in treatment number eight followed by treatment number two. Per cent green boll damage and open boll damage was lowest in the treatment number eight which received four sprays of different insecticides at 45,60,90 and 120 days after sowing. Highest seed cotton yield of 40.58 q/ha was obtained in the treatment number eight followed by treatment number six which recorded 35.75 q/ha.

CHAMRAJANAGARA

Highest yield (20.15 q/ha) was obtained in T8 followed by T6, where minimum green boll damage (0.51%,1.83% and 4.15% at 90,120,150 DAS,respectively.) and open boll damage (5.35%) were recorded. Minimum yield loss (%) was recorded in T8 (5.56) as against 34.47 yield loss in control.

COIMBATORE

The infestation on fruiting bodies due to *P. gossypiella*was minimum in T8 (3.42%) followed by T 2 (3.42%), T4 (4.60%) and control with 7.67 percent, respectively. The minimum boll damage was recorded in Locule and open boll basis damage (17.35%) in T8, followed by T2 (17.87%), T6 (17.87 %), T4 (24.48 %), T1 (24.66%), T3 (27.46%), T5 (29.54%), and control was 36.52%, respectively. lowest yield was recorded in control (1346 kg/ha). The maximum seed cotton yield was recorded in T8 (1720 kg/ha) followed by T2 (1708 kg/ha). The maximum yield 12.77 per cent increase over standard check was recorded in T8.

SRIVILLIPUTHUR

Rosette flowers (%)

The percentage of rosette flowers was ranged from 1.33 to 14.00 % on 45 and 60 DAS. The treatment (T8) recorded lowest percentage of rosette flowers followed by T2 and T3 when compared to untreated check.

Green boll damage (%)

The treatment (T8) recorded lowest green boll damage followed by T2, T6 and T3 when compared to untreated check.

Locule and boll damage (%)

The locule and boll damage was ranged from 0.91 to 5.69 percent. The low percentage (0.91 %) was noticed in treatment (T8) followed by T2, T7, T3 when compared to untreated check (10.63 percent)

Yield and yield loss

The Highest seed cotton yield (17.52 q/ha) and low yield loss (6.67 percent) was found in (T8) followed by T2 and T3 when compared to untreated check (9.40 q/ha and yield loss 29.41 percent)

Experiment 5 .Management of thrips through biorational approaches (Table 62)

Treatments		Dosage/lit
T1	Sesame oil	10ml
T2	Pongamia oil	10 ml
T3	Castor oil	10ml
T4	Neem oil	5ml
T5	Neem 300 ppm	5ml
T6	Neem1500ppm	5 ml
T7	Horticultural Mineral oil	5ml
T8	Spinosad 2.5EC	0.8ml
T9	Profenophos 50 EC	3.3ml
T10	Diafenthiuron 50EC	1.6ml
T11	Control	

Cultivar: RCH773BG-II

Replications: Three

Locations: Bathinda, Faridkot, Sirsa, Hisar, Sriganganagar

Methodology: First spray after observing ETL of Thrips (10 nymphs of thrips /leaf), subsequent sprays at 15 days interval upto 80 days.

Among the eleven treatments, in general chemical insecticides were performed better in lowering the thrips numbers as compared to different oils. Based on the percentage reduction of population the order of efficacy of the treatments were

Bathinda →Pongamia oil-10ml/lit> Spinosad 2.5EC-0.8ml/lit and Diafenthiuron 50 EC-1.6 ml/lit>Profenophos 50 EC-3.3ml/lit.

Faridkot → Spinosad 2.5EC-0.8ml/lit >Profenophos 50 EC-3.3ml/lit >Diafenthiuron 50EC-1.6ml/lit.

Hisar → Neem 1500ppm-5ml/lit> Castor oil-10ml/lit> Neem 300 ppm-5ml/lit.

Sirsa →Profenophos 50 EC-10ml/lit>Spinosad 2.5EC -0.8ml/lit>Diafenthiuron 50EC-1.6ml/lit.

Sriganganagar→ Spinosad 2.5EC-0.8 ml/lit>Diafenthiuron 50EC-1.6 ml/lit > Horticultural Mineral oil-5ml/lit

No plant phytotoxicity in any of the treatment was observed. Also the effect of different treatments on natural enemies was non-significant.

Ent 6: Enhancing the efficacy of yellow sticky trap using essential oils against sucking pests of cotton (Table 63)

Treatments:

T1-Yellow StickyTrap + Basil oil

T2-YST + sandalwood oil

T3-YST+ cotton seed oil

T4- YST alone

Replications – 5 traps per treatment

Methodology: 1.5 ml of essential oil will be taken and placed in eppendorf tube and covered the tube with muslin cloth to avoid external impurities.

Yellow sticky traps will be placed in the cotton field at equidistance between the traps (20 traps/ acre). Eppendorf tube with essential oil will be placed in centre of the yellows sticky trap at both the sides.

Observations will be recorded on number of leaf hoppers, whiteflies and others including natural enemies every day at 6 days interval from 5 random selected square of YST

After observations, replace the trap with new set of yellow sticky trap with essential oil and it will be continued till the crop season ends.

Statistical analysis: Analysis will be carried out by using One way ANOVA.

Bathinda : The results revealed statistically non-significant differences among different treatment in terms of catch of Leafhoppers (Nymphs & Adults), Whitefly adults and natural enemies.

However, numerically, YST + Basil oil attracted maximum number of Leafhoppers (15.30 Leafhoppers/ square of YST) and whitefly adults (27.40 Leafhoppers/ square of YST).

FARIDKOT: As per the results, oils didn't enhance the trap catches of YST w.r.t. whitefly and leafhopper as there are non-significant differences among the treatments.

HISAR: The maximum number of whiteflies (24.03/sq. inch) were recorded in YST + sandalwood oil followed by YST + basil oil (22.74/sq. inch), which were at par. The minimum number of whiteflies (21.66/ sq. inch) were recorded in YST alone followed by YST + cotton seed (22.57/ sq. inch), with no significant differences. The maximum number of Leafhoppers (11.28/ sq. inch) were recorded in YST + basil oil followed by YST + sandalwood oil (10.83/sq. inch), although both being at par. The minimum number of Leafhoppers (10.48/ sq. inch) were recorded in YST + cotton seed oil followed by YST alone (10.68/ sq. inch), with no significant differences.

SIRSA:

There was no significant difference among the treatments. Based on the overall average, T_1 (YST+ Sandalwood oil) was recorded numerically highest population of the whitefly (27.21), leafhopper (2.96) and natural enemy (1.05) followed by T_2 (YST+ Basil oil)

SrigangaNagar: Maximum whitefly population was trapped on yellow sticky trap + basil oil(24.56) whitefly/ square inch followed by yellow sticky + sandalwood oil (22.32) whitefly/ square inch, yellow sticky trap + cottonseed oil (21.04) whitefly/ square inch and (19.48) whitefly/square inch on yellow sticky trap alone, respectively and the difference between treatment was non-significant. Same trend was noticed in Leafhopper population trapping also.

Ent 7a: Evaluation ofnew Bt formulation against bollworm complex of cotton (Table 64)

Variety: FDK124

Locations: Bathinda, Faridkot, Sirsa, Hisar, Sriganganagar

Time and No. Spray: First spray after observation of 5-10% of fruiting body damage followed by 2-3 sprays as per the infestation.

Replications - Four

S. No.	Treatments	Dosage/litre
1.	Bt-127 SC formulation	2.0 ml/l
2.	Bt-127 SC formulation	3.0 ml/l
3.	Bt-127 SC formulation	4.0 ml/l
4.	Chlorantraniliprole 18.5 SC	0.3 ml/l
5.	Untreated check	

In Bathinda,Chlorantraniliprole 18.5 SC spray @ 0.6 ml/ l was found best treatment with minimum population of 0.95 larvae/plant followed by Bt formulation @ 4.0 ml/l with 1.60 larvae/plant. Highest seed cotton yield of 17.80 q/ha was recorded in the treatment with Chlorantraniliprole 18.5 SC spray @ 0.6 ml/ L. No plant phytotoxicity of any type was observed in any of the treatment.

In Faridkot: At 7 DAS, Chlorantraniliprole 18.5 SC @ 0.3ml/l recorded minimum larval count which is at par with Bt 127 SC @ 4ml/l. At 14 DAS, all the treatments were statistically at par though numerically Chlorantraniliprole 18.5SC@0.3ml/l recorded the least number of larvae. Maximum mean percent reduction of population was recorded as 30.43 and 17.37 inChlorantraniliprole18.5 SC @ 0.3ml/l andBt 127 SC @ 4ml/l respectively.

In **Hisar :** minimum count (0.58 larva/plant) was obtained with Chlorantraniliprole which was followed by Bt-127 @ 3.0 ml/litre (0.73 larvae/plant) and Bt-127 @ 4.0 ml/litre (0.77 larva/plant). Highest seed cotton yield (30.30 q/ha) was obtained with Chlorantraniliprole followed by Bt-127 @ 4.0 ml/litre (28.17 q/ha) and Bt-127 @ 3.0 ml/litre (27.95 q/ha).Maximum mean percent reduction of population was observed in Bt-127 @ 4.0 ml/litre and Chlorantraniliprole 18.5SC@0.3ml/l.

Sirsa : Chlorantraniliprole 18.5SC@0.3ml/l recorded the minimum number of larvae of 0.79 followed by Bt-127 SC formulation at (4ml/lit) recorded lowest bollworm followed by population 1.38 at 7 DAS.Same trend was observed in the percent reduction of population and yield .

Sriganga Nagar : Minimum spotted bollworm population of 0.40 larvae/plants was recorded in treatment Chlorantraniliprole 18.5 SC @ 0.33 ml/lit with a percent reduction of damage over control was 87.88 followed by Bt-127 SC formulation@ 4.00 ml/lit of water with a population of 0.90 larvae/ plants and a percent reduction of damage of 76.09 over control. Bt-127 SC formulation @ 3.00 ml/lit recorded 0.93 larvae/ plants with a percent reduction of damage over control as 71.87. Maximum seed

cotton yield was recorded in Chlorantraniliprole 18.5 SC @ 0.33 ml/lit of water 36.37 q/ha which is on par with Bt-127 SC formulation @ 4.00 ml/lit of water with 35.07 q/ha

Ent 7b : Evaluation of new microbial formulations against bollworm complex of cotton (Table 65)

Central Zone : Surat, Nanded, Junagadh, Rahuri
South Zone : Nandyal, Warangal, Dharwad, Raichur

Treatments
Variety : Local popular non Bt variety/hybrid susceptible to bollworms

Time and No. Spray: First spray after observation of 10% of fruiting body damage followed by 3 sprays at 15 days interval.
Replications -3
Observations:

- Larval population before and 3, 7 and 14 days after each spray
- Natural enemies before and 3, 7 and 14 days after each spray
- Phytotoxicity symptoms before and 15 and 30 days after spray
- Seed cotton yield

* Brigade-B (WP formulation) sponsored by Kan –biosys, Pune
** Bt-127 SC formulation supplied by DOR, Hyderabad

S.No	Treatments
1	Bt-127 SC formulation @2.0 ml/litre
2	Bt-127 SC formulation @3.0 ml/litre
3	Bt-127 SC formulation @4.0 ml/litre
4	Brigade-B (WP formulation) @ 3 gm/litre
5	Brigade-B (WP formulation) @ 5 gm/litre
6	Brigade-B (WP formulation) @ 7 gm/litre
7	Chlorantraniliprole 18.5 SC @ 0.3 ml/litre
8	Untreated check

RESULTS
CENTRAL ZONE (Nanded, Junagadh, Rahuri, Surat)
JUNAGADH

Significantly low larval population of bollworms was recorded in Brigade-B @ 3 gm/l, Brigade-B @ 5 gm/l and Bt-127 SC @ 3.0 ml/litre. Significantly lower percent damage by bollworms to green bolls, open bolls and locule damage in Brigade-B @ 3 gm/l, Brigade-B @ 5 gm/l and Bt-127 SC @ 3.0 ml/litrethan other remaining treatments.The population of natural enemies was no significant relation with all the treatments.

SURAT

Pooled results of three sprays revealed that significantly lowest *H. armigera* larval population was recorded in chlorantraniliprole 18.5 SC @ 0.3 ml/lit. (Av. 1.59 larvae/5 plant) followed by Brigade-B WP @ 7.0 ml/lit. (Av. 1.86 larvae/5 plant). The reduction of larval population higher in chlorantraniliprole 18.5 SC @ 0.3 ml/lit. and Brigade-B WP @ 7.0 ml/lit was 57.54 and 50.32 per cent, respectively. The lowest *E. vittella* larval population was recorded in chlorantraniliprole 18.5 SC @ 0.3 ml/lit. (Av. 1.06 larvae/5 plant) and was at par statistically at par with Brigade-B WP @ 7.0 ml/lit. (Av. 1.26 larvae/5 plant) followed by Brigade-B WP @ 5.0 ml/lit. and Bt-127 SC @ 4.0 ml/lit. The reduction of larval population of above treatments was 42.97 to 59.88 per cent. Lowest PBW larval population was recorded in chlorantraniliprole 18.5 SC @ 0.3 ml/lit. and Brigade-B WP @ 7.0 ml/lit with 77.38 and 70.24 per cent, respectively. The predators (lady bird beetle, *Chrysoperla* and spiders) population recorded more or less in all microbial formulation treatment compare to control plots as results was non-significant. The lowest natural enemies' population observed in chlorantraniliprole 18.5 SC @ 0.3 ml/lit. Damage to open boll and locules at harvest by bollworms was found below ETL in chlorantraniliprole 18.5 SC @ 0.3 ml/lit. followed by Brigade-B WP @ 7.0 and 5.0 g/lit. (<10.0% damage). As far as damage to open boll and locule by pink bollworm is concerned, below ETL damage was recorded in chlorantraniliprole 18.5 SC @ 0.3 ml/lit. followed by Brigade-B WP @ 7.0 and 5.0 g/lit. and Bt 127 SC @ 4.0 ml/lit.

The open boll damage was recorded above ETL in Bt-127 SC @ 2.0 and 3.0 ml/lit. and untreated control.

The highest seed cotton yield was found in chlorantraniliprole 18.5 SC @ 0.3 ml/lit. (1502 kg/ha) and was found statistically at par to Brigade-B WP @ 7.0 g/lit. (1224 kg/ha)

NANDED

The Lady bird beetle and *Chrysopa* population decreased significantly in Chlorantraniliprole 18.5 SC @ 0.3 ml/lit. Fruiting body damage by *Helicoverpa* bollworm ranged between (10.90 to 26.10 %) in control treatment it was below ETL in all microbial formulation Bt 127 SC and Brigade-B WP and Chlorantraniliprole 18.5 SC @0.3 ml/lit. *Helicoverpaarmigera* larval count /5 plants ranged from (0.67 to 4.00) it was noticed above ETL at 70 DAS in control treatment. It was found bellow ETL in all the microbial formulations Bt 127 SC and Brigade-B WP and Chlorantraniliprole 18.5 SC. @ 0.3 ml/ltr. Square damage (12.93 %) by Pink bollworm was found bellow ETL in all the microbial formulations Bt 127 SC and Brigade-B WP and Chlorantraniliprole 18.5 SC. @ 0.3 ml/lit. PBW larval count was below ETL in all the microbial formulations Bt 127 SC and Brigade-B WP and Chlorantraniliprole 18.5 SC. @ 0.3 ml/lit. Total fruiting body damage % at different crop stages by three bollworm i.e. spotted, *H. armigera* and pink bollworm ranged between (3.43 to 33.70 %) and above ETL during all the season in control treatment. However, fruiting body damage was below ETL in all the microbial formulations Bt 127 SC and Brigade-B WP and Chlorantraniliprole 18.5 SC. @ 0.3 ml/lit.

RAHURI

The lowest population of *Helicoverpa* was observed in treatment T7 (0.20/ plant) which was followed by T3 (0.48/ plant) and T2 (0.52/plant). Similarly lowest population of pink bollworm larvae/ 20 green bolls was observed in treatment T7 (2.56) which was followed by T3 (3.85), T6 (3.89), T5 (4.10) and T2 (4.12). The highest seed cotton yield (17.65 qt. /ha) was recorded in T7 treatment followed by T3 (15.50 qt. /ha) and T6 (14.72 qt./ha).

SOUTH ZONE (Nandyal, Warangal, Dharwad, Raichur)

NANDYAL

The mean of 3, 7, 14 DAS indicated that Chlorantraniliprole 18.5 Sc @ 0.3ml has recorded lowest PBW larvae 2.56 per 20 green bolls and highest percentage reduction of PBW larvae i.e., 40.98 % was noticed in treatment T7 Chlorantraniliprole 18.5 Sc @ 0.3ml /lit. Control plot recorded highest number of natural enemies i.e., spiders and Lady bird beetles. Highest yield of 1758 kg/ha was recorded in treatment T7 Chlorantraniliprole 18.5 Sc @ 0.3ml which is superior over all other treatments.

DHARWAD

After 14 days after second spraying, there was no significance difference in the reduction of Helicoverpa larvae among the microbial treatments, but differed significantly with the insecticide sprayed. Per cent reduction of 85.00 over control was recorded in insecticide sprayed. Among the microbials sprayed, Brigade B @ 7.0 g/L recorded 75.00 per cent reduction of Helicoverpa larvae over control.

Per cent reduction of 64.38, 42.92 and 50.68 over control was recorded at 14 days after third spray in insecticide sprayed, Brigade B @ 7.0 g/L and Bt 127 Sc @ 4.0 mL/L. Similarly, Per cent reduction of 71.88, 48.05 and 46.48 over control was recorded at 14 days after fourth spray in the chlorantraniliprole 18.5 SC @ 0.3 mL/L, Brigade B @ 7.0 g/L and Bt 127 Sc @ 4.0 mL/L treatments

Yield was highest (29.10 q/ha) in the plot sprayed with the chlorantraniliprole 18.5 SC @ 0.3 mL/L, followed by Bt 127 SC @ 4.0, 3.0 , 2.0 mL/L and Brigade – B @ 7.0, 5.0 and 3 gm/Lit were superior to the check.

RAICHUR

Pinkbollworm incidence in green boll is varied between 6.65 to 8.66 per 20 bolls in the treatments 1- 6, but it was 0.33 per 20 bolls in the treatment sprayed with Chlorantriniliprole 18.5 SC. Untreated control recorded 12.48 larvae per 20 bolls at the end of fourth spray. Seed cotton yield was maximum of 38.26 q/ha in the treatment Chlorantriniliprole 18.5 SC.

WARANGAL

During the trial period low infestation *Helicoverpaarmigera*was noticed, hence the efficacy of the microbial products was not tested. None of the treatments were effective againt PBW. However minimum population of *Spodopteralitura*and maximum yield was recorded in the treatment chlorantraniliprole @ 0.3ml.

Ent 8a : Validation of IPM module for cotton Pink bollworm

Centres: Sriganganagar

1.	Timely sowing	
2.	Installation of pheromone traps at 45 DAS	5 per ha
3.	Neem based formulation	1500 ppm
4.	Release of *Trichogrammabactarae*(thrice at weekly intervals) starting 50 DAS (at least one week after S. # 3)	1.5 lakh/ ha
5.	ETL (10 % fruiting body damage or) based application of recommended insecticides	
6.	Timely termination of crop	
7.	Use of Yellow sticky traps at 30 DAS @8 per acre,	
8.	Stem application of Flonicamid 1:20 at 30, 45 & 60 DAS	
9.	For sucking pests apply Flonicamid/ Dianoteferon, Diafenthurion in recommended doses at ETL	

Restrict the use of SPs 120 DAS

Check: Farmer's practice

Observations: Sucking and bollworm pests, natural enemies population, yield & economics (Net return/ha in Rs.)

Hybrid: Popular hybrid of the region, same hybrid in IPM module and Farmer's practice.

Sriganaganagar : As sufficient population of pink bollworm was not observed at Sriganaganagar, the trial was not conducted

Ent 8b : Validation of IPM module for cotton insect pests (Table 66 – 67)

Centres: All South and Central zone centres.

1.	Timely sowing	
2.	Installation of pheromone traps at 45 DAS	5 per ha
3.	Neem based formulation	1500 ppm
4.	Release of *Trichogrammabactarae*(thrice at weekly intervals) starting 50 DAS (at least one week after S. # 3)	1.5 lakh/ ha
5.	ETL (10 % fruiting body damage or) based application of recommended insecticides	
6.	Timely termination of crop	
7.	Use of Yellow sticky traps at 30 DAS @8 per acre,	
8.	Stem application of Flonicamid 1:20 at 30, 45 & 60 DAS	
9.	For sucking pests apply Flonicamid/ Dianoteferon, Diafenthurion in recommended doses at ETL	

Restrict the use of SPs 120 DAS

Check: Farmer's practice

Observations: Sucking and bollworm pests, natural enemies population, yield & economics (Net return/ha in Rs.)

Hybrid: Popular hybrid of the region, same hybrid in IPM module and Farmer's practice.

RESULTS

CENTRAL ZONE (All centres)

BANSWARA

This trial was vitiated

JUNAGADH

The mean data showed that the per cent rosette flower (1.32%) was recorded least in IPM plot as compared to farmer's practices plot. Similar trend was also found in per cent green boll, open boll and locules damage in IPM plot, which was significantly least than the farmer's practices plot. The mean data of moth catches per trap reflects that the least (6.95 moths/trap) moths were recorded in IPM plot as compared to farmer's practices plot (50.84 moths/trap).

The data on yield was observed significantly differed in both IPM and farmers practices plots and found higher in IPM plot (3455 Kg/ha) as compared to farmer's practices plot (1870 Kg/ha) in cotton.

SURAT

The data indicated that the pink bollworm damage was found significant lower in IPM module (timely sowing, installation of Phero-sensor TM-SP Sleeve trap, neem based formulation, release of *T. bactrae*, application of recommended insecticides at ETL, termination of crop timely, use of yellow sticky traps and stem application) as compare to farmers practices (spraying of insecticides and installation of pheromone traps). The higher moth catches observed in Phero-sensor TM-SP Sleeve trap than PCI funnel trap. The mean data revealed that the significantly lower per cent damage flowers (5.84%) were recorded in IPM module as compared to farmer's practices module (12.58%). Similar trend was also found in pink bollworm larvae, per cent green boll damage on boll and locule basis, open boll and locule damage at harvest in IPM module, which was significantly lower than the farmer's practices module. The larval population of *P. gossypiella* was significantly lower in IPM module (0.75 larvae/20 green bolls) as compared to farmer's practices module (2.83 larvae/ 20 green bolls). Damage to green boll was significantly lower in IPM module (5.97%) than farmer's practices module (17.22%) and similar trend was observed with respect to green boll damage on locule basis. Damage to open boll and locule damage at harvest was lower in IPM module (4.58 and 1.56%) as against 15.42 and 5.94 per cent, respectively in farmer's practices module. Seed cotton yield was maximum in IPM module (2545 kg/ha) and was significantly superior to farmer's practices module (1934 kg/ha). The sucking pests (leafhopper, thrips, aphid and whitefly) data was recorded during 30, 45, 60 and 75 DAS and revealed that lower population was observed in IPM module compared to farmers' practices.

AKOLA

Minimum sucking pests population was recorded in IPM field than check field. Overall mean of (2.67/20 bolls) PBW larval population was recorded in IPM field where as 6.89/20 bolls was recorded in check field. Minimum green boll, locule and open boll damages were 17.22%, 5.56%, 38.33%, and 50.56%, 16.39%, 86.67% in IPM field and farmers practice respectively.

NANDED

The population of sucking pests were observed less in IPM Module as compare to farmers practice. The predominant natural enemies found were lady bird beetle and *Chrysopa* more in IPM Module.

Low incidence of flower damage (7.00%) and green boll damage (14.00%) in IPM Module as compared to 16.20% and 26.00% in farmers practice. The lowest larval count (2.30 larvae/ 20 green bolls), open boll damage (8.30%) and locule damage (7.80%) was recorded in IPM module as compared

to larval count (5.00 larvae/ 20 green bolls), open boll damage (14.30%) and locule damage (14.40%) in farmers practice.

Yield and economics:

The IPM Module was proved effective by reducing the pest incidence and more seed cotton yield of 15.52 Q/ ha with a net realization of Rs. 13396/- .

RAHURI

The population of sucking pests were observed less in IPM Module as compare to (control plot) farmers practice. The predominant natural enemies found were lady bird beetle and *chrysopa* more in IPM Module.

Low incidence of flower damage (3.97%) and green boll damage (8.00%) in IPM Module as compare to 10.36% and 15.22 % in farmers practice.

The lowest larval count (5.21 larvae / 20 green boll), Open boll damage (13.67%/ 20 bolls) and locule damage (5.85% / 20 bolls) as compared to farmers practice. It was also noticed larval count (11.71 larvae /20 green bolls), open boll damage (27.13 %) and locule damage (12.35%).

Yield and economics:

In general, the IPM Module was proved effective by reducing the pest incidence and recorded seed cotton yield of 16.92qt/ ha with a net return of Rs. 59,830/-.

KHANDWA

This trial was vitiated

BHAWANIPATNA

a) **Sucking pests:** In the module-I (IPM) the average aphids, jassids, whitefly and thrips population (14.60, 3.72, 2.50 and 5.48 nos./3leaves) was recorded lower than the module-II (Farmers practice) with a population of 25.36, 6.08, 5.46 and 8.64 nos./3 leaves.
b) **Bollworms:** Fruiting body damaged (5.10%) by bollworm complex in Module-I recorded significantly lower damage than Module-II block (16.86%).
c) **Other pest:** The module-I (IPM) recorded minimum *Spodopteralitura* population (2.04 larvae/5 plant than module-II (farmers practice) (6.08 larvae/5 plant) during the month of October.
d) **Seed cotton yield and economics:** Module-I (IPM) recorded highest seed cotton yield (25.72 q/ha) as compared to module-II (non IPM) (21.50 q/ha). The net profit was highest (Rs. 80,738/-) in IPM module as compared to Farmers practice (module-II) (Rs. 56,100/-). The cost benefit ratio was 2.39 and 1.94 in module-I (IPM) and module-II (Farmers practice), respectively.

SOUTH ZONE

LAM GUNTUR

The mean of the three observations was low in IPM (12.5 larvae/ 20 green bolls) than FM (13 larvae/ 20 green bolls). There is 10 % green boll damage at 120 DAS, in both IPM and FM but it was low in FM at 150 DAS (20%) and high in IPM (23.3%). But at 180 DAS lower incidence (73.3%) in IPM compared to FM (83.3%), similarly seasonal mean was low in IPM (35.53%) than FM (37.77%).

Seasonal mean of the open boll damage was low in IPM (26.50%) than FM (28.13%). At harvest, open boll locule damage was low in IPM (11.6%) than FM (14%). Seed cotton yield was highest in FM (18.74q/ha) than IPM (17.56q/ha).

Infestation of sucking pests (Aphids, Leaf hopper, Thrips, Whitefly) in IPM was low when compared to farmers practice. The same trend was observed in the number of bollworms and fruiting body damage. Seed cotton yield was higher in IPM module as compared to farmers practice .

NANDYAL

PBW infestation on flowers was nil in IPM module as compared to farmers practice, in which 2% rosette flower incidence was recorded. IPM module plot has recorded 1.3 larvae per 20 green bolls where as in farmers practice 3.3 larvae were noticed in 20 green bolls. IPM plot had recorded green boll damage, open boll damage and locule damage of 6.6%, 10% and 5% respectively, whereas in farmers practice green boll damage, open boll damage and locule damage was 25%, 25% and 8.4% respectively. Yield of 2375kg/ha was recorded in IPM plot where as in farmers practice it was 1875 kg/ha,

DHARWAD

Incidence of mean PBW larvae in IPM (1.79 larvae/20 green bolls) was lower than in non IPM (17.48 larvae/20 green bolls). Synchronized spray of insecticides based on the PBW male moths trapped in the PBW Phero-Sensor TM-SP-Sleeve trap @ 10 traps/ha resulted in the reduced mean green boll damage (7.23%), Open boll damage (8.75%) and mean locule damage in green bolls (8.20%) and locule damage in open bolls at harvest (9.55%) in the IPM than the Non IPM (22.44 %, 36.67%, 27.41% and 29.77%, respectively). The lower incidence of PBW in IPM contributed for higher seed cotton yield of 19.35 q / ha as compared to 14.38 q / ha with non IPM with a net return of Rs. 36,708.00 as against Rs. 14,858.00 in non IPM.

RAICHUR

All the parameters like larvae per 20 bolls, open boll damage and locule damage was lower in the IPM block as compared to check. Highest seed cotton yield of 35.25 q/ha was recorded in IPM block.

CHAMRAJ NAGARA

IPM module has recorded less rosesteflower,less number of pink bollworm larvae/20 green bolls, minimum green boll damage, locule damage in green bolls,open boll locule damage. Higher yield (17.90q/ha) was recorded in IPM module as compared to farmers practice, where in higher incidence of pink bollworm was noticed.

COIMBATORE

Results indicated that low population of insect pests in IPM module management, followed by Farmers practices. Fruiting body damage was 5.24 per cent in IPM module as compared to 5.71 per cent in Farmers practice. A meagre difference was observed in the pheromone moth catches of PBW. Three rounds of Flonicamid 50 WG 15g/ha stem application was done at 15 days interval that was reflected in the stem weevil damage reduced in IPM module 18.57 per cent while comparing farmer's practices 33.33 per cent. A similar influence was observed in seed cotton yield of 1764 kg/ha compared to 1685 kg/ha in Farmers practices. The net returns Rs. 52420/ha was more from Farmers practices Rs. 47530/ha.

SRIVILLIPUTHUR

Sucking pests and natural enemies (Leafhopper, thrips, whitefly, aphid)

The mean population of sucking pest *viz.,* leafhopper, thrips, whitefly and aphid was low in IPM practice (3.40,3.87, 1.03 and 1.57 number per 3 leaves respectively) than farmer practice (11.07,10.37,4.93 and 9.33 number per 3 leaves respectively).

Rosette flowers (%); Number of larvae in bolls, Locule damage (%)

The rosette flower incidence was minimum in IPM (7.67 per cent) practice than farmer practice (17.3 percent). Number of bollworm larvae *viz.,Earias*sp, pink bollworm larvae, *Helicoverpa* larvae and *Spodoptera* larvae was low (0.30, 0.70, 0.20 and 1.00 per 5 plant respectively) than farmer practice (0.30,1.90, 0.50 and 2.90 per 5 plant respectively). The locule damage, pink bollworm larvae per 20 bolls was also low in IPM practice (3.50 percent and 13.30 number/ 20 bolls respectively) than farmer practice (2.50 and 1.00 number/20 bolls respectively).

Yield

The highest yield of cotton was noticed in IPM practice (21.65q/ha) compared to farmer practice (17.34 q/ha).

Ent 9. Evaluation of an BVG Agro Safe (a product from Plant extracts) on cotton pest complex - Paid up trial by BVG Life Sciences Ltd., (Table 68)

Central Zone : Irrigated - Junagadh, Rahuri, Khandwa
Rainfed - Akola, Nanded, Surat
Name of the Hybrid : DCH 32 and RCH 2 BG II
No of treatments : 8
Design : FRBD
Replications : 3

Treatment Details:

First three sprays to be taken at 15 days interval and thereafter, at 20 days interval upto 135 days of sowing of Cotton.

BVG Agro Safe spray @ 3.0, 4.5 and 6.0 ml/litre of water (30, 45, 60, 85, 110, 135 days after Sowing).

Observations: Record the infestation of all the sucking pests, bollworms and their natural enemies (predators and parasitoids) before and one week after application of the product, Agro safe, which will be done at the moderate level of infestation noticed. The natural enemy population will also has to be recorded individually.

S. No.	**Insecticide Treatment**	***Dosage*** **(ml Per litre of spray fluid*)***
T1	NBt (DCH 32) - BVG Agrosafe	3.00
T2	NBt (DCH 32) - BVG Agrosafe	4.50
T3	NBt (DCH 32) - BVG Agrosafe	6.00
T4	Bt (RCH 2 BG II) – BVG Agrosafe	3.00
T5	Bt (RCH 2 BG II) – BVG Agrosafe	4.50
T6	Bt (RCH 2 BG II) – BVG Agrosafe	6.00
T7	NBt Control (Unsprayed)	-
T8	Bt control (Unsprayed)	-

RESULTS

CENTRAL ZONE (Akola, Junagadh, Khandwa, Nanded, Rahuri, Surat)

JUNAGADH

All the treatments were found the sucking pests and bollworms significantly different with each other. Significantly lower population of leafhopper, aphids, whitefly and thrips was noted in Bt sprayed with Agrosafe @ 3 ml, 4.5 ml and 6 ml. Significantly lower percent damage to green bolls, open bolls and locule damage in Bt Cotton sprayed with 4.5 ml and 6.0 ml than other remaining treatments.

The population of natural enemies was significantly higher in Bt control plot followed by BtCotton plots sprayed with 3.0 ml, 4.5 ml, Non Bt Cotton sprayed with 4.5 ml and Non Bt control plot.

SURAT

BVG Agrosafe @ 6ml /lit. recorded lowest population of leafhopper, thrips, aphids and whitefly and maximum pest reduction in RCH 2 BG II and DCH 32. Higher population of natural enemies was recorded in control plot which is comparable to the BVG Agro Safe (all doses).

Bollworms:

Damage to open boll was found above ETL (>10.0% damage) in BVG Agro Safe all doses and control with hybrids except the BVG Agro Safe (RCH 2 BG II) @ 6 ml/lit (6.70%). Minimum locules damage at harvest was found in BVG Agro Safe (RCH 2 BG II) @ 6 ml/lit (3.41%) followed by BVG Agro Safe (RCH 2 BG II) @ 4.5 and 3 ml/lit and was significantly superior to rest of the treatments. Damage to open boll and locule by pink bollworm is concerned, below ETL damage was recorded in BVG Agro Safe (RCH 2 BG II) @ 6 ml/lit (6.70% and 3.41%) which was statistically at par with BVG Agro Safe (DCH 32 NBt) @ 6 ml/lit (7.46% and 3.84%).

Seed cotton yield: The highest seed cotton yield was found in BVG Agro Safe @ 6 ml/lit. (1471 kg/ha) and was found statistically at par to BVG Agro Safe @ 4.5 ml/lit. (1204 kg/ha) in RCH 2 BG II followed by BVG Agro Safe @ 6 ml/lit. in DCH 32 (1029 kg/ha).

AKOLA

Maximum percent reduction of leafhopper, thrips and whitefly over NBt control (unsprayed) was recorded in Bt (RCH 2 BG II) and Non Bt (DCH 32) sprayed with BVG Agrosafe @ 6 ml/lit. There was no significant difference were observed amongst various treatments as regards the predator population (Lady bird beetle (adult and grubs), chrysopa larvae and spiders). However, maximum reduction of natural enemies was recorded in BVG Agrosafe treatments. Highest seed cotton yield (3.882 Q/ha.) was obtained from Bt (RCH 2 BG II) BVG Agrosafe @ 6.0 ml/liter treatment followed by Bt (RCH 2 BG II) BVG Agrosafe @ 4.5 ml/liter treatment (3.59 Q/ha) and Bt (RCH 2 BG II) BVG Agrosafe @ 3.0 ml/liter treatment (3.121 Q/ha).

NANDED

Lowest population of jassid (1.12 /3 leaves) was recorded in *Bt* (RCH 2 BG II) BVG Agro safe 6.00 ml/Lit. of spray fluid treated plot and (38.80 %) reduction of pest over control followed by NBt (DCH 32 BVG Agro safe 4.50 ml/Lit .of spray fluid) (1.16 Jassids /3 leaves) and (36.62 %) reduction of pest over control.

Overall mean population of thrips after fifth sprays was declined below ETL in all the treatments and control plot. The lowest thrips population (3.46 / 3 leaves) was recorded in NBt (DCH-32) – BVG Agrosafe (6 ml per lit. of spray fluid), Bt (RCH 2 BG II) - BVG Agrosafe (6 ml per lit. of spray fluid) (3.50 Thrips /3 leaves) and (41.66 to 44.80 %) reducing pest over control plots.

whitefly population at different crop stage was found below (ETL) during the season.

The lowest percent infestation by *Helicoverpaarmigera* in green boll (1.81 and 2.13 %) in NBt (DCH-32) – BVG Agrosafe (6 ml and 4.5 ml per lit.) as compare to NBt (DCH-32) Control (Unsprayed) (3.86%).

The lowest percent infestation by Pink bollworm in green boll (2.02%) in Bt (RCH 2 BG II) - BVG Agrosafe (4.50 ml per lit. of spray fluid) at par with Bt (RCH 2 BG II) - BVG Agrosafe (6 ml per lit. with 2.26% and 46.95% reduction over control.

The lowest Open boll damage at harvest (7.04%) in Bt (RCH 2 BG II) – BVG Agrosafe (6 ml per lit.) at par with Bt (RCH 2 BG II) - BVG Agrosafe (4.50 ml per lit.) it was (7.94%). The lowest locule damage at harvest was noticed (4.21%) in Bt (RCH 2 BG II) - BVG Agrosafe (6 ml per lit.) at par with Bt (RCH 2 BG II) - BVG Agrosafe (4.5 ml per lit.) (4.90%) and Bt (RCH 2 BG II) - The maximum seed cotton yield (13.82 qt./ha) was recorded in Bt (RCH 2 BG II) - BVG Agrosafe (6 ml per lit.).

RAHURI

Lowest populations of aphids (5.03 /3 leaves) was recorded in T6 in which reduction of pest over control was 71.61 %, followed by T5 (5.72 Aphids /3 leaves) and 67.71 % reduction of pest over control. The lowest populations of jassid (3.54/ 3 leaves) was recorded in T6 in which 34.40 % reduction of pest over control was recorded, which was followed by T5 (3.68 Jassids /3 leaves) and 31.85% reduction of pest over control was observed. The treatment T3 was found to be the next best treatment. Lowest thrips population (1.22/ 3 leaves) was recorded in T5, followed by T4 (1.25 Thrips /3 leaves) and T3 (1.26 Thrips /3 leaves). Lowest whitefly population was recorded in T6 (1.07 white flies / 3 leaves) and followed by T5 (1.21 white flies / 3 leaves). The lady bird beetles (LBB) population was ranged from (0.79 to 1.37 LBB / plant). Significantly maximum population of (1.37 LBB / plant) was observed in untreated plots T7.

The lowest percent infestation by pink bollworm in green boll (11.95 %) was recorded in T6 (Table 8) which was followed by T5 (12.21 %)e. Similarly the lowest Open boll damage (Table 9) (31.29 %) in T6 which was followed by T3 (36.50 %). The lowest locule damage at harvest was noticed in T6 (14.50 %) followed by T5 (17.48 %). The maximum seed cotton yield (3.34 qt./ha) was recorded in T6.

KHANDWA

This trial was vitiated

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Table 1. Ent1a. Br02a (IET) : Preliminary screening of breeding material for resistance to insect pests of cotton (Sucking pests) at North Zone during 2019-20

Entry Code	Name of Entry	Jassid Injury Grade					No. of Jassid / 3 leaves					Whitefly / 3 leaves					Thrips / 3 leaves				
		BT	FA	HI	SR	SG	BT	FA	HI	SR	SG	BT	FA	HI	SR	SG	BT	FA	HI	SR	SG
101	RS 2915	I	III	II	I	I	1.80	3.17	6.50	1.42	0.43	2.10	12.83	30.50	16.75	5.77	11.90	4.00	14.80	20.75	12.43
102	F 2685	I	III	II	I	I	2.10	2.67	6.70	1.83	0.77	3.50	9.00	31.50	15.67	4.57	18.90	6.67	17.80	25.42	10.90
103	HS 304	I	III	II	I	II	2.80	2.83	7.80	2.33	1.37	4.00	6.33	30.10	15.83	4.90	20.90	5.33	20.90	20.50	13.37
104	**Local Check**	I	III	III	I	I	1.60	4.00	5.70	2.33	0.53	3.30	6.33	32.70	15.08	6.27	21.00	5.33	18.30	22.17	14.87
105	CSH 1715	I	IV	III	I	I	3.10	2.67	6.90	2.67	0.97	2.70	9.17	34.40	18.00	3.67	17.90	5.33	21.20	21.92	14.87
106	H 1528	I	II	II	I	I	2.10	2.50	7.10	1.58	0.37	3.10	10.50	33.70	17.50	2.83	19.60	5.17	23.10	25.85	6.77
107	PBH 56	I	III	III	I	I	2.70	3.67	6.70	2.92	0.83	2.20	10.17	33.80	15.75	4.47	15.80	3.83	17.30	21.42	9.37
108	**QC (CSH 3129)**	I	III	III	I	I	2.60	3.17	8.00	2.42	0.77	3.10	14.33	34.50	14.67	4.60	16.60	5.00	21.80	25.50	12.60
109	RS 2920	I	III	III	I	I	2.70	4.50	8.60	2.00	0.97	3.30	13.33	28.10	16.92	5.97	14.70	6.17	23.30	20.33	12.53
110	F 2720	I	II	II	I	I	2.90	3.17	6.70	2.58	0.87	2.20	9.67	28.40	15.75	7.23	16.50	7.33	18.90	27.67	13.07
111	H 1520	I	III	III	I	II	2.00	2.67	7.00	1.58	1.10	3.30	8.50	30.20	14.67	4.97	22.10	6.00	24.60	20.50	12.37
112	CSH 1725	I	III	II	I	I	2.60	2.83	9.50	2.50	0.97	4.30	8.17	30.60	16.58	5.13	16.00	5.83	24.00	15.92	11.70
113	PBH 86	I	III	II	I	II	2.80	3.17	8.20	2.25	1.30	4.00	6.33	28.10	21.42	5.43	17.60	6.00	26.00	20.50	12.67
114	**Zonal Check (F 2228)**	I	III	II	I	I	2.90	3.50	6.10	2.25	0.93	3.10	8.67	32.10	16.50	5.03	18.60	9.67	22.70	24.00	10.07
	HS 6	I	II		I		2.40	2.50		2.42		3.40	4.33		21.42		18.50	8.67		19.58	
	MRC 7017 Bt	I	III	II		II	2.60	3.67	9.80		1.00	3.60	5.17	32.00		4.50	14.90	7.67	26.10		13.00
	7017 NBt	I	III	II	I	II	2.00	3.50	7.80	2.00	1.23	3.30	3.83	28.40	13.42	5.57	11.70	6.67	21.20	20.25	11.67
	RS2013	I	II	II	I	I	2.30	4.50	6.30	2.58	0.77	2.70	10.50	28.40	22.58	4.77	19.20	4.33	19.50	26.25	11.57
	GA		IV	III	I	II		3.00	6.90	2.25	1.30		3.67	32.60	19.75	7.97		3.17	22.50	23.08	11.13

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

JIG - Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves)

Contd…

Table 1.1. Ent1a.Br02a (IET) : Preliminary screening of breeding material for resistance to insect pests (Boll damage) of cotton at North Zone during 2019-20

Entry Code	Name of Entry	Natural Enemies/ Plant			Green boll damage (%)				Open boll damage (%)					Open boll locule damage (%)					GOB (No./ Pl)
					SBW			PBW	SBW				PBW	SBW			PBW		
		FA	SR	SG	FA	HI**	SR	SG	BT	FA	HI**	SR	SG	BT	FA	SR	HI	SG	FA
101	RS 2915	6.17	1.39	1.83	5.28	7.50	9.83	7.50	25.00	11.10	8.04	3.84	10.00	12.26	5.48	1.92	2.13	3.94	124.00
102	F 2685	7.17	1.56	2.17	2.29	10.00	4.40	5.00	30.00	8.30	25.92	3.96	7.50	15.56	3.69	2.10	2.27	2.90	109.50
103	HS 304	8.00	1.58	2.00	5.69	5.00	12.22	5.00	11.67	12.60	18.30	5.97	2.50	16.90	6.32	2.47	2.31	0.92	181.00
104	**Local Check**	7.67	1.75	2.17	0.50	7.50	5.43	2.50	20.00	7.00	25.20	5.51	2.50	10.98	3.11	2.07	1.96	0.86	183.50
105	CSH 1715	5.33	1.36	1.67	0.00	2.50	5.40	7.50	16.67	8.70	22.27	1.63	5.00	12.21	4.08	1.33	1.04	1.88	113.00
106	H 1528	10.50	1.58	2.17	2.08	5.00	5.72	3.75	23.33	6.00	15.94	6.92	2.50	14.46	3.11	3.79	1.39	0.90	149.50
107	PBH 56	8.50	1.56	1.83	1.85	5.00	6.50	10.00	16.67	8.40	15.26	5.39	7.50	8.55	3.93	2.13	1.24	2.32	162.00
108	**QC (CSH 3129)**	6.00	1.69	2.00	2.00	15.00	7.67	5.00	20.00	18.20	17.68	6.82	5.00	14.73	9.12	2.71	2.10	2.43	141.50
109	RS 2920	7.33	1.78	2.00	0.34	7.50	7.62	3.75	30.00	9.20	13.75	5.10	5.00	16.90	4.85	2.34	2.32	2.19	195.00
110	F 2720	11.33	1.75	1.33	0.69	7.50	3.32	20.00	16.67	13.40	15.22	1.96	22.50	7.69	6.81	2.66	1.71	8.31	173.00
111	H 1520	7.83	1.28	1.67	1.04	5.00	6.49	7.50	13.33	9.60	15.97	6.34	10.00	17.46	3.60	1.94	1.99	3.26	171.50
112	CSH 1725	5.17	1.64	2.33	2.24	10.00	2.57	15.00	23.33	11.80	13.58	3.76	12.50	12.21	5.88	1.59	2.34	4.27	167.50
113	PBH 86	4.67	1.75	1.83	0.00	2.50	3.35	2.50	23.33	2.60	12.40	4.48	2.50	15.00	1.15	1.30	1.63	0.84	204.00
114	**ZC (F 2228)**	13.17	1.67	1.33	0.66	7.50	2.29	22.50	20.00	13.20	19.03	5.17	25.00	14.81	6.44	1.37	1.98	9.19	171.50
	HS 6	8.67	1.61		3.04		9.81		33.33	16.50		12.02		14.04	8.23	9.63			168.50
	MRC 7017 Bt	8.00		1.83	0.00	17.50		3.75	13.33	0.60	14.95		5.00	10.57	0.31		2.88	1.84	163.50
	7017 NBt	8.33	1.81	2.50	2.43	30.00	3.79	5.00	10.00	18.60	20.18	7.15	7.50	22.22	9.49	2.04	0.91	3.01	123.50
	RS2013	8.17	1.50	2.33	0.40	40.00	14.98	2.50	23.33	14.50	14.13	6.90	2.50	8.33	7.58	3.41	3.82	0.92	165.50
	GA	5.33	1.42	1.50	0.35	42.50	16.59	12.50		6.80	20.35	9.98	7.50		3.69	4.65	2.89	2.55	109.00

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar; ** - *Earias*spp&*P.gossypiella*
GOB – Good Open Bolls

Table 2. Ent1a. Br 06a (IET): Preliminary screening of breeding material for their reaction to key pests (Sucking pests) of cotton at North Zone during 2019-20

Entry code	Name of Entry	Jassid Injury Grade				No. of Jassid / 3 leaves				Whitefly / 3 leaves				Thrips / 3 leaves			
		BT	FA	HI	SG	BT	FA	HI	SG	BT	FA	HI	SG	BT	FA	HI	SG
121	F 2560	I	III	II	II	1.80	12.50	6.40	1.13	3.40	12.83	23.70	4.73	14.80	19.50	22.40	10.57
122	**Local Check**	I	II	II	II	2.10	10.50	6.60	1.50	5.00	7.83	29.30	4.77	17.30	13.67	21.00	12.00
123	PBH 78	II	III	II	II	2.30	13.83	8.50	1.14	3.70	11.17	24.90	5.50	15.90	17.17	23.30	11.27
124	RS 2928	I	III	II	II	2.90	14.67	8.10	0.93	4.60	15.83	22.30	4.77	12.60	18.50	20.70	11.80
125	**Zonal Check (CSH 3075)**	I	III	II	II	2.50	13.17	6.90	0.77	3.30	18.50	22.20	5.13	16.10	20.17	22.20	11.03
126	CSH 100	I	III	II	II	2.30	13.67	6.30	1.10	4.30	13.17	22.20	4.40	14.10	19.33	21.20	9.57
127	F 2757	I	II	II	II	1.90	11.67	7.10	0.70	3.70	14.67	22.50	3.50	14.60	17.00	20.80	11.73
128	RS 2921	I	III	II	II	2.40	15.50	6.40	0.93	4.40	19.67	22.80	5.03	17.30	17.83	18.70	10.60
129	H 1563	I	III	II	II	1.80	10.50	6.30	0.97	4.40	16.50	26.20	3.93	14.50	19.67	21.00	11.73
	MRC-7017 NBt			II	II			7.80	0.77			28.40	4.07			21.20	9.17
	MRC-7017 Bt			II	II			9.80	0.83			32.00	4.97			26.10	11.87
	GA			III	II			6.90	0.87			32.60	4.00			22.50	11.33
	RS 2013			II				6.30				28.40				19.50	

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

JIG - Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves)

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Table 2.1. Ent1a. Br 06a (IET): Preliminary screening of breeding material for their reaction to key pests (Boll damage) of cotton at North Zone during 2019-20

	Natural Enemies/Plant	Green boll damage (%)			Open boll damage (%)				Open boll locule damage (%)			Good open bolls (No./ Plant)
		SBW		PBW	SBW			PBW	SBW	PBW		
Name of Entry	**SG**	**FA**	**HI****	**SG**	**BT**	**FA**	**HI****	**SG**	**FA**	**HI**	**SG**	**FA**
F 2560	1.00	0.00	10.00	0.00	13.33	6.54	16.15	0.00	2.91	2.66	0.00	71.50
Local Check	1.67	3.76	5.00	7.50	21.67	5.80	19.71	5.00	2.60	2.70	1.88	79.00
PBH 78	1.33	0.76	2.50	15.00	16.67	2.35	12.01	12.50	0.95	3.88	4.45	85.00
RS 2928	1.17	1.19	2.50	5.00	20.00	13.52	18.75	5.00	6.26	2.35	2.19	70.00
Zonal Check (CSH 3075)	2.17	0.00	5.00	20.00	23.33	6.23	21.04	17.50	3.27	4.99	6.18	92.00
CSH 100	1.83	2.07	10.00	7.50	26.67	17.40	22.79	5.00	8.47	1.89	2.15	82.00
F 2757	2.17	1.06	2.50	5.00	28.33	1.76	17.27	5.00	1.22	2.55	1.97	85.50
RS 2921	1.83	2.43	5.00	10.00	16.67	9.51	34.09	7.50	4.29	2.25	2.93	86.00
H 1563	1.83	0.00	5.00	3.75	23.33	5.09	17.50	2.50	2.64	1.86	0.77	107.50
MRC-7017 NBt	1.83		30.00	12.50			20.18	10.00		3.82	3.48	
MRC-7017 Bt	1.67		17.50	10.00			14.95	7.50		0.91	2.89	
GA	1.67		42.50	3.75			20.35	2.50		2.88	0.96	
RS 2013			40.00				14.13			2.89		

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;
** - *Earias*spp&*P.gossypiella*

Table 3. Ent1a. Br 22a/b (IET) : Preliminary screening of breeding material for their reaction to key pests (Sucking pests) of cotton at North Zone during 2019-20

Entry code	Name of Entry	JIG		No. of Jassid / 3 leaves					Whitefly / 3 leaves					Thrips / 3 leaves				Natural Enemies / Plant		
		SR	SG	BT	FA	HI	SR	SG	BT	FA	HI	SR	SG	BT	HI	SR	SG	FA	SR	SG
131	PBD 88	I	I	2.20	1.50	4.10	0.84	0.40	2.40	3.67	15.80	8.75	6.45	7.40	4.90	14.42	4.70	2.67	0.33	0.75
132	CISA 17	I	I	2.80	1.50	4.10	1.00	0.70	2.40	5.33	20.40	8.67	5.50	7.80	8.50	15.17	2.65	3.17	0.28	1.25
133	**Local Check**	I	I	2.60	2.83	3.50	1.17	0.15	4.20	3.00	25.60	9.42	7.75	5.20	8.40	13.92	4.35	2.17	0.33	1.00
134	FDK 298	I	I	3.40	1.50	4.00	0.92	0.40	3.00	2.67	26.10	8.58	10.60	7.00	13.10	11.92	4.30	1.83	0.14	1.25
135	RG 870	I	I	2.40	2.33	3.90	0.92	0.40	4.00	3.33	29.70	10.67	9.85	5.80	14.90	14.42	4.45	1.83	0.06	1.00
136	HD 535	I	I	3.20	2.33	2.80	0.42	0.55	6.00	3.00	28.40	14.75	7.05	7.60	15.80	15.00	2.25	2.50	0.22	0.75
137	CISA 41-1	I	I	3.20	2.00	3.80	0.75	0.25	5.20	4.17	31.50	15.33	6.30	2.20	15.60	15.17	3.25	2.50	0.28	1.25
138	**Zonal Check (FDK 124)**	I	I	3.20	1.83	3.10	1.08	0.20	4.80	3.67	31.30	11.75	11.15	2.20	15.00	15.00	3.85	3.17	0.25	1.25
139	FDK 304	I	I	3.20	2.50	4.20	1.00	0.40	1.20	3.67	30.10	13.58	11.40	4.40	14.20	16.08	3.25	3.83	0.25	1.25
140	PBD 92	I	I	3.40	1.83	4.70	1.00	0.30	4.60	3.83	31.90	13.17	15.25	4.60	15.50	15.00	2.15	4.17	0.19	1.25
141	RG 868	I	I	2.20	1.50	4.10	0.83	0.15	4.00	3.50	30.50	12.00	5.65	3.20	14.60	18.33	2.05	2.00	0.25	1.25
142	HD 544	I	I	2.40	1.83	6.58	0.83	0.25	2.20	5.17	32.83	13.17	11.95	7.20	13.60	15.17	3.35	2.50	0.25	1.50
	FDK124				2.17					3.33								1.83		
	LD1019				3.00					2.17								2.67		
	CISA 310	I					1.33					16.25				15.42			0.39	
	CISA 614	I					0.83					13.58				15.25			0.39	

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

JIG - Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves)

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Table 3.1. Ent1a. Br 22a/b (IET) : Preliminary screening of breeding material for their reaction to key pests (Boll damage) of cotton at North Zone during 2019-20

Entry code	Name of Entry	Green boll damage (%)				Open boll damage (%)					Open boll Locule damage (%)					Good open bolls (No./ Plant)
		SBW			PBW	SBW				PBW	SBW			PBW		
		FA	HI**	SR	SG	BT	FA	HI**	SR	SG	BT	FA	SR	HI	SG	FA
131	PBD 88	2.70	15.00	4.91	20.00	20.00	15.27	3.82	28.21	22.50	12.07	7.97	23.30	1.11	14.52	187.00
132	CISA 17	3.87	15.00	4.96	7.50	20.00	22.18	6.12	13.21	10.00	10.58	10.62	7.44	1.95	5.97	196.00
133	**Local Check**	3.34	5.00	3.26	12.50	10.00	17.53	4.66	26.79	10.00	15.30	8.17	18.61	1.88	3.55	187.50
134	FDK 298	3.43	2.50	3.27	10.00	3.33	15.08	3.82	24.38	7.50	8.33	6.60	19.50	1.65	3.15	225.00
135	RG 870	1.26	5.00	8.52	7.50	3.33	13.61	6.83	32.50	5.00	9.80	5.26	27.86	2.16	1.54	214.00
136	HD 535	1.99	5.00	9.45	15.00	15.00	23.61	9.52	22.17	15.00	16.90	7.92	6.62	1.27	8.46	163.00
137	CISA 41-1	1.28	5.00	7.27	22.50	10.00	21.99	6.57	50.24	20.00	10.78	9.64	12.63	2.64	7.44	162.00
138	**Zonal Check (FDK 124)**	0.61	7.50	8.73	17.50	18.33	15.23	7.30	29.50	15.00	10.19	6.91	10.10	3.20	7.69	234.00
139	FDK 304	2.07	5.00	4.67	15.00	13.33	7.52	6.08	55.82	15.00	10.93	3.03	23.22	3.12	7.25	210.00
140	PBD 92	1.57	12.50	4.36	27.50	20.00	9.23	0.53	19.72	30.00	17.46	3.61	12.33	0.72	16.57	154.50
141	RG 868	2.59	7.50	6.23	22.50	11.67	14.47	4.29	17.00	25.00	20.09	5.99	6.97	1.14	16.02	215.00
142	HD 544	0.56	5.00	5.77	25.00	10.00	10.44	2.17	27.78	30.00	13.02	4.53	9.78	0.93	12.50	185.00
	FDK124	4.61					21.04					8.98				242.00
	LD1019	1.45					9.97					4.45				153.50
	CISA 310			4.70					19.82				10.26			
	CISA 614			7.14					45.07				18.11			

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

** - *Earias*spp&*P.gossypiella*

Table 4. Ent1a. Br 25a/b (PHT) : Preliminary screening of breeding material for their reaction to key pests (Sucking pests) of cotton at North Zone during 2019-20.

Entry code	Name of Entry	Jassid Injury Grade				No. of Jassid / 3 leaves				Whitefly / 3 leaves				Thrips / 3 leaves			
		BT	HI	SR	SG	BT	HI	SR	SG	BT	HI	SR	SG	BT	HI	SR	SG
151	KR 147	I	I	I	I	2.00	6.50	1.75	0.65	2.70	32.70	14.50	8.65	9.60	12.80	11.08	1.60
152	AJAH 103	I	I	I	I	3.00	8.20	1.25	0.40	3.70	36.70	19.33	3.60	7.20	17.00	13.33	2.15
153	KR 144	I	I	I	I	3.80	9.20	3.58	0.30	2.00	38.40	14.92	7.00	7.00	18.20	9.42	1.50
154	CISAA 18-3	I	I	I	I	2.40	11.20	1.33	0.10	3.30	33.90	13.00	6.80	9.60	17.80	11.25	1.70
155	**Local Check**	I	I	I	I	2.80	6.80	1.92	0.35	2.50	34.60	16.83	11.10	16.00	13.40	15.08	1.50
156	AAH 42	I	I	I	I	1.60	8.10	0.92	0.35	2.70	34.80	13.75	11.75	12.80	14.60	17.33	2.75
157	**Zonal Check (KR 64-NZ)**	I	I	I	I	1.00	6.70	1.67	0.80	3.80	36.50	18.50	8.25	9.60	11.80	14.83	1.55
158	CISAA 18-4	I	I	I	I	4.80	7.60	1.17	0.65	3.20	32.20	19.83	6.80	13.40	13.40	16.58	1.40
159	KR 155	I	I	I	I	4.20	8.60	1.58	0.45	2.50	36.00	17.83	10.25	14.60	12.30	15.75	2.15
	LD 949	I				1.60				2.80				15.60			
	CICR 2			I				1.25				16.92				13.25	
	CISA 310			I				1.75				17.83				15.58	

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

JIG - Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves)

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Table 4.1. Ent1a. Br 25a/b (PHT) : Preliminary screening of breeding materials for their reaction to key pests (Boll damage) of cotton at North Zone during 2019-20.

Entry code	Name of Entry	Natural Enemies / Plant		Green boll damage (%)			Open boll damage (%)				Open boll Locule damage (%)			
					SBW	PBW	SBW			PBW	SBW		PBW	
		SR	SG	HI**	SR	SG	BT	HI**	SR	SG	BT	SR	HI	SG
151	KR 147	0.39	0.25	7.50	2.46	27.50	16.67	1.20	11.04	35.00	13.76	5.48	1.06	13.69
152	AJAH 103	0.30	0.75	7.50	13.13	22.50	20.00	3.93	22.06	30.00	7.78	8.64	1.43	11.64
153	KR 144	0.33	0.50	10.00	9.69	15.00	6.67	6.56	14.98	17.50	14.93	4.06	3.55	6.97
154	CISAA 18-3	0.44	0.50	5.00	6.11	20.00	21.67	3.83	8.96	25.00	16.41	3.14	2.60	13.97
155	**Local Check**	0.25	1.50	5.00	7.62	12.50	16.67	5.86	19.57	17.50	7.98	7.67	2.49	5.86
156	AAH 42	0.31	0.25	5.00	12.31	25.00	16.67	3.61	9.16	32.50	11.46	4.45	1.90	13.78
157	**Zonal Check (KR 64-NZ)**	0.36	0.75	5.00	6.30	35.00	11.67	2.10	9.12	45.00	7.07	4.19	0.88	25.35
158	CISAA 18-4	0.36	1.00	12.50	6.28	12.50	15.00	1.04	11.66	17.50	9.14	6.08	0.93	10.43
159	KR 155	0.42	0.50	10.00	8.53	47.50	30.00	4.48	9.80	55.00	18.41	5.75	1.93	34.77
	LD 949						26.67				9.31			
	CICR 2	0.17			5.51				16.97			5.29		
	CISA 310	0.22			6.91				17.13			7.79		

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

** - *Eariass*pp&*P.gossypiella*

Table 5. Ent1a. Br 04a: Preliminary screening of breeding material for their reaction to key pests (Sucking pests) of cotton at North Zone during 2019-20

Entry	Name of Entry	Jassid Injury Grade				No. of Jassid / 3 leaves				Whitefly / 3 leaves				Thrips / 3 leaves				NE / Plant	
		BT	FA	HI	SG	BT	FA	HI	SG	BT	FA	HI	SG	BT	FA	HI	SG	FA	SG
9001	F 2596	I	II	II	I	2.30	2.83	6.10	1.30	3.60	5.83	25.90	6.23	14.80	8.00	19.00	8.83	9.17	1.37
9002	**Zonal Check (F 2228)**	I	II	II	I	4.20	3.17	6.10	1.27	4.00	4.17	27.00	4.20	16.30	4.67	21.60	12.30	7.33	1.49
9003	PBH 116	I	III	III	I	3.90	3.50	8.40	1.23	4.40	5.17	25.40	4.83	16.10	5.50	22.20	10.40	7.00	0.97
9004	**Local Check**	I	III	III	I	4.40	4.67	5.20	1.23	3.80	5.00	26.80	4.23	16.00	6.33	21.35	11.00	7.67	1.47
9005	F 2662	I	III	II	I	4.20	4.17	6.40	1.40	3.70	5.67	29.50	5.03	16.90	5.33	20.60	11.57	6.67	1.79
9006	**Quality Check (CSH 3129)**	I	III	II	I	5.10	3.67	6.70	0.63	3.60	5.67	29.40	5.23	14.40	7.83	20.30	11.07	6.83	1.38
	GA	I	IV	III	II	4.70	3.00	6.90	1.34	3.80	3.70	32.60	6.27	18.00	3.20	22.50	9.17	5.33	2.37
	RS2013	I	III	II	II	3.70	3.33	6.30	0.80	3.40	5.30	28.40	6.03	13.20	5.70	19.50	9.80	7.50	1.74
	MRC 7017 Bt	I	III	II	I	2.70	3.67	9.80	0.73	3.80	5.17	32.00	5.27	15.90	7.70	26.10	11.83	8.00	1.55
	MRC 7017 NBt	I	III	II		4.30	3.50	7.80		3.90	3.83	28.40		16.30	6.70	21.20		8.33	
	HS6		II				2.50				4.33				8.70			8.67	

JIG - Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves); NE – Natural enemies;

Table 5.1. Ent1a. Br 04a: Preliminary screening of breeding material for their reaction to key pests of cotton (Boll damage) at North Zone during 2019-20

Entry code	Name of Entry	Green boll damage (%)			Open boll damage (%)				Open boll Locule damage (%)				Good open bolls (No./ Plant)
		SBW		PBW	SBW			PBW	SBW		PBW		
		FA	HI**	SG	BT	FA	HI**	SG	BT	FA	HI	SG	FA
9001	F 2596	0.67	5.00	5.00	25.00	18.78	5.97	7.50	18.44	8.61	2.40	2.68	152.50
9002	**Zonal Check (F 2228)**	0.24	5.00	7.50	20.00	18.15	23.49	7.50	11.20	8.30	1.50	2.94	148.00
9003	PBH 116	0.45	10.00	3.75	15.00	8.68	39.04	5.00	9.30	3.74	2.62	1.76	157.00
9004	**Local Check**	2.21	10.00	10.00	23.33	11.39	20.88	12.50	15.68	5.35	1.57	5.23	174.00
9005	F 2662	0.00	5.00	12.50	28.33	12.82	17.80	12.50	17.45	6.08	1.70	4.40	146.50
9006	**QC (CSH 3129)**	4.19	7.50	17.50	21.67	9.90	12.24	20.00	9.57	4.64	2.30	8.09	122.50
	GA		42.50	15.00	20.00	6.84	20.35	17.50	16.57	3.69	2.88	6.13	109.00
	RS2013		40.00	17.50	16.67	9.47	14.13	17.50	12.77	3.85	2.89	5.77	162.00
	MRC 7017 Bt		17.50	3.75	16.67	0.64	14.95	5.00	10.08	0.31	0.91	1.63	163.50
	MRC 7017 NBt		30.00		30.00	18.63	20.18		15.68	9.49	3.82		123.50
	HS 6					16.48				8.23			168.50

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

** - *Earias*spp&*P.gossypiella*

Table 6. Ent1a. Br 06 a: Preliminary screening of breeding material (Sucking pests) for their reaction to key pests of cotton at North Zone during 2019-20

Entry code	Name of Entry	Jassid Injury Grade					No. of Jassid / 3 leaves					Whitefly / 3 leaves					Thrips / 3 leaves					NE / Plant	
		BT	FA	HI	SR	SG	BT	FA	HI	SR	SG	BT	FA	HI	SR	SG	BT	FA	HI	SR	SG	SR	SG
9011	RS 2914	II	III	II	I	II	5.10	14.17	6.80	2.42	1.13	5.00	14.50	27.50	10.67	6.10	13.40	15.83	17.70	23.92	7.03	1.53	2.67
9012	PBH 115	I	III	II	I	I	3.00	12.33	7.50	2.00	0.67	4.40	8.83	27.30	13.00	5.23	11.70	14.17	18.10	17.42	9.37	1.47	1.83
9013	**ZC (CSH 3075)**	I	IV	III	I	II	3.90	15.17	7.20	2.00	1.07	4.90	7.00	26.90	13.25	4.73	13.90	19.00	20.10	22.67	12.97	1.50	2.17
9014	H 1530	I	IV	II	I	I	3.70	12.67	7.10	1.83	0.67	4.30	8.33	24.30	16.08	6.57	15.00	13.33	19.20	21.75	12.17	1.44	3.17
9015	RS 2913	I	II	II	I	II	3.20	14.67	6.70	1.83	0.80	3.50	14.50	25.30	12.92	3.77	16.00	19.83	18.80	19.08	11.77	1.72	2.17
9016	**Local Check**	I	II	II	I	II	2.60	9.67	6.50	2.33	1.50	3.40	8.00	22.80	14.25	7.33	14.80	12.83	19.10	23.42	9.83	1.64	3.00
9017	PBH 174	I	III	II	I	III	3.80	11.17	7.20	2.08	2.27	4.00	10.50	25.30	18.83	7.23	17.70	19.83	21.30	26.42	13.43	1.47	2.17
9018		I	III	II	I	II	4.10	11.17	7.60	1.83	1.30	3.90	14.17	25.60	16.33	4.80	17.50	26.67	21.60	20.92	11.28	1.39	1.67
	GA	I		III	I	II	3.60		6.90	2.00	1.70	4.00		32.60	16.58	6.87	13.40		22.50	21.50	9.87	1.67	2.00
	RS2013	I		II	I	I	3.00		6.30	1.67	1.23	3.70		28.40	16.50	5.93	16.50		19.50	20.50	8.83	1.47	1.83
	MRC7017Bt	II		II		II	4.10		9.80		0.93	3.90		32.00		4.90	15.90		26.10		9.83		1.83
	MRC7017NBt	II		II	I	II	3.40		7.80	2.00	0.77	3.80		28.40	13.42	5.60	13.60		21.20	20.25	10.73	1.81	2.17
	HS-6				I					2.75					21.42					19.50		1.67	

JIG - Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves); NE – Natural enemies;

Table 6.1. Ent1a. Br 06 a: Preliminary screening of breeding material (Boll damage) for their reaction to key pests of cotton at North Zone during 2019-20

Entry code	Name of Entry	Green boll damage (%)				Open boll damage (%)					Open boll Locule damage (%)					Good open bolls (No./ Plant)
		SBW			PBW											
		FA	HI**	SR	SG	BT	FA	HI	SR	SG	BT	FA	SR	HI	SG	FA
9011	RS 2914	2.80	7.50	4.63	10.00	25	11.77	12.05	2.47	12.5	12.83	6.27	1.25	1.24	4.28	97.5
9012	PBH 115	0.00	2.50	7.71	5.00	31.67	3.66	17.95	3.86	7.50	15.68	1.57	2.11	1.64	2.77	96.00
9013	**ZC (CSH 3075)**	6.08	10.00	3.40	3.75	15.00	6.93	12.24	6.89	5.00	12.66	3.66	3.57	1.98	2.07	86.00
9014	H 1530	0.72	5.00	6.45	2.50	31.67	9.22	17.34	6.44	5.00	17.64	3.75	3.29	0.43	2.03	72.50
9015	RS 2913	1.39	5.00	5.81	7.50	28.33	7.84	9.17	5.61	12.50	15.46	3.47	2.83	1.40	4.10	100.00
9016	**Local Check**	3.06	7.50	7.49	0.00	31.67	7.27	9.29	6.57	2.50	21.31	3.15	2.29	1.88	0.62	73.50
9017	PBH 174	0.00	2.50	4.79	5.00	33.33	5.19	23.08	7.18	7.50	14.05	2.68	2.57	1.69	3.14	96.50
9018		1.50	2.50	5.86	8.75	26.67	12.64	16.27	6.22	10.00	14.20	6.05	2.12	1.37	3.96	94.00
	GA		42.50	12.94	5.00	18.33		20.35	6.08	5.00	9.13		2.65	2.88	2.37	
	RS2013		40.00	17.02	7.50	25.00		14.13	7.42	10.00	14.68		2.67	2.89	4.21	
	MRC7017Bt		17.50		2.50	11.67		14.95		2.50	4.82			0.91	0.80	
	MRC7017NBt		30.00	3.79	3.75	30.00		20.18	7.15	5.00	11.87		2.04	3.82	2.10	
	HS-6			13.93					13.37				12.20			

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

** - *Earias*spp&*P.gossypiella*

Table 7. Ent1a. Br 24 a: Preliminary screening of breeding material for their reaction to key pests (Sucking pests) of cotton at North Zone during 2019-20

Entry code	Name of Entry	JIG			No. of Jassid / 3 leaves					Whitefly / 3 leaves					Thrips / 3 leaves				NE / Plant		
		HI	SR	SG	BT	FA	HI	SR	SG	BT	FA	HI	SR	SG	BT	HI	SR	SG	FA	SR	SG
9021	PBD 22	I	I	I	2.10	2.00	4.40	0.92	0.25	2.30	3.67	31.60	16.92	10.85	2.50	13.80	12.92	2.65	2.50	0.56	0.97
9022	CISA 10	I	I	I	3.30	1.00	5.30	1.83	0.45	2.30	3.67	30.80	13.50	5.25	4.60	13.10	12.92	3.05	2.50	0.42	1.07
9023	**Zonal Check (FDK 124)**	I	I	I	3.30	2.17	6.80	0.83	0.35	4.10	5.17	30.30	11.08	9.05	3.60	12.60	11.75	3.40	2.50	0.44	0.91
9024	PBD 35	I	I	I	2.90	1.50	5.40	1.67	0.15	3.10	4.33	28.00	12.25	13.70	2.10	11.30	13.17	2.95	2.67	0.42	1.30
9025	FDK 281	I	I	I	2.10	2.50	7.20	1.42	0.20	2.10	6.00	30.70	13.83	10.00	3.70	14.60	10.17	2.25	3.50	0.58	0.92
9026	**Local Check**	I	I	I	1.70	2.67	6.20	1.58	0.35	2.60	5.17	31.30	12.42	11.75	4.30	14.20	13.25	3.00	2.83	0.58	1.04
9027	PBD 36	I	I	I	1.50	2.17	6.10	1.25	0.35	2.10	4.50	32.20	11.83	9.30	3.00	16.80	14.08	2.20	2.83	0.53	0.86
	FDK124					2.17					4.83								3.67		
	LD1019					2.33					4.56								3.78		
	CISA 310		I					1.83					19.25				12.08			0.36	
	CISA 614		I					0.83					13.58				15.25			0.39	
	RG-8			I					0.25					12.05				2.50			1.14
	RG-542			I					0.15					14.95				2.40			1.18

JIG - Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves); NE – Natural enemies

Table 7.1. Ent1a. Br 24 a: Preliminary screening of breeding material for their reaction to key pests (Boll damage) of cotton at North Zone during 2019-20

Entry code	Name of Entry	Green boll damage (%)				Good open bolls (No./ Plant)	Open boll damage (%)					Open boll Locule damage (%)				
		SBW			PBW		SBW				PBW	SBW			PBW	
		FA	HI**	SR	SG	FA	BT	FA	HI**	SR	SG	BT	FA	SR	HI	SG
9021	PBD 22	3.23	10.00	8.50	15.00	137.00	10.00	12.40	4.80	21.52	17.50	8.61	5.60	12.78	2.04	8.80
9022	CISA 10	4.82	7.50	10.17	12.50	154.50	18.33	16.11	5.24	17.63	15.00	17.51	8.15	6.89	2.07	4.73
9023	**ZC (FDK124)**	4.70	7.50	2.78	3.75	262.50	23.33	15.38	2.55	20.87	5.00	18.51	6.37	6.96	1.30	1.56
9024	PBD 35	6.11	5.00	12.08	15.00	162.50	30.00	12.22	6.37	18.91	17.50	20.08	6.52	8.95	2.05	9.48
9025	FDK 281	3.70	7.50	10.95	30.00	199.50	25.00	13.55	2.92	8.34	32.50	17.51	6.04	3.38	0.95	18.32
9026	**Local Check**	3.25	7.50	7.64	10.00	153.50	18.33	13.84	5.98	11.31	12.50	20.52	7.63	4.23	2.93	6.15
9027	PBD 36	4.59	7.50	7.72	17.50	162.50	18.33	8.12	8.35	9.28	20.00	13.27	4.16	4.94	4.08	13.05
	FDK124	3.94				249.00		17.92					8.83			
	LD1019	4.90				171.00		9.77					4.65			
	CISA 310			8.15						28.02				8.02		
	CISA 614			7.14						45.07				18.11		
	RG-8				27.50						30.00					11.67
	RG-542				20.00						22.50					12.67

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar; ** - *Earias*spp&*P.gossypiella*

Table 8. Ent1a. Br 25 a: Preliminary screening of breeding material for their reaction to key pests (Sucking pests) of cotton at North Zone during 2019-20

Entry code	Name of Entry	Jassid Injury Grade				No. of Jassid / 3 leaves					Whitefly / 3 leaves					Thrips / 3 leaves					Natural Enemies / Plant		
		BT	HI	SR	SG	BT	FA	HI	SR	SG	BT	FA	HI	SR	SG	BT	FA	HI	SR	SG	FA	SR	SG
9031	KR 139	I	I	I	I	0.90	2.33	5.90	1.50	0.50	2.20	5.83	32.90	14.08	8.20	5.30	0.00	12.40	14.67	2.15	3.00	0.36	0.75
9032	**ZC (KR 64)**	I	I	I	I	1.20	2.00	6.10	1.25	0.55	2.60	4.17	32.00	16.83	6.35	3.40	0.00	13.20	14.83	1.20	4.17	0.44	0.75
9033	KR 133	I	I	I	I	1.90	2.67	6.30	0.92	0.20	4.00	5.00	28.80	15.00	10.65	4.20	0.00	11.10	12.75	2.30	5.00	0.47	0.50
9034	CISAA 18-1	I	I	I	I	1.50	1.83	5.00	0.83	0.65	3.20	4.00	25.70	14.83	10.80	4.00	0.00	11.70	13.58	2.70	3.17	0.44	0.75
9035	**LC**	I	I	I	I	1.30	2.50	7.30	1.00	0.40	2.20	5.33	33.90	13.67	12.80	4.40	0.00	16.00	12.00	1.95	4.67	0.50	0.75
9036	KR 136	I	I	I	I	2.10	2.00	7.70	1.50	0.15	3.20	3.83	32.70	13.33	8.50	4.60	0.00	12.60	12.92	3.15	3.33	0.44	1.25
	LD949	I				0.80					2.00					5.00							
	LD1019						1.83					4.00									5.00		
	FDK124			I			1.83		1.83			5.33		16.08					12.25		2.17	0.46	
	HD 123			I					1.92					13.92					9.75			0.36	
	CISA 614			I					1.92					15.50					15.92			0.36	

JIG - Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves)

Table 8.1 Ent1a. Br 25 a: Preliminary screening of breeding material for their reaction to key pests (Boll damage) of cotton at North Zone during 2019-20

Entry code	Name of Entry	Green boll damage (%)				Good open bolls (No./ Plant)	Open boll damage (%)					Open boll Locule damage (%)				
		SBW			PBW		SBW				PBW	SBW			PBW	
		FA	HI**	SR	SG	FA	BT	FA	HI**	SR	SG	BT	FA	SR	HI	SG
9031	KR 139	4.06	5.00	6.11	5.00	5.00	16.67	10.31	7.02	10.32	7.50	11.04	4.77	3.96	2.87	2.53
9032	**Zonal Check (KR 64)**	3.10	5.00	12.59	2.50	2.50	21.67	8.23	2.48	11.53	2.50	13.24	3.81	4.70	1.85	0.77
9033	KR 133	2.69	7.50	6.31	20.00	20.00	15.00	11.16	4.59	11.38	22.50	7.63	5.05	4.93	2.32	10.00
9034	CISAA 18-1	4.13	7.50	6.00	10.00	10.00	23.33	12.09	3.05	11.27	12.50	10.78	4.96	4.51	1.65	4.26
9035	**Local Check**	5.82	5.00	12.62	3.75	3.75	21.67	12.63	2.37	8.48	5.00	14.91	5.55	6.32	1.32	2.15
9036	KR 136	4.46	12.50	9.86	7.25	7.25	26.67	14.05	2.53	9.77	7.50	12.18	6.42	4.53	2.14	3.18
	LD949						16.67					11.08			2.87	2.53
	LD1019	3.37						13.64					6.64	4.78	1.85	0.77
	FDK124	5.01		8.56				14.86		10.15			7.29	4.97	2.32	10.00
	HD 123			3.31						10.34				5.06	1.65	4.26
	CISA 614			8.53						13.29					1.32	2.15

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar; ** - *Earias*spp&*P.gossypiella*

Table 9. Ent 1a. Br 02a (IET) : Preliminary screening of breeding materials for their reaction to key pests (Leafhopper) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	JIG									Leaf hopper /3 leaves									
		BA	JU	SU	RA	BW	LG	RC	CBE	SVPR	BA	JU	SU	RA	KH	BW	LG	RC	CBE	SVPR
201	CPD 1902	III	I	1.40	I	II	3.00	II	III	3.00	12.00	9.40	3.40	4.83	8.00	5.17	5.50	6.33	4.10	2.90
202	GISV319	IV	II	1.00	I	II	2.00	II	II	2.00	13.67	14.70	1.07	4.94	9.50	4.33	4.60	7.36	1.70	2.53
203	RAH 1047	IV	III	1.47	II	III	3.00	III	III	4.00	14.33	17.70	4.27	5.17	8.00	7.83	6.00	8.24	3.00	4.07
204	CCH 19-2	III	III	1.67	II	III	3.00	II	II	3.00	12.33	15.70	4.73	5.28	10.50	7.00	6.20	5.48	1.90	2.73
205	BS 8-19	IV	II	1.13	III	III	2.00	III	II	2.00	14.00	13.40	3.07	5.22	12.00	6.00	3.50	8.68	1.40	3.43
206	CPD 1901	IV	II	1.33	II	IV	3.00	IV	III	4.00	14.33	13.80	2.60	6.06	10.00	8.00	5.70	9.24	5.40	5.83
207	GJHV 557	II	III	1.80	I	II	2.00	II	II	2.00	7.33	16.60	4.20	4.89	14.00	4.83	3.60	7.66	2.90	3.40
208	**ZC (Phule Yamuna/BGDS 1063)**	IV	II	1.40	II	III	2.00	III	II	3.00	13.33	10.60	3.80	4.50	11.50	6.66	4.10	8.42	2.40	3.07
209	TSH 363	II	I	2.27	I	II	1.00	II	II	2.00	7.00	8.50	6.60	4.67	10.00	5.50	2.90	6.54	3.20	7.97
210	RB 614	III	III	1.40	III	III	2.00	III	III	3.00	10.33	15.40	3.53	4.78	10.50	6.83	4.20	8.43	2.00	3.27
211	GTHV 15/34	III	II	2.00	I	III	2.00	III	I	2.00	12.67	10.60	7.40	4.89	11.00	5.50	3.80	7.55	2.50	1.80
212	RHC 1419	IV	I	1.13	III	IV	2.00	III	III	3.00	13.00	9.10	3.93	5.72	14.50	8.17	4.30	8.46	1.80	3.50
213	GISV 323	II	III	1.13	I	II	2.00	II	I	2.00	9.00	18.20	2.80	4.94	14.50	4.83	3.90	6.68	1.90	2.30
214	ARBH 1901	IV	II	1.00	IV	III	3.00	III	III	3.00	14.00	12.00	0.93	5.39	16.50	7.83	6.20	11.42	4.00	3.93
215	**Quality Check (Suraj)**	IV	II	2.27	IV	III	3.00	III	III	2.00	15.00	12.90	8.33	5.06	15.50	5.67	5.70	12.34	4.20	2.47
216	RAH 1046	III	II	1.40	II	III	2.00	III	II	3.00	10.67	12.20	4.73	5.56	11.00	5.83	4.40	11.52	2.40	1.97
217	BGDS 1047	IV	II	1.40	III	III	2.00	IV	III	*2.00*	12.67	10.20	4.40	5.61	16.50	7.00	3.60	12.62	3.70	*2.13*
218	RB 615	III	III	1.93	II	II	3.00	III	III	1.00	12.00	13.30	6.20	6.22	10.00	5.17	6.70	8.88	3.10	2.40
219	L 1527	IV	I	1.07	III	III	2.00	III	III	2.00	12.33	9.60	4.33	5.00	14.50	6.50	4.70	12.69	3.60	2.70
220	BS 7-19	IV	I	1.33	IV	IV	3.00	III	III	3.00	15.33	9.40	3.13	5.39	10.00	8.00	5.40	11.53	2.90	2.47
221	SHS 234	IV	II	1.00	IV	III	2.00	III	III	3.00	14.00	14.70	1.47	5.78	10.00	6.67	3.90	9.45	3.30	3.83
222	CCH 19-1	III	II	1.13	III	III	3.00	II	III	3.00	10.67	12.50	5.33	6.61	10.00	6.17	6.20	7.66	2.90	3.40
223	**Local Check**	III	III	1.00	III	II	2.00	III	III	3.00	11.00	16.00	1.33	5.89	11.50	4.50	4.70	11.54	3.20	2.53
224	TSH 383	IV	II	1.33	I	II	2.00	II	II	3.00	12.67	14.70	7.13	4.44	17.00	5.17	4.50	7.66	3.00	4.90
225	RHC 1409	II	II	1.00	II	I	1.00	II	I	1.00	8.33	12.60	1.93	5.67	14.50	4.00	2.60	8.46	2.80	3.27
226	GJHV 566	II	II	1.00	I	I	2.00	I	II	1.00	7.67	13.40	1.53	4.83	12.00	3.83	4.60	4.32	1.90	2.23
	DCH 32 (SC)	IV			II	IV	4.00			4.00	15.00			13.06		15.33	8.60			7.87
	DHY 286 (RC)	I									4.67									
	RCH-2 Bt (RC)	IV									13.67									
	RCH-2Non Bt (SC)	IV									12.33									
	NDLH 1938				IV	I	2.00			2.00				4.83		3.83	4.20			2.60
	Ajeet 155 BGII				II	III								6.00		5.83				
	Bt JADOO BG II	4.00					2.00			2.00							4.50			2.37
	LRA 5166				II									4.94						

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves); BA – Banswara; JU – Junagadh; SU – Surat; RA – Rahuri; KH – Khandwa; BW – Bhawanipatna; LG – Lam, Guntur; RC – Raichur; CBE – Coimbatore; SVPR – Srivilliputtur

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Table 9.1 Ent 1a. Br 02a (IET) : Preliminary screening of breeding materials for their reaction to key pests (Whitefly and Thrips) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	Whitefly / 3 leaves										Thrips / 3 leaves							
		BA	JU	SU	RA	KH	BW	LG	RC	CBE	SVPR	JG	SU	RA	BW	LG	RC	CBE	SVPR
201	CPD 1902	22.00	15.50	5.33	3.67	11.00	2.50	3.50	3.20	0.54	1.33	21.20	21.80	29.50	8.83	1.50	6.28	12.36	2.03
202	GISV319	23.00	12.90	2.93	4.11	16.00	2.33	5.10	2.20	0.32	1.33	15.20	8.40	23.78	7.33	0.70	8.66	18.36	1.80
203	RAH 1047	21.00	24.70	5.87	4.50	14.50	2.33	4.40	0.87	0.66	1.13	19.20	24.93	29.00	10.83	2.00	6.28	13.23	5.00
204	CCH 19-2	14.00	23.20	6.87	4.61	12.50	2.50	3.90	2.87	0.33	1.13	16.60	32.47	33.17	10.00	1.40	3.90	7.79	1.90
205	BS 8-19	20.33	21.90	4.93	4.17	14.00	3.00	4.10	2.54	0.28	1.80	17.40	20.13	28.00	9.67	1.20	8.66	10.13	1.37
206	CPD 1901	20.67	16.60	3.80	5.17	15.00	1.83	4.20	0.67	0.36	1.30	20.10	11.87	23.89	11.00	1.70	11.04	5.06	1.03
207	GJHV 557	9.00	19.70	6.93	4.50	13.50	2.50	13.00	0.54	0.25	0.80	17.70	30.07	26.06	7.83	4.60	3.90	17.89	1.33
208	**ZC (Phule Yamuna/BGDS 1063)**	23.00	22.30	6.47	4.33	11.50	2.67	4.00	2.87	0.18	0.93	14.80	27.87	24.94	9.66	4.00	8.66	4.56	1.68
209	TSH 363	8.33	13.10	7.00	3.94	13.00	2.83	6.60	2.87	0.69	1.43	12.50	20.40	28.50	9.17	1.90	3.90	4.29	1.38
210	RB 614	12.67	24.90	5.07	4.33	11.50	3.17	4.00	0.87	0.45	1.07	14.70	27.27	29.39	9.83	1.70	7.28	5.11	0.83
211	GTHV 15/34	22.00	20.30	5.47	3.28	11.00	2.33	3.50	2.20	0.56	0.83	18.10	22.07	36.89	8.50	1.80	1.52	4.78	1.00
212	RHC 1419	22.67	13.70	4.20	3.44	13.00	2.67	2.70	1.54	0.54	1.30	18.70	26.80	33.50	8.83	2.80	11.04	3.13	1.60
213	GISV 323	10.00	24.60	6.00	3.67	16.50	2.17	4.40	3.54	0.36	1.23	14.70	24.67	33.78	7.83	1.60	6.28	4.65	1.50
214	ARBH 1901	23.33	22.90	3.87	4.11	14.50	2.50	4.50	1.20	0.34	0.90	13.80	20.47	30.44	10.83	0.50	3.90	4.12	1.17
215	**Quality Check (Suraj)**	21.33	21.50	4.67	4.39	14.00	2.67	5.40	0.54	0.26	1.67	14.50	26.47	14.33	8.67	0.30	6.65	11.01	0.90
216	RAH 1046	13.00	24.40	4.07	3.67	15.00	2.33	2.80	3.87	0.28	0.53	15.10	19.87	35.89	8.83	1.60	3.90	4.31	1.97
217	BGDS 1047	21.00	22.20	5.53	4.56	15.00	2.83	3.70	0.87	0.34	*1.03*	14.60	19.73	37.06	10.00	1.20	3.90	16.33	*1.40*
218	RB 615	22.00	15.40	5.33	3.72	18.00	2.17	4.50	4.20	0.56	0.80	16.70	34.87	35.67	8.17	2.50	25.32	3.99	1.14
219	L 1527	21.33	23.30	3.07	3.50	17.00	2.33	2.50	5.20	0.59	0.97	14.30	21.07	33.67	9.50	1.70	14.21	4.02	0.80
220	BS 7-19	23.00	18.40	5.53	4.61	15.00	2.83	3.50	2.54	0.61	1.23	14.60	19.13	36.56	11.00	2.10	1.52	16.36	1.27
221	SHS 234	17.00	15.10	6.87	3.78	17.00	2.83	5.40	2.87	0.22	1.10	13.20	40.60	29.28	9.67	1.70	8.07	15.89	1.40
222	CCH 19-1	12.00	22.70	5.33	3.56	16.50	1.50	2.00	3.87	0.23	0.87	13.40	21.53	24.17	10.17	1.65	6.28	4.44	1.73
223	**Local Check**	14.67	13.10	2.80	4.44	14.00	2.67	2.80	2.87	0.65	0.90	12.40	14.73	25.83	7.50	1.10	7.99	19.12	1.37
224	TSH 383	15.33	19.10	6.80	3.94	14.50	2.50	2.85	3.87	0.52	1.13	14.60	27.13	21.67	8.17	2.30	4.68	4.13	2.10
225	RHC 1409	8.33	17.40	4.00	4.39	13.50	3.17	3.40	5.87	0.45	1.03	16.50	17.60	22.39	7.00	2.00	4.55	4.36	2.77
226	GJHV 566	8.67	18.60	4.00	4.39	17.00	2.33	4.40	2.20	0.78	1.42	22.40	16.67	28.06	6.83	1.10	3.12	17.12	1.43
	DCH 32 (SC)	24.00			5.00		3.50	3.90			1.02		23.02	27.89	9.67	2.80			1.53
	DHY 286 (RC)	5.67																	
	RCH-2 Bt (RC)	22.00																	
	RCH-2Non Bt (SC)	20.33						2.70											
	NDLH 1938				4.00		2.17				0.99			29.11	6.83	2.80			2.63
	LRA 5166				4.33									23.61					

BA – Banswara; JU – Junagadh; SU – Surat; RA – Rahuri; KH – Khandwa; BW – Bhawanipatna; LG – Lam, Guntur; RC – Raichur; CBE – Coimbatore; SVPR - Srivilliputtur

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Table 9.2. Ent 1a. Br 02a (IET) : Preliminary screening of breeding materials for their reaction to key pests (Aphids and Natural enemies) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	Aphids/3 leaves								Natural Enemies/Plant*							
		JU	RA	KH	BW	LG	RC	CBE	SVPR	SU	Rahuri			BW	RC	CBE	SVPR
											LBB	Chr	Spi				
201	CPD 1902	16.50	18.44	2.50	26.83	5.30	3.10	9.30	2.88	1.13	1.28	0.72	0.89	0.33	0.65	0.21	0.10
202	GISV319	17.40	16.50	2.00	16.50	4.70	4.13	8.40	1.03	1.40	1.61	0.78	0.89	0.50	0.93	0.16	0.04
203	RAH 1047	15.40	17.22	2.00	29.50	4.00	5.13	9.20	1.47	1.80	0.78	0.61	0.61	0.33	1.23	0.05	0.00
204	CCH 19-2	26.10	18.72	3.00	21.17	2.10	4.13	6.20	3.57	1.47	1.22	1.44	0.83	0.66	0.69	0.06	0.10
205	BS 8-19	27.90	14.17	2.00	18.50	6.40	2.40	5.70	0.60	1.27	1.50	1.17	0.72	0.83	1.23	0.04	0.05
206	CPD 1901	24.30	15.67	3.50	28.17	6.80	6.32	4.50	0.57	1.27	1.61	1.17	0.89	0.50	0.96	0.02	0.05
207	GJHV 557	26.60	14.17	3.00	22.16	9.00	5.42	7.10	1.48	1.33	1.00	0.94	0.72	0.00	0.67	0.13	0.15
208	**ZC (Phule Yamuna/BGDS 1063)**	26.80	14.00	2.00	23.17	9.30	4.44	7.10	1.37	1.27	1.17	1.28	0.89	0.50	0.95	0.04	0.07
209	TSH 363	14.50	12.33	3.50	29.33	4.60	5.32	8.80	0.87	0.93	1.17	0.94	0.83	0.67	1.33	0.01	0.03
210	RB 614	28.10	13.44	1.50	22.50	6.90	6.13	6.40	0.93	1.07	1.17	0.89	0.83	0.17	1.23	0.02	0.05
211	GTHV 15/34	25.80	15.72	4.00	33.17	9.50	4.40	4.80	0.07	1.07	1.00	0.94	0.89	0.33	1.13	0.24	0.10
212	RHC 1419	24.90	15.06	3.00	35.50	7.35	6.13	4.10	2.80	1.33	0.89	1.00	0.78	0.33	1.15	0.15	0.03
213	GISV 323	23.50	26.44	1.00	26.17	5.80	7.02	7.20	1.87	1.47	0.94	0.94	0.83	0.67	0.67	0.06	0.32
214	ARBH 1901	23.70	15.17	3.00	22.16	7.20	6.13	4.10	2.03	1.73	1.22	0.78	0.83	0.50	0.33	0.06	0.22
215	**Quality Check (Suraj)**	26.00	14.78	1.50	23.66	8.60	4.46	6.50	1.87	1.47	1.00	1.11	0.83	0.50	0.64	0.04	0.15
216	RAH 1046	18.10	16.39	2.50	34.50	6.60	4.53	6.00	2.67	1.80	11.72	11.50	11.56	0.83	0.36	0.15	0.25
217	BGDS 1047	18.30	14.06	2.00	25.50	5.10	5.13	9.80	1.40	1.60	1.00	0.72	0.67	0.00	1.15	0.04	0.10
218	RB 615	24.40	14.67	2.00	30.33	4.10	7.36	6.50	0.90	1.67	1.33	0.89	1.17	0.33	0.66	0.08	0.03
219	L 1527	25.40	16.89	3.00	30.67	5.60	6.09	7.30	1.67	1.60	1.17	1.11	0.72	0.67	0.56	0.09	0.07
220	BS 7-19	14.70	13.89	2.50	28.00	7.40	4.44	8.20	1.07	1.60	1.28	1.28	0.94	0.50	0.95	0.06	0.12
221	SHS 234	23.10	13.89	3.50	32.33	5.20	0.13	7.70	2.17	1.53	1.11	1.00	1.28	0.83	0.79	0.25	0.10
222	CCH 19-1	21.30	14.33	2.50	26.67	4.60	2.44	3.80	1.40	1.73	1.11	0.89	0.72	0.67	0.58	0.02	0.08
223	**Local Check**	20.50	11.89	2.50	23.16	4.10	1.13	4.20	0.93	1.67	1.06	1.06	0.83	0.50	0.96	0.01	0.07
224	TSH 383	18.20	14.00	2.00	31.67	1.60	3.13	4.20	1.20	1.53	0.89	0.89	0.78	0.50	0.57	0.04	0.50
225	RHC 1409	16.10	14.67	3.00	19.67	4.50	2.46	3.50	1.67	1.40	1.00	0.94	0.61	0.50	1.03	0.06	0.05
226	GJHV 566	25.90	14.39	4.50	19.33	5.00	6.13	5.50	1.03	1.60	1.11	1.17	0.83	0.67	1.13	0.05	0.12
	DCH 32 (SC)		13.83		30.17	4.50			0.57		0.94	0.89	0.83	0.50			0.05
	DHY 286 (RC)																
	RCH-2 Bt (RC)																
	RCH-2Non Bt (SC)																
	NDLH 1938		15.83		17.83	2.30			1.40		1.00	0.89	0.94	0.33			0.12
	Ajeet 155 BGII		14.06		24.17						0.89	0.89	0.83	0.33			
	Bt JADOO BG II					2.60			0.73								0.15
	LRA 5166		19.11								0.89	1.06	0.78				

BA – Banswara; JU – Junagadh; SU – Surat; RA – Rahuri; KH – Khandwa; BW – Bhawanipatna; LG – Lam, Guntur; RC – Raichur; CBE – Coimbatore; SVPR - Srivilliputtur

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Table 9.3. Ent 1a. Br 02a (IET) : Preliminary screening of breeding materials for their reaction to key pests (Green and Open Boll damage) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	Green boll damage (%)						Open boll damage (%)									
				PBW		*H. armigera*						*H. armigera*		PBW			
		JU	RC	SU	LG	BW	SU	JU	KH	RC	CBE	SU	BW	SU	KH	LG	SVPR
201	CPD 1902	24.89	60.69	3.42	59.88	7.17	5.40	26.72	35.00	61.42	4.50	3.32	6.00	4.71	45.00	16.85	0.00
202	GISV319	29.92	48.36	3.22	51.77	8.55	1.51	32.33	20.00	43.09	4.00	1.11	7.58	4.81	45.00	21.83	0.00
203	RAH 1047	19.84	67.01	6.54	45.70	9.63	6.08	23.53	35.00	68.20	5.50	3.59	8.57	6.85	40.00	15.06	0.00
204	CCH 19-2	24.89	38.06	5.06	46.02	5.02	5.72	27.24	15.00	38.98	2.50	3.44	4.03	5.87	60.00	17.56	0.00
205	BS 8-19	29.92	67.56	5.42	49.42	7.53	6.33	32.21	10.00	67.54	3.00	3.89	6.53	6.07	45.00	16.45	0.00
206	CPD 1901	34.94	56.69	5.83	49.36	6.81	5.91	37.14	20.00	56.18	4.50	3.39	5.81	6.44	35.00	11.78	1.30
207	GJHV 557	14.76	65.41	5.95	45.73	9.72	5.70	17.83	25.00	71.14	5.50	3.23	8.70	6.26	40.00	17.16	0.00
208	**ZC (Phule Yamuna/BGDS 1063)**	29.92	54.56	4.85	56.10	7.70	6.24	34.50	30.00	52.09	4.50	3.84	6.67	5.72	35.00	8.11	0.00
209	TSH 363	39.96	62.07	7.80	62.73	7.35	5.00	42.83	35.00	67.19	2.50	2.74	6.30	7.96	25.00	22.05	0.00
210	RB 614	50.00	68.41	7.04	55.46	7.96	6.50	53.60	25.00	67.14	3.50	3.82	6.96	7.22	40.00	14.87	1.33
211	GTHV 15/34	44.98	56.89	5.39	57.56	7.98	10.28	48.47	20.00	57.28	4.00	6.51	6.97	5.74	60.00	18.62	1.33
212	RHC 1419	24.89	59.56	8.34	62.08	3.93	7.00	27.22	35.00	63.08	3.50	4.09	2.93	8.14	45.00	15.45	0.00
213	GISV 323	29.92	38.57	7.63	51.86	8.74	9.62	33.14	45.00	38.61	4.50	5.90	7.74	7.30	45.00	11.89	0.00
214	ARBH 1901	19.84	68.56	8.28	50.58	8.00	10.15	24.22	30.00	71.14	4.50	6.24	7.26	7.58	45.00	5.83	0.00
215	**Quality Check (Suraj)**	14.76	58.35	8.35	65.06	9.63	5.76	16.64	40.00	51.83	3.00	3.32	8.63	8.13	35.00	13.59	1.33
216	RAH 1046	39.96	48.16	6.10	37.13	5.12	6.25	44.27	45.00	48.28	3.00	3.72	4.12	6.68	25.00	10.09	0.00
217	BGDS 1047	29.92	63.16	7.29	36.18	7.35	8.88	33.15	20.00	61.45	5.50	5.56	6.35	6.98	55.00	9.40	*0.00*
218	RB 615	34.94	68.71	9.57	60.71	7.82	7.76	38.34	20.00	69.53	4.00	4.50	6.82	8.75	40.00	17.00	0.00
219	L 1527	55.02	67.66	10.17	48.78	7.59	8.13	58.12	30.00	67.29	3.00	4.80	6.59	8.96	35.00	13.96	0.00
220	BS 7-19	24.89	31.16	7.54	66.26	5.36	7.02	27.59	30.00	32.33	4.00	4.23	4.36	7.46	25.00	16.18	0.00
221	SHS 234	19.84	60.16	7.37	65.10	7.75	6.17	22.72	25.00	59.82	5.50	3.63	6.75	7.37	25.00	42.18	0.00
222	CCH 19-1	14.76	56.66	8.65	41.03	5.88	8.28	17.97	25.00	55.85	5.50	4.90	4.88	8.11	40.00	24.39	0.00
223	**Local Check**	29.92	63.66	6.77	63.41	6.42	2.83	31.69	30.00	63.35	3.00	1.02	5.42	7.27	60.00	29.33	0.00
224	TSH 383	50.00	60.16	6.79	52.38	4.71	9.22	53.65	35.00	64.24	2.50	5.69	3.71	6.66	30.00	36.17	0.60
225	RHC 1409	34.94	66.16	5.96	53.66	7.97	2.72	37.76	35.00	71.14	2.50	0.94	6.97	6.90	35.00	12.07	0.00
226	GJHV 566	39.96	48.16	4.23	48.78	8.00	2.62	44.81	25.00	46.63	4.50	0.91	7.00	5.63	35.00	11.73	0.00
	DCH 32 (SC)				52.44	7.83							5.38			34.15	0.60
	DHY 286 (RC)																
	RCH-2 Bt (RC)																
	RCH-2Non Bt (SC)																
	NDLH 1938				50.00	8.50							7.33			23.21	0.60
	LRA 5166																

BA – Banswara; JU – Junagadh; SU – Surat; RA – Rahuri; KH – Khandwa; BW – Bhawanipatna; LG – Lam, Guntur; RC – Raichur; CBE – Coimbatore; SVPR - Srivilliputtur

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Table 9.4. Ent 1a. Br 02a (IET) : Preliminary screening of breeding materials for their reaction to key pests (Open boll locule damage and Rosette flower) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	Open boll locule damage (%)				Open boll locule damage (%)				Rosette Flower		Good open bolls (No./ Plant)		
						H. a	PBW (%)			PBW (%)				
		JU	KH	RC	CBE	BW	SU	LG	SVPR	SU	SVPR	BA	LG	RC
201	CPD 1902	23.31	34.50	63.03	75.90	3.47	1.71	8.24	0.00	2.52	0.00	76.00	29.10	7.22
202	GISV319	28.45	31.00	64.94	35.70	5.31	1.71	11.90	0.00	0.00	0.00	74.00	31.90	4.14
203	RAH 1047	18.47	31.00	61.07	45.90	6.04	2.70	8.38	0.00	11.22	0.00	70.00	34.50	1.25
204	CCH 19-2	22.94	34.25	42.98	50.53	2.03	2.08	10.23	0.00	6.45	0.00	75.00	27.70	5.26
205	BS 8-19	26.30	34.75	58.64	47.40	4.53	2.55	8.04	0.00	4.67	0.00	71.00	38.70	6.45
206	CPD 1901	32.07	37.50	65.20	29.35	3.81	2.31	7.78	1.32	1.52	1.33	72.00	31.30	4.26
207	GJHV 557	13.27	32.50	67.72	36.99	5.70	2.96	9.12	0.00	5.67	0.00	99.00	34.70	2.48
208	**ZC (Phule Yamuna/BGDS 1063)**	27.92	30.50	57.82	34.12	4.67	2.25	5.24	0.00	3.73	0.00	76.00	38.10	15.65
209	TSH 363	37.78	33.50	63.50	36.26	4.30	3.02	12.70	0.00	1.23	0.00	122.00	28.50	3.45
210	RB 614	43.76	34.25	68.36	31.50	4.96	3.09	8.65	1.32	3.78	1.33	102.00	31.30	6.24
211	GTHV 15/34	41.86	34.25	67.19	28.14	4.97	2.16	11.19	1.26	3.50	0.00	81.00	33.30	2.36
212	RHC 1419	22.72	38.00	62.36	32.06	0.93	3.34	8.36	0.00	1.52	0.00	62.00	31.10	9.14
213	GISV 323	27.87	33.50	62.87	41.94	5.74	3.00	6.08	2.33	3.54	0.00	110.00	37.50	5.44
214	ARBH 1901	18.80	34.25	67.19	48.68	5.26	2.83	2.68	0.00	3.81	0.00	73.00	29.10	11.25
215	**Quality Check (Suraj)**	13.60	30.50	64.52	39.86	6.08	3.26	8.29	3.42	3.61	0.00	55.00	25.10	2.35
216	RAH 1046	36.00	31.00	49.81	35.41	2.12	2.68	5.17	0.00	4.93	1.33	68.00	27.50	8.14
217	BGDS 1047	30.98	37.00	58.31	43.80	4.35	2.90	5.51	*0.00*	5.68	*0.00*	66.00	25.50	3.16
218	RB 615	32.18	36.75	65.71	54.10	4.82	3.38	9.40	0.00	3.95	0.00	67.00	26.70	7.45
219	L 1527	49.93	33.50	61.71	58.52	5.57	3.07	8.50	0.00	5.27	0.00	72.00	29.70	7.46
220	BS 7-19	22.48	39.00	64.93	49.10	2.36	2.84	9.22	0.00	3.97	0.00	53.00	20.50	4.14
221	SHS 234	17.85	34.50	62.84	31.14	4.75	2.74	10.51	0.00	2.12	0.00	70.00	16.85	6.25
222	CCH 19-1	14.90	30.50	58.89	48.52	2.88	3.16	14.52	0.00	6.84	0.00	81.00	17.85	8.36
223	**Local Check**	28.15	29.50	60.81	36.33	3.42	3.44	15.23	0.00	0.00	0.00	78.00	16.05	7.45
224	TSH 383	44.61	34.00	60.95	26.94	1.71	2.83	16.96	0.00	2.62	0.00	74.00	17.65	5.25
225	RHC 1409	32.17	36.00	67.91	21.34	4.97	2.66	8.55	0.00	0.00	0.00	115.00	34.45	12.36
226	GJHV 566	36.48	36.75	66.38	27.29	5.00	2.14	7.28	0.00	1.28	0.00	119.00	38.25	10.48
	DCH 32 (SC)					3.38		20.22	2.50		0.00	124.00	14.65	
	DHY 286 (RC)											101.00		
	RCH-2 Bt (RC)											126.00		
	RCH-2Non Bt (SC)											69.00		
	NDLH 1938					5.33		14.64	1.45		0.00		20.65	
	Ajeet 155 BGII					0.00								
	Bt JADOO BG II							9.08	2.54		0.60		30.85	
	LRA 5166													

BA – Banswara; JU – Junagadh; SU – Surat; RA – Rahuri; KH – Khandwa; BW – Bhawanipatna; LG – Lam, Guntur; RC – Raichur; CBE – Coimbatore; SVPR - Srivilliputtur

Table 10. Ent 1a. Br 02b (IET): Preliminary screening of breeding materials for their reaction to key pests (Leaf hopper) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	JIG				Jassid /3 leaves			
		BA	NA	DW	CN	BA	NA	DW	CN
231	TSH 375	III	I	II	I	9.00	3.80	5.00	1.90
232	GBHV 206	III	I	III	I	10.00	3.00	4.40	1.80
233	NH 702	III	I	III	I	10.00	3.20	3.80	1.50
234	ARBH 1951	III	I	II	I	9.00	4.67	4.30	2.00
235	**ZC (NH 615/ NDLH 1938)**	II	I	II	I	8.33	3.47	4.20	1.85
236	NDLH 2051-3	II	I	II	I	8.00	1.60	4.10	1.25
237	BS 8-19	III	I	III	I	10.67	4.60	4.11	1.60
238	RHC 1419	IV	I	II	I	12.00	3.73	4.20	1.20
239	TVH 007	III	I	II	I	9.00	3.40	4.30	1.85
240	CNDTS 283	II	I	III	I	7.00	2.93	4.80	1.60
241	RB 610	III	I	III	I	10.33	3.07	5.80	1.45
242	CCH 19-3	IV	I	III	I	15.33	3.40	6.00	1.75
243	RAH 1046	III	I	IV	I	11.00	3.33	5.60	1.75
244	NH 703	IV	I	II	I	13.00	3.80	6.40	1.50
245	AKH 2013-2	II	I	III	I	7.33	2.07	4.10	1.30
246	CPD 1951	IV	I	III	I	11.67	3.73	5.90	1.90
247	CNH 09-119	IV	I	III	I	14.67	2.27	4.10	1.15
248	BGDS 1047	II	I	III	I	7.67	4.67	4.70	2.10
249	CNH 2077	IV	I	II	I	14.00	3.07	4.60	1.90
250	RB 603	IV	I	III	I	12.00	3.47	3.50	1.50
251	TSH 356	II	I	IV	I	6.67	3.40	4.10	2.00
252	GTHV 15/36	II	I	III	I	6.00	3.27	5.70	1.80
253	RHC 1409	II	I	III	I	7.00	3.13	4.50	1.55
254	CPD 1952	III	I	III	I	10.33	3.20	5.10	2.70
255	CCH 19-2	IV	I	III	I	14.67	3.80	5.70	1.55
256	CNH 17393	IV	I	III	I	15.00	4.40	5.60	1.50
257	**Local Checks**	IV	I	III	I	14.33	3.53	6.60	1.90
258	GBHV 209	IV	I	III	I	14.00	3.73	3.10	1.60
259	RAH 1045	IV	I	III	I	14.00	4.47	4.50	1.55
260	NDLH 2056-4	IV	I	II	I	14.33	2.47	5.40	1.95
261	NH 701	II	I	II	I	8.33	3.80	4.40	2.40
262	BS 7-19	II	I	III	I	9.33	3.73	5.40	1.90
263	CNH 1134	II	I	II	I	7.00	2.73	5.10	2.00
264	**Quality Check (Suraj)**	II	I	III	I	9.00	2.80	6.70	1.60
	DCH 32 (SC)	IV	II	IV		16.00	8.20	4.90	
	DHY 286 (RC)	I				4.00			
	RCH-2 Bt (RC)	IV				13.33			
	RCH-2Non Bt (SC)	IV				12.67			
	NDLS 938			II				4.10	
	Bunny 2 Bt			II				4.30	
	NDLH-1938		I				3.60		
	Jadoo		I				3.87		

BA – Banswara; NA – Nanded; DW – Dharwad; CN - Chamarajanagara

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);

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Table 10.1. Ent 1a. Br 02b (IET): Preliminary screening of breeding materials for their reaction to key pests (Sucking pests) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	Whitefly / 3 leaves			Thrips / 3 leaves		Aphids / 3 leaves		CLCV infected plants (%)
		BA	NA	CN	NA	CN	NA	CN	CN
231	TSH 375	19.33	1.47	1.30	0.00	0.70	0.87	4.00	20.00
232	GBHV 206	19.67	0.93	1.00	0.27	1.00	0.80	5.45	15.00
233	NH 702	21.33	1.07	1.30	0.00	0.90	1.33	3.80	5.00
234	ARBH 1951	19.67	1.00	1.00	0.13	0.70	0.47	4.60	21.00
235	**ZC (NH 615/ NDLH 1938)**	11.00	0.53	1.60	0.27	1.10	0.87	3.95	5.26
236	NDLH 2051-3	11.00	0.93	0.90	0.00	0.90	1.13	5.45	0.00
237	BS 8-19	21.33	1.60	0.90	0.40	0.70	0.93	4.10	11.11
238	RHC 1419	23.33	1.47	1.05	0.00	0.95	2.07	4.10	15.78
239	TVH 007	12.33	0.87	1.35	0.00	1.00	2.40	5.25	5.88
240	CNDTS 283	10.00	0.27	1.10	0.00	0.70	0.73	3.25	5.00
241	RB 610	21.67	0.80	0.75	0.00	0.70	0.60	3.40	16.66
242	CCH 19-3	26.33	0.40	1.15	0.07	1.00	0.93	4.00	15.00
243	RAH 1046	23.00	0.47	1.35	0.73	1.05	1.20	2.70	10.00
244	NH 703	24.00	0.60	1.30	0.20	1.05	1.40	3.20	0.00
245	AKH 2013-2	10.33	0.67	1.30	0.27	0.90	1.27	3.80	0.00
246	CPD 1951	24.00	0.60	0.60	0.20	0.70	0.00	3.60	10.52
247	CNH 09-119	25.00	0.47	1.10	0.00	0.90	1.80	3.25	17.64
248	BGDS 1047	11.00	1.00	1.65	0.27	1.15	0.27	3.15	11.11
249	CNH 2077	22.00	0.93	1.35	0.00	1.00	0.33	3.80	31.25
250	RB 603	20.00	0.87	1.25	0.40	1.05	1.07	3.85	10.00
251	TSH 356	9.00	0.73	1.45	0.40	1.00	0.40	3.00	0.00
252	GTHV 15/36	8.33	0.27	1.00	0.53	1.00	0.40	4.00	16.66
253	RHC 1409	9.33	1.07	1.00	0.00	1.00	1.87	3.00	22.20
254	CPD 1952	19.67	0.60	1.05	0.60	0.95	0.27	3.50	10.00
255	CCH 19-2	23.67	0.87	0.88	0.00	0.90	0.87	4.00	0.00
256	CNH 17393	26.00	0.80	0.55	0.00	0.55	1.13	5.00	13.33
257	**Local Checks**	25.33	0.47	1.15	0.60	1.20	1.47	3.65	0.00
258	GBHV 209	25.00	0.40	1.00	0.00	0.90	0.67	3.85	15.78
259	RAH 1045	26.00	0.80	1.00	0.00	1.00	1.60	4.60	5.55
260	NDLH 2056-4	26.00	0.73	1.40	0.33	1.08	0.00	3.90	5.55
261	NH 701	11.00	0.80	0.80	0.00	0.90	0.00	2.85	0.00
262	BS 7-19	13.00	1.00	1.30	0.27	1.05	0.27	4.25	20.00
263	CNH 1134	9.67	0.53	1.50	0.27	0.98	0.40	3.00	10.00
264	**Quality Check (Suraj)**	17.67	1.00	0.95	0.00	0.65	0.40	3.25	0.00
	DCH 32 (SC)	17.67	1.20		0.00		0.73		
	DHY 286 (RC)	5.33							
	RCH-2 Bt (RC)	15.33							
	RCH-2Non Bt (SC)	14.00							
	NDLS 938								
	Bunny 2 Bt								
	NDLH-1938		0.73		0.27		0.40		
	Jadoo		1.00		0.00		1.33		

BA – Banswara; NA – Nanded; DW – Dharwad; CN – Chamarajanagara

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Table 10.2. Ent 1a. Br 02b (IET): Preliminary screening of breeding materials for their reaction to key pests (Boll damage) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	Natural Enemies / Plant	Green boll damage (%)			Open boll damage (%)			Open boll Locule damage (%)		Good open bolls (No./ Plant)
			H. a	PBW		*H.a*	PBW		PBW		
		ND	DW	ND	DW	DW	ND	DW	ND	DW	BW
231	TSH 375	0.33	11.00	16.67	10.25	4.50	16.27	11.38	5.08	11.94	88.00
232	GBHV 206	0.13	12.00	26.67	10.30	4.05	14.44	11.95	7.52	12.78	62.00
233	NH 702	0.27	7.70	23.33	10.20	4.25	11.27	10.30	10.52	10.35	65.00
234	ARBH 1951	0.13	8.40	21.67	10.15	4.00	17.74	10.23	10.67	10.26	64.00
235	**ZC (NH 615/ NDLH1938)**	0.20	12.10	21.67	10.20	5.00	15.64	11.30	9.33	11.85	90.00
236	NDLH 2051-3	0.07	7.05	5.00	10.15	4.80	8.44	10.68	2.50	10.94	94.00
237	BS 8-19	0.20	10.11	13.33	10.15	3.61	24.15	10.73	10.42	11.01	68.00
238	RHC 1419	0.20	7.00	18.33	10.20	5.05	10.10	10.30	4.17	10.35	66.00
239	TVH 007	0.47	11.35	15.00	10.10	5.65	23.33	10.65	7.00	10.93	75.00
240	CNDTS 283	0.00	7.35	16.67	10.20	5.70	19.21	11.30	8.00	11.85	98.00
241	RB 610	0.07	10.45	20.00	10.30	6.40	20.78	11.45	8.83	12.03	67.00
242	CCH 19-3	0.13	11.00	28.33	10.40	6.75	25.66	11.60	8.00	12.20	42.00
243	RAH 1046	0.20	12.20	11.67	10.20	6.90	26.01	11.30	8.00	11.85	76.00
244	NH 703	0.13	7.97	15.00	10.30	7.70	16.02	10.95	6.33	11.28	68.00
245	AKH 2013-2	0.13	8.88	8.33	10.05	6.95	9.02	10.58	4.58	10.84	92.00
246	CPD 1951	0.13	8.25	11.67	10.10	7.40	14.49	10.15	8.17	10.18	70.00
247	CNH 09-119	0.13	5.99	8.33	10.40	6.85	8.69	11.10	1.67	11.45	66.00
248	BGDS 1047	0.07	8.87	26.67	10.30	7.80	12.37	11.45	12.00	12.03	101.0
249	CNH 2077	0.00	8.18	13.33	10.20	8.20	14.14	11.90	7.53	12.75	59.00
250	RB 603	0.13	7.84	11.67	10.15	8.95	10.71	11.23	6.67	11.76	71.00
251	TSH 356	0.07	12.00	30.00	10.35	8.15	13.63	12.03	7.80	12.86	94.00
252	GTHV 15/36	0.13	11.97	15.00	10.20	8.10	19.25	12.30	7.40	13.35	95.00
253	RHC 1409	0.13	6.71	20.00	10.15	7.45	15.16	10.73	8.10	11.01	80.00
254	CPD 1952	0.33	6.61	11.67	10.20	7.30	23.87	11.37	8.97	11.96	65.00
255	CCH 19-2	0.13	7.45	26.67	10.10	9.50	14.16	10.65	6.90	5.18	60.00
256	CNH 17393	0.07	7.75	16.67	10.45	6.90	21.24	10.98	7.47	5.66	58.00
257	**Local Checks**	0.20	7.95	28.33	10.45	7.95	20.56	11.18	7.60	6.84	59.00
258	GBHV 209	0.07	10.86	13.33	10.00	8.30	10.13	10.00	6.93	7.25	62.00
259	RAH 1045	0.00	11.33	11.67	11.00	7.40	13.80	11.50	8.33	7.75	64.00
260	NDLH 2056-4	0.07	10.23	10.00	10.45	8.00	9.62	11.18	10.10	6.84	65.00
261	NH 701	0.07	8.13	13.33	10.60	7.15	17.91	11.40	9.67	7.45	90.00
262	BS 7-19	0.13	12.21	26.67	10.80	9.45	17.44	11.70	6.97	7.40	64.00
263	CNH 1134	0.00	10.17	10.00	10.85	7.45	9.61	11.78	2.50	7.99	76.00
264	**QC (Suraj)**	0.07	8.02	11.67	10.90	8.20	20.34	12.85	7.33	7.58	70.00
	DCH 32 (SC)	0.00	10.30	26.67	13.40	6.70	42.40	15.50	10.67	16.55	75.00
	DHY 286 (RC)										67.00
	RCH-2 Bt (RC)										105.0
	RCH-2Non Bt (SC)										60.00
	NDLS 938		10.20		10.20	5.60		11.05		11.48	
	Bunny 2 Bt		0.00		9.95	1.15		9.78		9.69	
	NDLH-1938	0.00		25.00			16.28		7.33		
	Jadoo	0.00		15.00			16.63		4.50		

ND – Nandyal; DW – Dharwad; BW - Bhawanipatna

Table 11. Ent 1a. Br 02a/b CC (IET): Preliminary screening of breeding materials for their reaction to key pests (Sucking pests) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	JIG		Jassid/3 leaves		Whitefly / 3leaves			Thrips / 3 leaves		Aphids / 3 leaves			NE / Plant
		SU	LG	SU	LG	SU	KH	LG	SU	LG	SU	KH	LG	SU
271	CCHC 19-2	1.47	2.00	2.00	4.90	3.20	12.50	3.50	19.47	2.80	30.07	2.50	10.90	2.00
272	CNH 18529	1.53	2.00	3.67	4.30	3.47	15.00	3.00	22.80	1.00	25.73	4.00	2.10	1.47
273	**ZC (Phule Yamuna/Suraj)**	1.60	2.00	3.00	4.90	3.60	16.50	1.50	22.93	2.60	30.80	4.00	1.40	1.07
274	DHCC 1901	1.00	3.00	2.13	5.40	1.67	12.50	4.10	12.67	0.80	19.93	3.00	4.40	0.93
275	CCHC 19-1	1.67	3.00	4.67	5.90	3.20	12.00	3.90	26.00	1.80	22.27	4.50	4.50	1.80
276	CNH 18528	1.93	3.00	4.87	6.10	3.00	13.50	2.50	32.40	2.80	23.20	3.50	10.20	1.07
277	**Local Check**	1.87	2.00	5.40	4.10	5.13	12.50	2.70	31.20	3.50	21.60	3.50	3.70	1.20
278	DHCC 1902	1.00	3.00	1.33	5.90	2.80	16.50	2.50	13.60	4.30	18.53	1.50	8.30	1.00
	Jaadoo		2.00		4.00			4.90		1.30			8.20	
	NDLH		2.00		3.60			4.30		4.30			4.10	
	DCH-32		4.00		7.40			2.50		2.60			3.50	

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves); NE – Natural enemies; SU – Surat; LG – Lam Guntur; KH – Khandwa;

Table 11.1. Ent 1a. Br 02a/b CC (IET): Preliminary screening of breeding materials for their reaction to key pests (Boll damage) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	Green boll damage (%)			Open boll damage (%)				Open boll Locule damage (%)			Rosette Flower by PBW (%)	Good open bolls (No./ Plant)
		H. a	PBW		*H. a*	PBW			KH	PBW			
		SU	SU	LG	SU	SU	KH	LG		SU	LG	SU	LG
271	CCHC 19-2	3.30	4.28	59.77	2.80	5.78	55.00	24.15	41.25	2.24	18.17	1.45	13.65
272	CNH 18529	6.14	6.11	43.75	2.88	4.65	45.00	7.59	33.75	1.91	5.50	6.98	18.65
273	**ZC (Phule Yamuna/Suraj)**	6.21	4.00	51.86	3.28	4.16	45.00	6.49	32.50	1.61	4.64	5.19	21.85
274	DHCC 1901	1.76	1.76	43.17	1.18	1.66	50.00	3.06	38.25	0.47	1.98	0.00	24.05
275	CCHC 19-1	7.14	8.32	57.50	3.38	8.44	45.00	14.14	37.50	3.26	12.89	1.28	16.65
276	CNH 18528	7.54	11.56	57.50	3.74	10.45	40.00	16.38	37.50	3.73	8.62	7.75	22.45
277	**Local Check**	6.12	5.05	48.75	2.71	4.67	50.00	9.69	34.25	2.15	10.63	4.56	30.45
278	DHCC 1902	2.23	2.47	60.74	0.93	2.31	40.00	7.78	31.25	0.92	7.49	0.00	22.25
	Jaadoo			45.00				6.05			5.81		39.25
	NDLH			58.54				14.49			9.49		30.25
	DCH-32			48.17				43.56			26.24		10.25

SU – Surat; LG – Lam Guntur; KH – Khandwa;

Table 12. Ent 1a. Br 06 a (IET): Preliminary screening of breeding materials for their reaction to key pests (Jassid and whitefly) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	JIG						Jassid / 3 leaves							Whitefly / 3 leaves						
		JU	RA	BW	LG	RC	CBE	JU	RA	KH	BW	LG	RC	CBE	JU	RA	KH	BW	LG	RC	CBE
281	CCH 19-4	II	II	II	II	II	III	10.30	5.67	16.00	5.67	3.70	5.66	1.50	21.20	3.39	13.50	3.17	2.60	3.32	0.65
282	BS 9-19	II	III	IV	III	II	IV	14.10	6.33	13.50	8.16	6.40	7.66	2.70	29.40	3.11	13.00	2.83	2.70	4.88	0.46
283	RHC-HD 1405	III	III	III	II	III	III	18.00	6.83	9.00	6.33	3.70	8.21	2.80	24.10	3.50	14.50	2.34	3.10	4.44	0.21
284	DSC 1902	III	IV	IV	III	III	IV	16.20	7.89	15.00	8.00	5.50	8.66	2.90	19.30	4.44	15.50	2.67	4.50	5.82	0.32
285	GTHV 18/17	III	II	I	II	II	III	16.00	6.11	12.50	4.50	4.10	4.16	1.70	22.20	3.39	15.00	2.33	2.60	1.82	0.25
286	**Local Check**	II	I	III	II	II	III	11.20	5.56	15.50	6.67	4.10	3.55	3.30	22.80	3.44	12.50	3.33	2.90	2.82	0.58
287	CCH 15-1	III	II	III	II	II	III	15.40	6.28	15.00	6.67	4.90	6.16	3.00	28.90	3.39	15.00	3.17	3.00	4.66	0.45
288	GJHV 584	II	III	III	II	III	III	12.80	5.72	12.00	6.33	4.60	5.66	2.20	25.40	2.83	11.50	3.00	4.30	8.54	0.36
289	RAHC 1902	II	II	II	II	II	III	12.60	6.72	14.00	5.33	4.80	4.16	1.60	20.30	3.33	16.00	2.83	4.00	4.82	0.35
290	CCH 19-2	II	II	III	II	II	III	10.70	6.06	11.00	7.33	4.60	6.66	2.50	25.30	3.83	15.00	3.33	3.50	3.64	0.88
291	TCH 1875	III	IV	IV	III	III	III	15.30	5.89	15.50	8.16	4.80	8.66	3.00	28.50	4.06	13.00	2.83	2.10	7.94	0.54
292	**CC (Suraj)**	III	III	III	II	III	III	15.20	6.67	12.50	6.00	3.40	6.16	4.70	27.20	3.61	13.50	3.33	2.20	4.67	0.44
293	DSC 1901	II	III	III	III	II	IV	13.50	6.83	12.50	7.50	5.60	5.46	3.30	23.00	3.78	11.00	3.00	2.00	3.46	0.38
294	RAHC 1901	II	II	II	II	II	III	14.40	7.00	13.50	5.17	3.80	4.79	3.30	25.90	3.72	14.00	3.33	2.10	3.88	0.35
295	RHC-HD 1312	II	II	I	II	II	II	13.10	6.22	14.50	3.66	2.50	5.26	1.80	19.90	4.22	11.00	2.17	2.10	4.10	0.28
	NDLH 1938			I	II						3.83	3.20						2.17	2.50		
	DCH 32			IV	II						15.33	8.50						3.50	1.90		
	Ajeet 155 BGII			III	IV						5.83							3.17			
	Jaadoo											3.90							8.40		

JU – Junagadh; RA – Rahuri; KH – Khandwa; BW – Bhawanipatna; LG – Lam Guntur; RC – Raichur; CBE – Coimbatore;
JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);

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Table 12.1. Ent 1a. Br 06 a (IET): Preliminary screening of breeding materials for their reaction to key pests (Thrips and Aphids) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	Thrips / 3 leaves						Aphids / 3 leaves							Natural Enemies / Plant					
															RA			BW	RC	CBE
		JU	RA	BW	LG	RC	CBE	JU	RA	KH	BW	LG	RC	CBE	LBB	Chr	Spi			
281	CCH 19-4	13.20	24.17	8.67	3.30	10.81	17.13	19.00	16.50	2.50	28.81	10.20	2.09	9.10	0.78	0.78	0.72	0.33	1.32	0.25
282	BS 9-19	13.90	30.72	10.16	2.60	11.41	17.89	26.00	11.11	3.00	30.56	4.90	5.99	8.20	0.78	1.00	0.78	0.50	0.90	0.12
283	RHC-HD 1405	16.40	29.00	8.83	2.50	12.54	18.12	21.00	13.72	4.00	24.35	4.50	5.76	9.60	1.17	0.94	0.94	0.83	0.66	0.01
284	DSC 1902	17.90	31.67	10.00	3.00	12.84	18.55	28.20	16.56	4.50	30.68	5.60	6.03	6.50	1.06	0.89	0.78	0.66	0.87	0.06
285	GTHV 18/17	15.00	38.94	6.50	4.10	10.50	17.12	25.50	17.11	3.50	17.31	7.40	4.76	5.70	0.78	0.89	0.83	0.67	1.19	0.03
286	**Local Check**	19.70	36.22	8.67	1.80	9.83	16.65	22.70	22.78	3.00	26.42	12.00	2.09	4.50	12.17	11.72	11.50	1.00	1.36	0.02
287	CCH 15-1	16.10	37.11	10.17	2.40	14.53	16.82	19.00	13.72	1.50	26.80	3.50	6.02	7.10	1.11	1.11	0.94	1.17	0.80	0.11
288	GJHV 584	17.10	36.44	8.83	1.90	12.85	15.98	21.20	12.06	1.50	24.28	3.80	4.74	7.50	0.61	0.78	0.94	0.50	1.02	0.04
289	RAHC 1902	19.50	34.67	8.33	2.70	12.74	8.12	17.20	10.67	3.50	28.56	5.90	4.31	8.60	1.00	1.06	0.78	0.50	0.92	0.05
290	CCH 19-2	14.30	34.89	9.33	2.00	15.76	15.65	18.40	15.72	4.00	25.18	3.70	5.12	6.40	1.00	0.78	0.89	0.33	0.61	0.06
291	TCH 1875	18.40	38.67	10.16	1.80	15.87	16.12	21.60	12.44	2.50	32.03	7.30	6.02	4.50	1.22	1.11	0.89	0.50	0.51	0.29
292	**CC (Suraj)**	16.50	43.00	9.00	2.00	16.44	15.56	18.30	15.11	2.50	30.92	9.80	5.12	4.10	1.06	0.83	0.83	0.33	0.69	0.17
293	DSC 1901	21.70	39.11	9.50	1.00	16.77	14.98	19.80	16.39	2.50	22.51	2.50	6.01	7.80	0.89	1.17	0.83	0.50	0.57	0.05
294	RAHC 1901	20.10	32.39	7.67	2.00	17.50	15.66	17.30	14.67	3.50	30.43	7.60	5.12	4.10	1.00	0.83	1.00	0.83	0.67	0.06
295	RHC-HD 1312	14.40	37.83	5.66	1.30	13.94	8.78	21.30	18.78	2.50	15.20	8.80	3.45	6.40	1.00	1.17	1.17	0.50	0.65	0.06
	NDLH 1938			6.83	1.00						17.83	6.60						0.33		
	DCH 32			9.67	1.60						30.17	4.10						0.50		
	Ajeet 155 BGII			7.50							24.17							0.33		
	Jaadoo				2.20							5.20								

JU – Junagadh; RA – Rahuri; KH – Khandwa; BW – Bhawanipatna; LG – Lam Guntur; RC – Raichur; CBE – Coimbatore;

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Table 12.2. Ent 1a. Br 06 a (IET): Preliminary screening of breeding materials for their reaction to key pests (Boll damage) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	Green boll damage (%)		Green boll damage (%)		Open boll damage (%)				Open boll damage (%)		
				H. a	PBW					*H. a*	PBW	
		JU	RC	BW	LG	JU	KH	RC	CBE	BW	KH	LG
281	CCH 19-4	34.94	45.15	5.07	60.00	36.36	25.00	42.39	4.50	4.73	45.00	15.75
282	BS 9-19	29.92	44.15	7.92	50.58	35.21	35.00	41.84	4.00	6.40	55.00	24.83
283	RHC-HD 1405	34.94	32.65	6.78	32.50	38.54	40.00	29.62	5.50	6.00	40.00	16.76
284	DSC 1902	29.92	45.15	7.52	54.38	31.87	20.00	43.29	2.50	6.92	45.00	15.88
285	GTHV 18/17	26.44	67.65	7.88	40.88	28.20	20.00	64.35	3.00	6.67	35.00	21.63
286	**Local Check**	24.89	29.65	7.33	57.32	29.42	15.00	26.79	4.50	6.33	40.00	18.47
287	CCH 15-1	29.92	60.65	6.43	64.27	34.72	40.00	57.41	5.50	5.07	40.00	30.08
288	GJHV 584	24.89	61.15	6.07	67.92	26.77	25.00	58.29	4.50	4.74	30.00	27.69
289	RAHC 1902	39.96	60.15	7.62	61.25	44.49	35.00	59.59	2.50	6.62	25.00	13.04
290	CCH 19-2	29.92	60.15	6.28	64.82	31.96	45.00	61.97	3.50	5.28	45.00	40.12
291	TCH 1875	34.94	57.65	5.42	64.21	38.72	20.00	54.91	4.00	3.89	50.00	23.57
292	**CC (Suraj)**	24.89	64.15	7.13	66.25	28.03	45.00	61.02	3.50	6.13	50.00	16.93
293	DSC 1901	24.89	50.15	7.69	63.33	27.98	45.00	47.76	4.50	6.69	55.00	32.23
294	RAHC 1901	29.92	44.65	6.98	57.50	33.51	25.00	46.49	4.50	5.98	55.00	19.47
295	RHC-HD 1312	19.84	55.15	4.99	67.07	22.54	35.00	56.94	3.00	3.99	35.00	14.72
	NDLH 1938			8.33	48.34					7.33		24.07
	DCH 32			6.38	44.48					5.38		25.93
	Ajeet 155 BGII			3.27						2.27		
	Jaadoo				60.46							10.40

JU – Junagadh; KH – Khandwa; BW – Bhawanipatna; LG – Lam Guntur; RC – Raichur; CBE – Coimbatore;

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Table 12.3. Ent 1a. Br 06 a (IET): Preliminary screening of breeding materials for their reaction to key pests (Open boll locule damage) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	Open boll Locule damage (%)				Open boll Locule damage (%)		Good open bolls (No./ Plant)	
						H. a	PBW		
		JU	KH	RC	CBE	BW	LG	LG	RC
281	CCH 19-4	30.16	35.25	50.75	68.30	2.38	10.72	28.45	3.22
282	BS 9-19	28.51	31.75	54.95	61.13	4.60	15.56	18.85	2.35
283	RHC-HD 1405	31.03	31.75	45.86	46.40	3.61	10.83	31.05	7.25
284	DSC 1902	26.34	34.00	44.05	58.40	3.84	11.36	16.45	7.15
285	GTHV 18/17	24.22	37.50	54.88	48.50	3.80	12.76	22.65	14.24
286	**Local Check**	23.11	38.50	47.61	50.76	3.83	12.03	28.45	5.25
287	CCH 15-1	27.50	34.75	47.57	45.00	3.06	21.93	22.25	2.26
288	GJHV 584	23.37	33.25	48.19	75.60	2.90	14.39	27.05	3.34
289	RAHC 1902	38.16	36.25	54.48	48.08	4.64	10.44	31.65	5.41
290	CCH 19-2	27.70	37.25	51.30	56.90	3.16	19.26	28.05	2.25
291	TCH 1875	32.88	39.25	51.65	39.40	2.31	15.92	21.45	5.36
292	**CC (Suraj)**	23.94	42.25	50.12	49.90	4.28	13.86	18.85	4.14
293	DSC 1901	21.63	39.50	55.48	47.40	4.44	17.98	16.45	11.46
294	RAHC 1901	28.35	37.25	35.88	50.07	4.11	14.32	26.65	5.45
295	RHC-HD 1312	17.14	34.50	54.32	44.29	2.50	10.88	25.45	6.23
	NDLH 1938					5.33	16.57	23.05	
	DCH 32					3.38	17.51	14.25	
	Ajeet 155 BGII					0.00			
	Jaadoo						8.13	36.45	

JU – Junagadh; KH – Khandwa; BW – Bhawanipatna; LG – Lam Guntur; RC – Raichur; CBE – Coimbatore;

Table 13. Ent 1a. Br 06 b (IET): Preliminary screening of breeding materials for their reaction to key pests (Sucking pests) of cotton at South Zone during 2019-20

Entry Code	Name of Entry	JIG			Jassid / 3 leaves			Whitefly / 3 leaves		Thrips / 3 leaves		Aphids / 3 leaves		CLCV infected plants (%)	Natural Enemies / Plant	
		ND	DW	CN	ND	DW	CN	ND	CN	ND	CN	ND	CN	CN	ND	CN
301	RAHC 1901	I	III	II	4.60	5.80	3.05	0.13	2.00	0.00	1.40	0.00	4.05	0.00	0.13	2.30
302	TCH 002	I	III	II	4.07	5.80	3.80	0.13	1.95	0.00	1.90	0.40	5.00	0.00	0.07	2.75
303	GBHV 187	I	III	II	2.20	5.60	3.65	0.07	1.55	0.13	1.50	0.00	4.65	10.52	0.13	2.60
304	CNH 09-77	I	III	II	3.13	5.80	3.40	0.07	2.05	0.00	1.85	0.27	4.40	0.00	0.13	2.51
305	RHC-HD 1312	I	III	III	4.40	4.40	6.65	0.13	2.85	0.00	1.95	0.00	10.55	35.00	0.20	3.15
306	CCH 15-1	I	III	II	4.53	8.40	3.00	0.27	1.40	0.13	1.35	0.67	3.70	25.00	0.07	2.45
307	DSC 1951	I	III	I	5.13	5.30	1.65	0.27	0.45	0.00	0.55	0.87	3.70	0.00	0.20	1.50
308	**CC (Suraj)**	I	III	II	4.87	4.40	4.00	0.13	2.70	0.00	1.95	0.00	4.00	5.00	0.07	2.62
309	CNH 1133	I	III	I	3.07	6.30	1.95	0.20	1.05	0.00	0.35	0.00	2.65	15.78	0.20	1.58
310	CCH 19-4	I	III	II	3.67	5.50	3.20	0.60	2.10	0.00	1.50	0.80	4.90	23.52	0.07	2.53
311	CNH 2046	I	III	I	4.93	5.70	1.90	0.33	1.05	0.07	0.65	0.20	2.75	0.00	0.00	1.15
312	RHC-HD 1405	I	III	III	5.53	5.70	6.80	0.20	3.85	0.00	2.50	0.00	9.40	0.00	0.13	3.15
313	GTHV 18/19	I	II	II	5.47	4.80	3.00	0.80	1.90	0.00	1.75	0.00	5.90	16.66	0.20	2.45
314	CNH 1132	I	III	II	3.93	5.00	3.60	0.53	1.95	0.07	1.70	0.00	4.70	5.26	0.13	2.34
315	**Local Check**	I	II	II	3.00	6.40	2.75	0.47	1.95	0.00	1.95	1.00	5.50	5.26	0.13	2.56
316	CNDTS 44	I	III	III	4.13	4.50	6.65	0.60	4.05	0.00	2.65	0.00	9.23	5.88	0.07	3.48
317	DSC 1952	I	III	III	4.33	5.90	5.20	0.27	3.95	0.20	2.65	0.00	11.05	11.11	0.13	3.91
318	CNH 09-45	I	II	II	3.60	6.10	2.10	0.20	2.25	0.00	1.95	0.67	4.05	6.25	0.00	2.56
319	RAHC 1902	I	II	II	3.27	6.30	2.10	0.20	2.45	0.00	1.90	0.27	4.85	5.00	0.07	1.98
320	CCH 19-5	I	II	II	5.13	6.00	2.00	0.40	2.35	0.00	1.80	0.00	5.35	15.78	0.13	2.15
	DCH-32	I			6.80			0.07		0.00		1.13			0.13	
	NDLH-1938	I			4.33			0.13		0.00		0.40			0.07	
	Jadoo	I			4.67			0.13		0.00		0.00			0.00	

ND – Nandyal; DW – Dharwad; CN – Chamarajanagara;

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);

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Table 13.1. Ent 1a. Br 06 b (IET): Preliminary screening of breeding materials for their reaction to key pests (Boll damage) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	Green boll damage (%)				Open boll damage (%)				Open boll Locule damage due to PBW (%)		
		H. a	PBW			*H. a*	PBW					
		DW	ND	DW	CN	DW	ND	DW	CN	ND	DW	CN
301	RAHC 1901	8.27	41.67	11.28	12.56	6.10	17.56	12.40	13.52	9.81	12.96	15.14
302	TCH 002	11.26	38.33	11.25	13.50	5.95	14.43	12.69	14.12	8.13	13.40	16.15
303	GBHV 187	13.14	20.00	11.25	12.50	6.15	10.47	12.36	13.46	3.11	12.91	14.60
304	CNH 09-77	8.02	18.33	11.42	12.84	5.95	11.63	13.51	15.60	3.25	14.56	16.05
305	RHC-HD 1312	9.28	48.33	14.26	18.52	6.00	22.87	16.88	19.50	10.04	18.19	22.14
306	CCH 15-1	7.95	35.00	11.56	13.52	6.15	27.19	12.68	13.80	9.02	13.24	15.04
307	DSC 1951	7.56	58.33	11.35	6.80	4.00	28.10	9.73	8.10	7.91	8.91	10.56
308	**CC (Suraj)**	7.81	46.67	10.31	10.62	5.00	20.88	10.77	11.23	7.08	11.00	14.60
309	CNH 1133	10.46	23.33	12.00	7.50	4.45	12.41	10.05	8.10	4.31	9.08	10.52
310	CCH 19-4	10.81	41.67	10.26	11.32	5.70	13.47	11.38	12.50	7.92	11.94	14.80
311	CNH 2046	7.18	40.00	10.97	6.53	3.70	25.80	9.11	7.25	7.65	8.18	9.65
312	RHC-HD 1405	7.00	41.67	16.28	17.56	8.70	25.70	17.14	18.00	8.90	17.57	21.56
313	GTHV 18/19	11.35	30.00	12.70	13.40	6.90	17.12	13.60	14.50	8.51	14.05	15.75
314	CNH 1132	7.21	38.33	11.82	12.64	6.50	15.88	12.19	12.56	7.50	12.38	14.50
315	**Local Check**	12.26	25.00	10.13	10.26	6.30	13.97	10.44	10.75	4.26	10.60	12.03
316	CNDTS 44	12.21	33.33	14.40	16.80	6.95	25.43	16.25	18.10	7.36	17.18	23.45
317	DSC 1952	11.62	41.67	17.10	19.20	8.70	17.82	18.58	20.05	8.75	19.31	22.80
318	CNH 09-45	12.22	30.00	10.23	10.45	5.70	14.12	11.26	12.30	4.79	11.78	15.16
319	RAHC 1902	12.14	28.33	10.06	11.12	5.95	16.25	11.05	12.04	6.76	11.55	13.45
320	CCH 19-5	12.23	55.00	11.80	13.60	6.30	24.18	13.20	14.60	7.03	13.90	15.60
	DCH-32		60.00				29.16			13.51		
	NDLH-1938		33.33				23.15			10.04		
	Jadoo		45.00				16.35			21.43		

ND – Nandyal; DW – Dharwad; CN – Chamarajanagara;

Table 14. Ent 1a. Br 12a (IET): Preliminary screening of breeding materials for their reaction to key pests (Jassid and Whitefly) of cotton at Central and South Zones during 2019-20.

Entry Code	Name of Entry	Jassid injury grade						Jassid / 3 leaves						Whitefly / 3 leaves				
		SU	RA	LG	DW	CN	CBE	SU	RA	LG	DW	CN	CBE	SU	RA	LG	CN	CBE
321	SBSD 5-6	1.95	IV	IV	III	I	III	6.30	10.17	6.50	10.70	1.30	8.40	5.30	4.39	1.80	1.00	0.65
322	CCB 64B	2.60	IV	IV	III	I	III	8.35	11.94	6.40	10.00	1.05	8.30	3.35	5.89	1.30	0.88	0.45
323	DB 1901	2.15	IV	III	III	I	III	8.20	13.61	5.70	8.70	1.80	7.20	4.50	6.67	2.60	1.05	0.31
324	**ZC (Phule Rukhmai-CZ &Suvin-SZ)**	2.70	IV	III	III	I	III	10.05	13.11	4.60	7.70	2.05	6.80	4.50	6.83	1.40	0.95	0.54
325	CCB 142	3.15	IV	III	III	I	III	12.35	14.22	4.10	6.50	1.10	8.00	4.15	5.83	2.60	1.30	0.39
326	CCB 141	3.30	IV	III	III	II	III	12.05	14.61	5.20	6.30	3.10	7.60	5.20	6.22	1.10	2.25	0.48
	NDLH			II						2.60						2.90		
	DCH-32			IV						6.90						2.90		

SU – Surat; RA – Rahuri; LG – Lam Guntur; DW – Dharwad; CN – Chamarajanagara; CBE – Coimbatore;

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);

Table 14.1. Ent 1a. Br 12a (IET): Preliminary screening of breeding materials for their reaction to key pests (Thrips and Aphids) of cotton at Central and South Zones during 2019-20.

Entry Code	Name of Entry	Thrips / 3 leaves					Aphids / 3 leaves					CLCV infected plants (%)	Natural Enemies / Plant					
		SU	RA	LG	CN	CBE	SU	RA	LG	CN	CBE	CN	SU	RA			CN	CBE
														LBB	Chrysopa	Spider		
321	SBSD 5-6	12.70	23.58	1.60	0.40	3.94	20.00	14.19	1.70	2.80	9.40	20.00	0.30	1.00	1.10	1.11	1.25	0.22
322	CCB 64B	21.65	20.83	0.80	0.88	3.85	12.75	13.44	3.20	2.70	8.60	10.52	0.35	1.21	0.70	1.25	1.52	0.12
323	DB 1901	19.95	18.64	0.70	0.65	4.10	21.85	13.00	4.20	3.35	9.70	15.78	0.55	1.22	0.74	0.89	1.35	0.06
324	**ZC (Phule Rukhmai/Suvin)**	17.95	14.69	1.20	0.70	3.16	20.80	12.70	2.80	4.05	6.60	10.52	0.90	1.19	1.19	0.70	1.10	0.05
325	CCB 142	22.20	17.18	0.80	0.10	2.55	27.70	11.11	1.90	3.45	6.30	5.26	0.35	1.11	0.59	1.01	0.98	0.04
326	CCB 141	22.65	17.17	0.90	2.15	3.14	25.45	11.22	3.70	4.25	5.80	0.00	0.55	1.28	0.84	1.03	2.15	0.02
	NDLH			0.90					2.90									
	DCH-32			0.80					3.60									

SU – Surat; RA – Rahuri; LG – Lam Guntur; CN – Chamarajanagara; CBE – Coimbatore;

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Table 14.2. Ent 1a. Br 12a (IET): Preliminary screening of breeding materials for their reaction to key pests (Boll damage) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	Green boll damage (%)						Open boll damage (%)					
		H. a		PBW				*H. a*		PBW			
		SU	DW	SU	LG	DW	CN	SU	DW	SU	LG	DW	CN
321	SBSD 5-6	14.50	12.26	7.62	66.65	10.77	6.54	5.70	4.75	7.39	20.44	8.81	6.84
322	CCB 64B	11.93	13.02	9.25	70.00	11.58	7.15	6.42	4.90	9.07	34.96	10.01	8.45
323	DB 1901	10.47	12.23	8.60	65.00	12.55	8.10	5.38	5.45	5.71	36.21	10.48	8.40
324	**ZC (Phule Rukhmai /Suvin)**	14.18	12.14	6.27	54.88	11.75	7.50	7.06	4.65	6.43	41.25	9.66	7.56
325	CCB 142	15.89	11.30	6.42	54.33	10.95	6.89	7.88	3.85	8.51	42.06	9.52	8.10
326	CCB 141	19.44	12.11	7.02	61.83	11.62	12.23	7.52	6.75	8.38	32.56	12.33	13.04
	Jaadoo				61.80						9.57		
	NDLH				46.31						11.86		
	DCH-32				61.99						33.65		

SU – Surat; RA – Rahuri; LG – Lam Guntur; DW – Dharwad; CN – Chamarajanagara; CBE – Coimbatore;

Table 14.3. Ent 1a. Br 12a (IET): Preliminary screening of breeding materials for their reaction to key pests (Open Boll locule damage) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	Open boll Locule damage (%)					Rosette Flower by PBW (%)	Good open bolls (No./ Plant)
		PBW						
		SU	LG	DW	CN	CBE	SU	LG
321	SBSD 5-6	2.90	13.57	9.83	8.50	35.90	1.67	31.65
322	CCB 64B	3.79	15.75	10.23	8.64	28.39	2.08	26.65
323	DB 1901	2.60	17.34	10.44	9.50	40.01	1.32	27.45
324	**ZC (Phule Rukhmai-CZ &Suvin-SZ)**	3.05	28.60	10.61	8.15	28.88	1.25	15.65
325	CCB 142	3.94	28.49	10.31	9.45	45.50	0.00	10.65
326	CCB 141	4.01	20.85	12.68	13.87	56.60	1.56	16.85
	Jaadoo		6.78					27.45
	NDLH		6.21					27.85
	DCH-32		18.76					14.25

SU – Surat; LG – Lam Guntur; DW – Dharwad; CN – Chamarajanagara; CBE – Coimbatore;

Table 15. Ent 1a. Br 15a (PHT): Preliminary screening of breeding materials for their reaction to key pests (Sucking pests) of cotton at Central and South Zones during 2019-20

Entry code	Name of Entry	Jassid injury grade					Jassid / 3 leaves					Whitefly / 3 leaves				Thrips / 3 leaves		
		BW	RA	LG	DW	CBE	BW	RA	LG	DW	CBE	BW	RA	LG	CBE	RA	LG	CBE
331	DHB 1902	II	III	III	II	III	8.67	14.39	4.30	7.10	7.40	15.33	7.39	5.40	0.51	18.28	0.70	15.98
332	RHB 1401	IV	III	III	III	III	12.33	17.28	4.90	8.00	5.60	18.33	5.17	3.30	0.45	18.03	0.90	8.18
333	**Local Check**	II	II	III	III	III	9.00	15.39	6.60	8.50	8.20	16.00	5.83	2.40	0.36	18.97	0.60	12.65
334	DHB 1901	IV	II	III	III	III	13.00	15.83	3.70	6.90	5.20	19.00	6.28	2.30	0.49	20.74	0.70	6.12
335	**Phule Dhara (CC)**	IV	II	III	III	III	11.67	14.83	3.80	7.50	6.30	17.67	6.78	3.70	0.88	28.81	0.80	11.56
336	LAHB 2	III	II	III	III	III	10.33	14.78	4.30	7.70	5.20	17.33	6.33	4.20	0.58	23.08	1.25	9.46
	DCH 32 (SC)	IV		III			13.00		7.30			19.00		1.90			0.10	
	DHY 286 (RC)	I					4.00					4.33						
	RCH-2 Bt (RC)	IV					9.33					18.33						
	RCH-2Non Bt (SC)	IV					9.00					16.00						
	Jaadoo			II					3.50					4.40			0.40	
	NDLH			II					2.80					1.70			2.10	

BW – Bhawanipatna; RA – Rahuri; LG – Lam Guntur; DW – Dharwad; CBE – Coimbatore

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);

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Table 15.1. Ent 1a. Br 15a (PHT): Preliminary screening of breeding materials for their reaction to key pests (Boll damage) of cotton at Central and South Zones during 2019-20

Entry code	Name of Entry	Aphids / 3 leaves			Natural Enemies / Plant				Green boll damage (%)			Open boll damage (%)			
					RA			CBE	*H. a*	PBW		*H. a*	PBW		
		RA	LG	CBE	LBB	Chrysopa	Spider		DW	LG	DW	DW	LG	DW	CBE
331	DHB 1902	9.93	4.00	9.40	1.16	0.99	0.67	0.22	8.09	67.96	10.79	3.85	23.08	9.19	4.50
332	RHB 1401	8.78	5.40	8.60	1.01	0.74	0.92	0.14	10.83	65.01	8.80	3.55	33.03	8.03	4.00
333	**Local Check**	11.44	3.00	8.90	1.02	0.88	0.78	0.02	7.29	65.43	10.75	4.10	37.19	9.10	5.50
334	DHB 1901	9.52	4.10	6.90	1.31	1.01	0.84	0.06	12.04	59.61	10.79	4.10	39.38	9.18	2.50
335	**Phule Dhara (CC)**	19.48	3.50	7.70	13.00	12.83	12.73	0.25	10.99	53.75	11.80	4.80	38.76	9.69	5.50
336	LAHB 2	9.30	6.70	7.20	1.10	0.97	0.73	0.04	11.64	61.25	12.58	5.40	39.29	7.91	4.00
	DCH 32 (SC)		3.70							61.83			49.01		
	DHY 286 (RC)														
	RCH-2 Bt (RC)														
	RCH-2Non Bt (SC)														
	Jaadoo		2.00							49.60			20.98		
	NDLH		10.10							56.25			26.49		

RA – Rahuri; LG – Lam Guntur; DW – Dharwad; CBE – Coimbatore

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Table 15.2. Ent 1a. Br 15a (PHT): Preliminary screening of breeding materials for their reaction to key pests (Open boll locule damage) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	Open boll Locule damage (%)			Good open bolls (No./ Plant)	
		PBW				
		LG	DW	CBE	BW	LG
331	DHB 1902	15.87	10.88	29.99	102.0	21.1
332	RHB 1401	19.67	10.14	44.69	74.0	16.1
333	**Local Check**	24.33	11.28	35.51	98.0	16.7
334	DHB 1901	23.88	10.87	50.44	82.0	19.1
335	**Phule Dhara (CC)**	25.59	10.64	29.35	87.0	19.9
336	LAHB 2	21.55	10.58	36.62	89.0	17.9
	DCH 32 (SC)	18.74			118.0	17.3
	DHY 286 (RC)				103.0	
	RCH-2 Bt (RC)				121.0	
	RCH-2Non Bt (SC)				77.0	
	Jaadoo	12.36				34.7
	NDLH	13.58				34.3

BW – Bhawanipatna; RA – Rahuri; LG – Lam Guntur; DW – Dharwad; CBE – Coimbatore

Table 16. Ent 1a. Br 22a/b (IET): Preliminary screening of breeding materials for their reaction to key pests of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	JIG		Jassid / 3 leaves			Whitefly / 3 leaves		Thrips / 3 leaves	Aphids / 3 leaves		Natural Enemies / Plant	Green boll damage (%)		
													H. a	PBW	
		DW	CN	KH	DW	CN	KH	CN	CN	KH	CN	CN	DW	DW	CN
341	DWDA 1902	I	I	12.50	2.10	0.10	12.50	0.10	0.10	4.50	2.70	0.87	6.20	5.13	2.25
342	CNA 2036	I	I	11.50	1.70	0.30	13.50	0.10	0.10	2.00	2.80	0.65	3.85	5.15	2.30
343	CNA 2037	I	I	13.00	2.00	0.30	14.50	0.20	0.20	3.00	3.00	1.04	6.25	4.93	1.85
344	NDLA 3116-3	I	I	12.50	2.80	0.00	12.50	0.00	0.00	4.50	3.35	0.98	6.62	5.20	2.40
345	JLA 1102	I	I	13.00	1.70	0.25	14.00	0.10	0.10	3.50	2.90	0.25	3.95	4.93	1.86
346	**ZC (AKA 7/DLSa 17)**	I	I	11.00	2.60	0.00	15.00	0.00	0.00	4.00	3.20	0.54	7.01	4.77	1.54
347	PA 863	I	I	16.00	3.00	0.00	14.00	0.00	0.00	3.00	2.60	0.68	3.05	4.84	1.68
348	MDL 2689	I	I	13.00	2.10	0.30	14.50	0.40	0.25	3.50	2.85	0.75	5.87	4.49	0.98
349	GAM 267	I	I	12.50	2.80	0.00	13.00	0.30	0.10	4.50	2.60	0.66	6.28	4.75	1.50
350	CNA 1042	I	I	11.50	2.70	0.00	11.50	0.10	0.10	3.00	3.25	0.65	3.75	4.13	0.25
351	NDLA 3104-4	I	I	12.50	3.20	0.25	11.00	0.00	0.10	4.00	3.45	0.00	5.30	4.30	0.60
352	**Local Check**	I	I	15.00	2.60	0.00	13.00	0.30	0.30	3.00	3.80	0.45	4.00	5.28	2.56
353	JLA 1313	I	I	13.00	2.30	0.20	16.50	0.10	0.00	2.50	2.90	0.25	5.25	4.93	1.85
354	GAM 273	I	I	12.50	2.10	0.00	14.50	0.00	0.00	3.00	3.00	0.35	5.15	4.83	1.65
355	PA 860	I	I	14.00	2.20	0.00	14.00	0.00	0.00	4.50	3.20	0.45	5.35	4.00	0.00
356	MDL 2679	I	I	17.00	2.70	0.30	12.50	0.30	0.10	2.50	2.90	0.80	4.19	4.68	1.35
357	AKA 2013-8	I	I	12.50	2.40	0.00	15.00	0.00	0.00	3.50	3.30	0.45	5.92	4.73	1.45
358	CNA 2035	I	I	13.50	1.90	0.45	18.00	0.10	0.00	2.00	2.70	0.35	5.92	5.03	2.05
359	DWDA 1901	I	I	11.00	2.20	0.50	14.50	0.00	0.00	4.00	3.00	0.25	5.25	4.78	1.56
	Br-24 b CVT 9661		I			0.00		0.10			3.00	0.00			1.68

KH – Khandwa; DW – Dharwad; CN – Chamarajanagara;

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);

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Table 16.1. Ent 1a. Br 22a/b (IET): Preliminary screening of breeding materials for their reaction to key pests (Open boll damage) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	Open boll damage (%)					Open boll Locule damage (%)		
			H. a	PBW			SBW	PBW	
		KH	DW	KH	DW	CN	KH	DW	CN
341	DWDA 1902	4.50	4.20	55.00	5.29	3.25	34.00	5.37	5.45
342	CNA 2036	2.00	2.80	60.00	5.18	2.45	30.75	5.19	3.56
343	CNA 2037	3.00	2.90	40.00	4.73	3.20	30.75	4.64	4.60
344	NDLA 3116-3	4.50	4.08	50.00	6.05	3.54	34.50	6.47	5.40
345	JLA 1102	3.50	3.08	50.00	5.24	2.89	34.75	5.40	3.56
346	**ZC (AKA 7/DLSa 17)**	4.00	4.70	40.00	5.11	3.55	37.50	5.28	5.60
347	PA 863	3.00	1.18	35.00	5.55	3.45	32.50	5.90	5.45
348	MDL 2689	3.50	2.10	40.00	4.50	2.65	34.00	4.50	5.80
349	GAM 267	4.50	2.65	35.00	5.15	4.50	33.50	5.34	5.50
350	CNA 1042	3.00	2.18	40.00	5.39	2.54	34.25	6.02	4.56
351	NDLA 3104-4	4.00	2.48	60.00	5.93	2.65	34.00	6.75	4.52
352	**Local Check**	3.00	2.85	55.00	5.57	3.56	38.25	5.71	6.50
353	JLA 1313	2.50	2.50	45.00	5.69	2.85	34.00	6.07	4.32
354	GAM 273	3.00	2.25	55.00	5.16	3.45	34.25	5.33	5.41
355	PA 860	4.50	2.75	35.00	4.68	2.50	30.50	5.01	3.52
356	MDL 2679	2.50	2.70	25.00	4.11	2.35	31.00	3.82	4.50
357	AKA 2013-8	3.50	2.45	55.00	4.13	3.54	37.00	3.84	4.60
358	CNA 2035	2.00	3.20	50.00	5.72	3.54	36.50	6.07	4.20
359	DWDA 1901	4.00	2.38	40.00	4.64	3.45	34.50	4.57	4.56
	Br-24 b CVT 9661					3.56			5.20

KH – Khandwa; DW – Dharwad; CN – Chamarajanagara;

Table 17. Ent 1a. Br 22ab (IET) CC: Preliminary screening of breeding materials for their reaction to key pests of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	JIG	Jassid / 3 leaves		Whitefly / 3 leaves		Thrips / 3 leaves	Aphids / 3 leaves		Natural Enemies / Plant	Green boll damage (%)	
											H. a	PBW
		SU	SU	KH	SU	KH	SU	SU	KH	SU	SU	SU
381	DDCC 1902	1.13	3.73	12.50	5.53	18.00	15.93	19.87	3.50	1.67	6.68	8.60
382	**ZC (AKA 7/DLSa 17)**	1.00	2.80	12.00	5.47	15.00	16.87	5.73	4.00	1.73	2.72	6.40
383	CNA 18562	1.07	2.93	12.50	4.87	17.00	13.8	12.93	4.00	1.33	3.62	6.86
384	**DDCC 1 (Common Check)**	1.07	3.73	12.00	5.13	12.50	15.07	13.60	3.00	2.13	4.72	6.08
385	DDCC 1901	1.13	3.87	13.50	5.93	14.50	21.93	9.47	5.00	1.67	7.38	6.39
386	**Local Check**	1.07	3.40	15.50	4.87	15.00	14.8	8.60	5.50	2.13	5.67	5.68
387	CNA 18563	1.40	4.53	15.00	4.60	12.50	18.93	19.80	4.50	2.07	6.96	6.93

SU – Surat; KH – Khandwa;

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);

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Table 17.1. Ent 1a. Br 22ab (IET) CC: Preliminary screening of breeding materials for their reaction to key pests (Open boll damage) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	Open boll damage (%)				Open boll Locule damage (%)		Rosette Flower by PBW (%)
		SBW	*H. a*	PBW		SBW	PBW	
		KH	SU	SU	KH	KH	SU	SU
381	DDCC 1902	60.00	2.49	7.17	55.00	38.75	2.91	0.00
382	**ZC (AKA 7/DLSa 17)**	20.00	1.05	4.69	45.00	33.75	2.42	0.00
383	CNA 18562	45.00	1.02	3.63	50.00	33.00	1.93	2.95
384	**DDCC 1 (Common Check)**	35.00	2.00	6.83	50.00	39.75	2.46	2.56
385	DDCC 1901	30.00	1.75	6.61	55.00	37.50	2.01	0.00
386	**Local Check**	20.00	1.57	5.33	35.00	37.50	1.83	4.77
387	CNA 18563	45.00	2.38	6.35	65.00	34.25	1.98	2.96

SU – Surat; KH – Khandwa;

Table 18. Ent 1a. Br 32b (IET): Preliminary screening of breeding materials for their reaction to key pests of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	JIG		Jassid / 3 leaves		Whitefly / 3 leaves	Thrips / 3 leaves	Aphids / 3 leaves	Natural Enemies / Plant	Green boll damage (%)			
										H. armigera		PBW	
		SU	DW	SU	DW	SU	SU	SU	SU	SU	DW	SU	DW
421	GBhv 312	1.00	I	1.27	1.80	6.40	13.87	9.60	0.73	2.67	5.19	3.72	5.65
422	DDhc 1901	1.00	I	1.67	2.10	11.80	15.07	11.87	0.73	3.44	5.05	2.35	5.43
423	**ZC (G Cot 23/DDhc 11)**	1.00	I	2.53	3.30	10.47	14.53	10.40	1.07	4.45	4.29	5.57	5.70
424	GShv 780/16	1.40	I	3.33	2.60	13.00	21.87	14.40	1.27	11.19	5.10	9.97	5.43
425	GShv 797/16	1.33	I	3.27	1.70	13.67	17.33	20.33	1.67	9.15	5.97	10.73	5.27
426	GVhv 845	1.00	I	1.53	2.40	8.47	14.80	13.60	0.33	3.94	4.10	3.65	5.34
427	GShv 829/16	1.00	I	1.40	2.30	9.53	14.00	10.93	0.40	3.93	6.22	3.80	4.99
428	GBhv 313	1.53	I	4.13	1.80	12.67	19.20	21.73	1.33	7.44	4.52	8.55	5.25
429	GShv 329/15	1.00	I	1.07	1.00	8.67	14.13	12.67	0.73	3.72	5.67	4.25	4.63
430	**Local Check**	1.33	I	2.87	2.20	12.20	17.60	22.13	1.40	9.93	6.45	10.46	4.80
431	GVhv 936	1.67	I	4.07	1.50	14.67	21.40	16.67	1.53	10.72	4.01	11.88	5.78

SU – Surat; DW – Dharwad;

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);

Contd….

Table 18.1. Ent 1a. Br 32b (IET): Preliminary screening of breeding materials for their reaction to key pests (Open boll damage) of cotton at Central and South Zones during 2019-20

Entry Code	Name of Entry	Open boll damage (%)				Open boll Locule damage (%)		Rosette Flower by PBW (%)
		H. armigera		PBW		PBW		
		SU	DW	SU	DW	SU	DW	SU
421	GBhv 312	2.40	2.10	2.85	5.33	0.59	5.16	0.00
422	DDhc 1901	1.90	2.43	3.08	5.71	0.79	5.86	0.00
423	**ZC (G Cot 23/DDhc 11)**	3.53	2.80	3.76	6.35	0.94	6.68	0.00
424	GShv 780/16	7.66	2.10	7.25	5.22	3.45	5.11	1.85
425	GShv 797/16	8.26	1.60	5.81	6.14	3.00	6.57	5.41
426	GVhv 845	3.37	2.15	2.65	6.67	0.48	7.34	0.00
427	GShv 829/16	3.51	1.68	4.55	5.50	1.14	5.75	0.00
428	GBhv 313	3.77	1.98	4.92	6.13	1.15	6.56	2.39
429	GShv 329/15	2.89	2.35	3.76	4.81	1.08	4.91	0.00
430	**Local Check**	6.74	2.00	7.11	5.40	3.13	5.70	4.99
431	GVhv 936	7.19	1.75	7.31	6.39	3.67	6.70	5.23

SU – Surat; DW – Dharwad;

Table 19. Ent 1a. Br 03a (ZT): Preliminary screening of breeding materials for their reaction to key pests (Leafhopper and Whitefly) of cotton at Central zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade				Jassid / 3 leaves					Whitefly / 3 leaves				
		JU	SU	RA	BW	JU	SU	RA	KH	BW	JU	SU	RA	KH	BW
9101	TSH 367	I	1.10	I	II	9.30	4.40	5.11	11.00	5.17	18.50	3.90	4.72	12.50	2.83
9102	SHS 113	II	1.90	III	III	10.50	6.40	7.44	13.50	7.00	17.30	6.60	4.33	14.50	3.50
9103	**ZC (Phule Yamuna)**	II	1.50	II	II	11.50	5.60	9.06	14.00	5.83	19.70	7.60	4.28	16.50	1.83
9104	GJHV-522	II	1.30	I	III	11.90	4.90	5.78	14.00	6.50	20.30	9.30	4.50	12.50	3.50
9105	**Local Check**	II	1.00	III	III	12.50	2.20	8.89	11.00	7.50	16.60	4.70	4.06	12.00	2.17
9106	F 2662	II	1.20	III	III	10.30	4.20	5.61	9.00	7.00	19.80	8.00	3.83	11.50	3.16
9107	RAH 1076	II	2.50	III	IV	10.90	8.00	6.61	14.00	8.00	18.90	3.40	5.11	12.50	3.50
9108	GJHV-554	I	1.00	I	II	8.70	2.60	5.44	14.00	5.67	17.80	3.90	3.94	12.50	2.83
9109	**Quality Check (Suraj)**	II	2.30	II	III	13.50	7.40	7.50	14.00	7.00	15.00	8.90	3.56	13.00	3.00
	NDLH 1938	II	1.20		I	11.40	4.30			3.83	19.20	6.00			2.00
	DCH 32	III	4.00		IV	16.70	22.90			16.16	17.50	7.70			2.83
	Ajeet 155	I	1.30		III	10.00	5.90			6.33	18.30	4.90			2.83
	DHY286	I	1.00			8.80	1.10				27.60	17.40			

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);
JU – Junagadh; SU – Surat; RA – Rahuri; KH – Khandwa; BW – Bhawanipatna;

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Table 19.1. Ent 1a. Br 03a (ZT): Preliminary screening of breeding materials for their reaction to key pests (Thrips and Aphids) of cotton at Central zone during 2019-20

Entry Code	Name of Entry	Thrips / 3 leaves				Aphids / 3 leaves					Natural Enemies / Plant				
												LBB	Chry	Spi	
		JU	SU	RA	BW	JU	SU	RA	KH	BW	SU	RA	RA	RA	BW
9101	TSH 367	17.00	23.20	35.61	8.16	17.40	14.90	11.00	2.50	23.00	0.40	1.17	0.94	0.89	0.66
9102	SHS 113	18.50	37.60	34.00	9.33	18.60	26.40	11.67	4.00	32.17	0.50	1.11	0.72	0.78	0.83
9103	**ZC (Phule Yamuna)**	14.90	32.50	26.56	7.66	25.00	34.10	13.22	4.00	28.43	0.80	0.89	0.67	0.89	1.17
9104	GJHV-522	16.30	27.60	34.22	9.50	22.30	20.30	12.78	3.00	34.33	0.50	1.50	0.72	0.67	1.00
9105	**Local Check**	19.70	25.70	27.78	9.50	25.80	20.20	14.93	2.00	33.33	0.90	1.39	0.72	0.78	0.33
9106	F 2662	14.50	35.10	24.28	9.67	24.10	30.90	12.78	2.50	29.83	1.10	1.00	0.83	0.78	0.67
9107	RAH 1076	12.80	33.30	27.78	10.00	27.50	34.30	14.00	3.50	31.67	1.10	1.06	1.00	1.00	0.50
9108	GJHV-554	18.10	24.10	29.67	7.67	26.40	18.80	13.56	1.50	21.00	0.70	0.94	0.94	0.89	0.33
9109	**Quality Check (Suraj)**	19.00	35.90	25.50	9.67	24.20	32.70	11.93	3.00	30.00	1.10	0.94	0.89	0.94	0.67
	NDLH 1938	16.20	31.10		6.00	19.30	31.40			20.22	2.00				0.67
	DCH 32	17.70	34.30		10.33	21.90	34.60			23.34	3.20				0.50
	Ajeet 155	15.30	33.50			17.30	34.80			25.00	2.30				0.33
	DHY286	12.80	21.00			22.90	21.70				1.50				

JU – Junagadh; SU – Surat; RA – Rahuri; KH – Khandwa; BW – Bhawanipatna;

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Table 19.2. Ent 1a. Br 03a (ZT): Preliminary screening of breeding materials for their reaction to key pests (Thrips and Aphids) of cotton at Central zone during 2019-20

Entry Code	Name of Entry	Green boll damage (%)				Open boll damage (%)						Open boll Locule damage (%)				Rosette Flower by PBW (%)
		JU	SU	BW	PBW	JU	KH	SU	BW	SU	KH	JU	KH	BW	SU	
			H. a		SU			*H. a*		PBW				*H. a*	PBW	SU
9101	TSH 367	38.71	1.00	8.36	0.32	39.65	35.00	1.92	6.03	0.60	40.00	34.06	32.00	2.69	0.15	0.25
9102	SHS 113	33.15	7.68	7.94	1.94	35.59	20.00	5.48	5.50	2.90	45.00	28.43	33.75	2.06	1.29	1.72
9103	**ZC (Phule Yamuna)**	40.95	4.69	6.20	1.68	42.67	35.00	5.11	3.59	2.61	45.00	35.50	32.50	0.71	1.30	4.74
9104	GJHV-522	30.01	10.12	6.72	2.21	31.51	15.00	5.41	5.80	2.36	50.00	25.19	35.00	3.22	1.11	1.85
9105	**Local Check**	31.46	1.02	8.31	0.39	32.24	10.00	0.62	5.98	0.75	40.00	25.79	37.50	3.32	0.19	0.00
9106	F 2662	36.59	6.83	6.39	2.64	38.10	20.00	6.18	5.12	2.46	25.00	29.88	36.25	2.27	1.15	1.72
9107	RAH 1076	38.82	8.91	7.20	2.99	40.72	25.00	5.92	4.42	4.44	45.00	32.83	33.75	1.90	1.63	3.23
9108	GJHV-554	38.85	1.07	7.99	0.00	41.64	30.00	2.71	6.00	0.63	25.00	34.17	31.25	3.60	0.08	0.00
9109	**QC (Suraj)**	33.21	9.22	7.18	2.24	35.65	35.00	7.15	4.40	2.43	35.00	28.87	35.00	2.52	1.21	1.52
	NDLH 1938	29.86	7.46	8.07	6.07	31.39		12.01	6.07	9.55		24.43		4.47	4.22	3.13
	DCH 32	43.19	26.37	8.41	19.49	45.51		19.79	6.46	10.22		38.65		5.02	5.55	16.07
	Ajeet 155	27.74	0.00	1.88	1.56	30.74		0.00	0.25	2.40		24.68		0.00	1.35	4.17
	DHY286	31.08	10.80		5.22	32.92		11.29		5.56		27.27			2.73	0.00

JU – Junagadh; SU – Surat; RA – Rahuri; KH – Khandwa; BW – Bhawanipatna;

Table 20. Ent 1a. Br 04a (ZT): Preliminary screening of breeding materials for their reaction to key pests (Sucking pests) of cotton at Central zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade				Jassid / 3 leaves				Whitefly / 3 leaves				Thrips / 3 leaves			
		JU	SU	RA	BW	JU	SU	RA	BW	JU	SU	RA	BW	JU	SU	RA	BW
9111	TCH 1828	I	1.90	III	III	9.10	5.60	5.83	7.83	17.30	6.80	3.89	2.67	16.60	26.90	31.11	9.67
9112	**QC (Suraj)**	II	2.60	II	III	11.90	7.80	5.67	7.50	15.50	4.40	4.39	2.00	13.60	32.50	31.39	8.83
9113	RAH 1071	II	1.30	II	II	10.20	4.70	6.06	5.83	14.60	5.70	4.33	2.83	17.40	38.20	32.00	7.33
9114	**ZC (Phule Yamuna)**	II	1.00	II	III	13.90	2.00	5.28	7.50	17.20	9.10	4.33	2.33	12.90	26.50	34.78	10.50
9115	CPD-1501	II	1.40	I	III	12.70	3.40	5.44	7.67	21.30	5.20	4.61	3.16	11.80	32.70	38.78	8.33
9116	**Local Check**	II	1.00	I	III	10.20	1.90	5.44	6.17	21.90	7.30	5.11	3.50	16.10	21.70	35.33	10.17
9117	SIMA 5	I	2.90	I	IV	9.20	9.70	5.28	8.16	17.60	4.20	3.89	1.83	18.80	43.40	32.72	9.67
	NDLH 1938	II	1.20		I	11.40	4.30		3.83	19.20	6.00		2.00	16.20	31.10		6.00
	DCH 32	III	4.00		IV	16.70	22.90		16.16	17.50	7.70		2.83	17.70	34.30		10.33
	Ajeet 155 BGII	I	1.30		III	10.00	5.90		6.83	18.30	4.90		2.83	15.30	33.50		9.67
	DHY 286 (JR)	I	1.00			8.80	1.10			27.60	17.40			12.80	21.00		

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);

JU – Junagadh; SU – Surat; RA – Rahuri; BW – Bhawanipatna;

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Table 20.1. Ent 1a. Br 04a (ZT): Preliminary screening of breeding materials for their reaction to key pests (Aphids, Green boll damage) of cotton at Central zone during 2019-20

Entry Code	Name of Entry	Aphids / 3 leaves				Natural Enemies / Plant					Green boll damage (%)			
						SU	LBB	Chry	SPi	BW	JU	*H. armigera*		PBW
		JU	SU	RA	BW		RA	RA	RA			SU	BW	SU
9111	TCH 1828	16.10	28.10	15.74	25.67	0.90	1.00	0.67	0.94	0.50	35.41	6.69	8.53	2.80
9112	**Quality Check (Suraj)**	21.60	27.00	17.44	29.33	1.20	1.06	0.83	0.67	1.00	45.19	9.52	8.97	2.04
9113	RAH 1071	25.10	31.20	16.70	27.50	0.70	0.78	0.50	0.83	0.83	44.27	11.41	8.46	2.51
9114	**ZC (Phule Yamuna)**	19.60	20.20	17.26	31.17	0.70	0.94	1.11	0.61	0.33	27.62	1.16	7.03	0.39
9115	CPD-1501	24.50	31.80	16.70	33.17	1.30	1.33	0.78	0.83	0.83	29.9	6.83	8.34	1.71
9116	**Local Check**	17.80	21.40	15.22	31.33	0.70	1.17	0.78	0.78	0.50	32.26	1.48	9.82	1.07
9117	SIMA 5	22.20	33.90	15.81	29.50	1.20	0.78	0.67	0.72	0.83	27.62	9.01	9.00	2.52
	NDLH 1938	19.30	31.40		20.22	2.00				0.67	29.86	7.46	8.07	6.07
	DCH 32	21.90	34.60		23.34	3.20				0.50	43.19	26.37	8.41	19.49
	Ajeet 155 BGII	17.30	34.80		25.00	2.30				0.33	27.74	0.00	1.88	1.56
	DHY 286 (JR)	22.90	21.70			1.50					31.08	10.80		5.22

JU – Junagadh; SU – Surat; RA – Rahuri; BW – Bhawanipatna;

Contd….

Table 20.2. Ent 1a. Br 04a (ZT): Preliminary screening of breeding materials for their reaction to key pests (Boll damage and Rosette flowers) of cotton at Central zone during 2019-20

Entry code	Name of Entry	Open boll damage (%)				Open boll Locule damage (%)			Rosette Flower by PBW (%)
		JU	*H. armigera*		PBW	JU	*H. a*	PBW	
			SU	BW	SU		BW	SU	SU
9111	TCH 1828	38.04	7.96	5.90	3.14	31.73	3.54	1.64	0.00
9112	**Quality Check (Suraj)**	49.58	6.35	6.86	3.04	40.00	4.24	1.31	4.59
9113	RAH 1071	45.99	6.22	6.30	2.34	39.75	3.31	1.11	1.52
9114	**ZC (Phule Yamuna)**	29.37	1.87	5.22	0.38	23.60	2.79	0.09	0.00
9115	CPD-1501	31.53	4.56	5.80	2.59	24.32	3.43	1.24	5.43
9116	**Local Check**	35.24	1.40	7.20	1.37	28.41	5.08	0.43	1.72
9117	SIMA 5	29.87	4.97	6.43	4.43	24.52	4.63	1.92	0.00
	NDLH 1938	31.39	12.01	6.07	9.55	24.43	4.47	4.22	3.13
	DCH 32	45.51	19.79	6.46	10.22	38.65	4.02	5.55	16.07
	Ajeet 155 BGII	30.74	0.00	0.25	2.40	24.68	0.00	1.35	4.17
	DHY 286 (JR)	32.92	11.29		5.56	27.27		2.73	0.00

JU – Junagadh; SU – Surat; RA – Rahuri; BW – Bhawanipatna;

Table 21. Ent 1a. Br 05a (ZT): Preliminary screening of breeding materials for their reaction to key pests (Sucking pests) of cotton at Central zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade				Jassid / 3 leaves				Whitefly / 3 leaves				Thrips / 3 leaves			Aphids / 3 leaves		
		BA	JU	SU	RA	BA	JU	SU	RA	BA	JU	SU	RA	JU	SU	RA	JU	SU	RA
9121	**ZC (Phule Asmita)**	IV	II	1.4	III	9.67	11.80	4.60	6.06	17.33	20.60	6.60	4.67	18.40	38.40	34.72	26.70	27.60	20.48
9122	GSHH 15032	III	II	1.5	I	8.00	10.90	4.40	5.83	15.67	16.60	7.30	5.06	12.10	35.70	31.90	22.70	35.50	17.63
9123	**Local Check**	II	II	1.0	I	6.00	13.40	2.60	5.83	11.67	20.00	5.40	4.83	15.90	22.40	40.80	20.10	16.80	29.78
9124	GJHH 13	III	I	1.0	I	7.33	9.60	1.80	5.78	14.00	15.40	4.70	5.83	16.90	20.10	33.74	17.50	23.20	17.67
	DCH 32 (SC)	IV	III	4.0		11.33	16.70	22.90		23.67	15.60	7.70		20.40	34.30		24.70	34.60	
	DHY 286 (RC)	I	I	1.0		3.67	9.00	1.10		4.33	24.20	17.40		13.70	21.00		24.10	21.70	
	RCH-2 Bt (RC)	III				8.00				15.00									
	RCH-2 Non Bt (SC)	III				9.00				14.33				17.80					
	NDLH 1938 (JR)		II	1.2			11.90	4.30			18.10	6.00			31.10		18.40	31.40	
	Ajeet-155 BG II (BWR)		II	1.3			11.60	5.90			17.20	4.90		16.90	33.50		17.70	34.80	

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);

BA – Banswara; JU – Junagadh; SU – Surat; RA – Rahuri;

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Table 21.1. Ent 1a.Br 05a (ZT): Preliminary screening of breeding materials for their reaction to key pests (Sucking pests) of cotton at Central zone during 2019-20

Entry Code	Name of Entry	Natural Enemies / Plant				Green boll damage (%)			Open boll damage (%)			Open boll Locule damage (%)		Rosette Flower by PBW (%)	Good open bolls (No./ Plant)
		SU	LBB	Chry	SPi	JU	*H. a*	PBW	JU	*H. a*	PBW	JU	PBW		
			RA	RA	RA		SU	SU		SU	SU		SU	SU	BW
9121	**ZC (Phule Asmita)**	1.80	1.28	0.73	1.02	30.59	4.78	3.28	31.35	5.83	3.54	25.47	1.63	1.92	85.0
9122	GSHH 15032	1.20	0.76	0.78	0.60	42.73	5.62	1.89	44.14	7.65	3.69	38.82	1.78	1.79	94.0
9123	**Local Check**	1.20	13.09	13	13.06	37.17	0.72	0.37	37.37	1.37	1.05	30.63	0.70	3.26	124.0
9124	GJHH 13	1.30	1.16	0.95	0.69	35.52	0.71	0.00	36.44	1.03	1.01	30.24	0.42	0.00	113.0
	DCH 32 (SC)	3.20				43.60	26.37	19.49	47.70	19.79	10.22	40.10	5.55	16.07	126.0
	DHY 286 (RC)	1.50				35.10	10.80	5.22	34.70	11.29	5.56	28.80	2.73	0.00	103.0
	RCH-2 Bt (RC)														145.0
	RCH-2 Non Bt (SC)														75.0
	NDLH 1938 (JR)	2.00				32.90	7.46	6.07	33.50	12.01	9.55	26.60	4.22	3.13	
	Ajeet-155 BG II (BWR)	2.30				27.10	0.00	1.56	30.90	0.00	2.40	25.00	1.35	4.17	

BA – Banswara; JU – Junagadh; SU – Surat; RA – Rahuri;

Table 22. Ent 1a. Br 06a (ZT): Preliminary screening of breeding materials for their reaction to key pests (Sucking pests) of cotton at Central zone during 2019-20.

Entry Code	Name of Entry	Jassid injury grade			Jassid / 3 leaves					Whitefly / 3 leaves					Thrips / 3 leaves		
		BA	RA	BW	BA	JU	RA	KH	BW	BA	JU	RA	KH	BW	JU	RA	BW
9131	GJHV 534	II	II	II	8.67	10.20	5.67	9.50	5.50	15.33	17.80	4.89	11.50	2.83	17.80	33.33	8.67
9132	RHC-HD 1438	IV	III	III	13.67	11.90	5.17	11.50	7.00	24.00	16.00	5.00	14.00	3.50	19.40	39.06	9.00
9133	**Local Check**	IV	III	III	10.33	11.30	5.39	13.00	6.83	19.00	14.80	5.00	17.50	1.83	20.20	35.78	10.83
9134	SHC 374	IV	II	IV	11.67	16.50	4.72	14.00	8.16	23.00	15.50	5.39	14.00	3.50	12.90	37.06	11.17
9135	DSC 1801	IV	III	IV	10.67	17.70	4.78	15.00	8.33	19.33	16.60	5.06	11.00	2.17	16.00	33.06	10.66
9136	RHC HD 1420	II	III	I	7.00	14.00	6.11	12.00	5.33	12.67	18.70	3.83	12.00	3.16	16.10	31.61	7.17
9137	**Zonal check (Suraj)**	II	II	IV	8.33	14.70	6.11	13.00	8.00	14.00	22.90	5.00	12.50	3.50	13.90	29.11	10.83
9138	RHC HD 1406	III	II	III	9.00	13.80	5.56	12.00	7.00	17.00	17.40	5.11	13.50	2.83	12.60	30.22	11.00
9139	TCH 1897	III	II	III	9.33	10.70	6.00	12.00	6.00	18.33	25.00	4.56	11.00	3.00	15.00	39.22	8.67
9140		II			7.67					13.33							
	NDLH 1938			I					3.83					2.00			6.00
	DCH 32	IV		IV	14.33				16.16	24.67				2.83			11.33
	Ajeet 155			III					6.33					2.83			9.67
	DHY 286 (RC)	I			4.33					5.00							
	RCH-2 Bt (RC)	IV			13.00					22.00							
	RCH-2 Non Bt (SC)	IV			12.33					20.67							

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);
BA – Banswara; JU – Junagadh; RA – Rahuri; KH – Khandwa; BW – Bhawanipatna;

Table 22.1. Ent 1a. Br 06a (ZT): Preliminary screening of breeding materials for their reaction to key pests (Boll damage) of cotton at Central zone during 2019-20

Entry Code	Name of Entry	Aphids / 3 leaves				Natural Enemies / Plant				Green boll damage (%)		Open boll damage (%)				Open boll Locule damage (%)			Good open bolls (No./ Plant)
						LBB	Chry	Spi	BW		*H.a*			*H.a*	PBW	JU	KH	BW	
		JU	RA	KH	BW	RA	RA	RA		JU	BW	JU	KH	BW	KH			*H.a*	BA
9131	GJHV 534	18.90	18.22	3.50	22.50	0.94	0.78	0.72	0.66	29.92	9.31	33.69	45.00	5.98	45.00	26.99	33.50	3.32	106.0
9132	RHC-HD 1438	27.20	13.67	5.00	29.17	1.22	0.83	0.78	0.83	34.94	7.39	37.88	25.00	5.12	50.00	32.59	36.50	2.27	104.0
9133	**Local Check**	26.10	12.78	4.00	32.06	0.94	0.78	0.89	1.17	29.92	8.20	33.20	45.00	4.42	45.00	26.72	33.75	1.90	102.0
9134	SHC 374	24.10	12.74	5.00	30.83	1.06	0.78	0.50	1.00	24.89	8.99	27.87	25.00	6.00	50.00	21.99	37.00	3.60	76.0
9135	DSC 1801	17.60	15.44	2.50	27.00	0.89	0.89	0.83	0.33	39.96	8.18	44.49	25.00	4.40	35.00	42.46	38.00	2.52	74.0
9136	RHC HD 1420	18.30	16.07	2.50	19.17	1.50	0.89	1.06	0.67	44.98	9.36	48.06	25.00	6.03	25.00	42.03	37.50	2.69	126.0
9137	**ZC (Suraj)**	21.50	18.81	3.50	31.67	1.17	0.94	0.94	0.50	36.56	8.94	37.39	35.00	5.50	50.00	33.84	36.25	2.06	113.0
9138	RHC HD 1406	16.20	18.93	4.50	24.00	1.39	1.06	0.89	0.33	29.92	7.20	33.33	35.00	3.59	25.00	26.13	32.00	0.71	109.0
9139	TCH 1897	16.80	17.22	4.50	23.50	1.11	0.72	0.94	0.67	36.56	7.72	38.85	40.00	5.80	50.00	33.97	36.00	3.22	108.0
9140																			117.0
	NDLH 1938				20.22				0.67		8.07			6.07				4.47	
	DCH 32				23.34				0.50		8.41			6.46				5.02	121.0
	Ajeet 155				25.00				0.33		1.88			0.25				0.00	
	DHY 286 (RC)																		119.0
	RCH-2 Bt (RC)																		144.0
	RCH-2 Non Bt (SC)																		74.0

BA – Banswara; JU – Junagadh; RA – Rahuri; KH – Khandwa; BW – Bhawanipatna;

Table 23. Ent 1a. Br 13a (ZT-PVT): Preliminary screening of breeding materials for their reaction to key pests of cotton at Central zone at Rahuri during 2019-20

Entry Code	Name of Entry	Jassid injury grade	Jassid / 3 leaves	Whitefly / 3 leaves	Thrips / 3 leaves	Aphids / 3 leaves	Natural Enemies / Plant		
							LBB	Chry	Spi
9151	CCB 64	IV	16.61	6.33	24.22	11.67	1.11	0.94	1.11
9152	DB-1701	IV	17.94	9.89	21.61	14.56	0.94	0.94	0.89
9153	CCB 26	IV	17.94	5.50	20.83	13.52	1.28	1.00	0.94
9154	DB 1801	IV	17.72	4.89	27.94	23.78	11.78	11.50	11.28
9155	**ZC (Phule Rukmai)**	IV	15.11	5.39	21.17	12.19	1.28	0.89	0.78
9156	DB-1601	IV	15.06	5.28	18.33	12.85	1.17	0.83	0.67
9157	CCB 143B	IV	15.33	5.28	18.56	12.70	0.89	0.78	0.83
9158	CCB 51-2	IV	16.50	5.11	16.28	12.48	1.06	0.89	0.94

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);

Table 24. Ent 1a. Br 15a (ZT): Preliminary screening of breeding materials for their reaction to key pests of cotton at Central zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade		Jassid / 3 leaves		Whitefly / 3 leaves		Thrips / 3 leaves	Aphids / 3 leaves	Natural Enemies / Plant			Good open bolls (No./ Plant)
										LBB	Chry	Spi	
		BA	RA	BA	RA	BA	RA	RA	RA	RA	RA	RA	BA
9161	RHB 1002	IV	II	9.33	13.06	19.67	5.22	21.99	14.22	1.22	1.08	0.89	135
9162	**ZC (Phule Dhara)**	IV	II	9.67	14.00	22.00	5.61	21.78	11.30	1.35	0.94	0.89	124
9163	RHB 1623	IV	II	10.33	12.17	23.67	5.00	20.08	17.52	0.86	0.94	0.90	102
9164	**Local Check**	IV	III	10.67	13.83	25.33	5.39	16.42	11.26	1.10	1.01	0.95	100
9165	RHB 1624	IV	III	11.33	10.72	26.00	6.56	24.23	12.07	1.17	0.81	0.95	92
	DCH 32 (SC)	IV		11.00		22.67							122
	DHY 286 (RC)	I		3.67		3.67							105
	RCH-2 Bt (RC)	III		7.56		8.00							
	RCH-2 Non Bt (SC)	IV		9.00		9.33							76

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);

BA – Banswara; RA – Rahuri;

Table 25. Ent 1a. Br 03b (ZT): Preliminary screening of breeding materials for their reaction to key pests (Sucking pests) of cotton at Central zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade				Jassid / 3 leaves				Whitefly / 3 leaves				Thrips / 3 leaves		Aphids / 3 leaves	
		BA	BH	AK	NA	BA	BH	AK	NA	BA	BH	AK	NA	BH	NA	BH	NA
9171	BS 3-17	IV	1.2	II	III	13.00	4.40	2.60	3.20	27.33	1.50	6.50	8.45	4.70	8.20	16.20	16.70
9172	RAH 1075	IV	1.0	II	II	12.33	2.80	5.10	3.45	25.00	1.10	7.00	7.05	4.50	8.60	22.00	15.85
9173	CPD-1751	IV	1.2	II	II	14.00	4.20	5.10	3.90	27.33	1.00	5.80	7.05	6.50	8.50	24.30	16.30
9174	**Local Check**	II	1.0	II	II	9.00	3.30	4.60	3.40	18.67	0.10	7.40	6.80	5.40	8.50	19.90	16.10
9175	NH 704	IV	1.2	II	II	10.33	4.30	3.00	3.10	21.00	0.50	10.30	8.45	3.50	8.40	22.10	17.05
9176	NDLH - 2035-5	II	1.2	II	I	8.00	4.20	2.90	2.85	15.00	0.50	7.00	7.70	2.90	6.50	18.70	14.70
9177	CPD-1752	II	1.2	II	IV	8.67	4.70	3.90	3.30	16.33	0.80	10.90	7.65	2.50	9.70	17.40	15.70
9178	**Quality Check (Suraj)**	IV	1.2	II	III	13.00	4.00	4.50	3.00	25.00	1.10	7.70	7.45	2.20	7.50	16.40	15.45
9179	AKH 10-3	IV	1.0	I	II	12.67	3.20	4.00	2.40	26.00	1.50	9.00	7.30	2.00	7.00	13.80	17.45
9180	NDLH - 2057-1	II	1.2	II	I	7.33	2.40	2.90	3.50	14.00	1.10	6.40	7.50	1.10	7.55	17.80	17.20
9181	**Zonal Check (NH 615)**	III	1.2	II	II	10.00	2.80	2.50	3.00	21.33	0.70	10.30	7.95	2.60	7.70	20.90	15.70
9182	RHC 1307	IV	1.0	II	III	12.33	2.30	4.00	3.00	23.00	0.60	8.40	6.60	2.20	7.25	23.50	17.20
	DHY-286	I	1.0	I		3.67	2.40	2.10		4.33	2.10	2.60		1.10		16.30	
	DCH-32	IV	4.0	III	IV	14.30	18.90	7.20	4.00	16.33	2.10	6.20	8.60	3.00	14.10	23.50	16.05
	Ajeet 155			I	II			2.80	3.10			6.50	7.80		8.25		17.05
	NDLH 1938		2.0				6.60		2.80		1.30		8.30	1.80	7.30	17.70	16.95
	RCH-2 Bt (RC)	IV				12.67				13.67	1.70			2.30			
	RCH-2 Non Bt (SC)	IV				12.00				11.33	2.20			1.90			
	Bunny Bt (BR)		2.4				8.60									26.30	
	Bunny Non Bt(BS)		3.8				12.50									22.80	

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);
BA – Banswara; BH – Bharuch; AK – Akola; NA – Nanded;

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Table 25.1. Ent 1a. Br 03b (ZT): Preliminary screening of breeding materials for their reaction to key pests (Boll damage) of cotton at Central zone during 2019-20

Entry Code	Name of Entry	Natural Enemies / Plant		Green boll damage (%)		Open boll damage (%)						Open boll Locule damage (%)				Rosette Flower by PBW (%)	Good open bolls (No./ Plant)		
		LBB	Chr	*H. a*	PBW	BH	AK	*H. a*	PBW			BH	AK	PBW					
		NA	NA	NA	NA			NA	BH	AK	NA			BH	NA	NA	BA	AK	NA
9171	BS 3-17	1.35	0.85	5.65	21.80	6.11	47.27	2.25	2.95	21.53	18.80	3.00	21.79	1.45	8.20	4.45	71	8	24
9172	RAH 1075	1.50	0.55	4.10	22.85	6.55	53.72	1.95	3.41	23.18	19.70	3.03	23.18	1.70	7.60	4.55	48	4	27
9173	CPD-1751	1.75	0.65	4.90	20.60	5.83	36.88	2.35	4.02	22.64	17.10	2.84	22.91	2.04	8.35	3.30	45	11	31
9174	**Local Check**	1.55	0.65	3.95	23.00	4.02	61.11	2.70	5.88	29.17	18.90	2.08	29.17	2.51	7.90	5.75	73	4	18
9175	NH 704	1.70	0.50	5.05	24.35	9.27	30.66	2.45	9.27	11.24	21.25	5.77	11.24	4.46	8.70	6.10	75	12	17
9176	NDLH - 2035-5	1.85	0.65	4.50	22.80	6.72	58.76	2.55	6.72	28.45	23.15	3.42	28.77	2.78	9.10	6.30	80	8	29
9177	CPD-1752	1.80	0.85	4.40	22.65	10.85	92.86	2.05	10.85	64.73	18.70	6.81	64.73	6.41	8.20	5.75	72	2	12
9178	**QC (Suraj)**	1.80	0.50	4.10	23.60	8.15	72.26	2.10	8.15	36.45	20.15	6.08	36.45	4.91	8.30	6.05	51	4	13
9179	AKH 10-3	1.95	0.55	3.75	23.25	2.95	65.61	2.00	2.95	34.13	18.90	1.45	34.86	1.69	8.30	5.95	49	10	7
9180	NDLH - 2057-1	1.95	0.45	4.40	23.75	3.41	82.42	2.15	3.41	49.21	20.80	1.64	49.21	1.50	8.10	6.00	74	5	24
9181	**ZC (NH 615)**	1.85	1.10	5.05	23.15	6.63	78.33	2.45	5.83	46.67	20.75	3.03	47.08	1.64	7.95	7.20	76	4	13
9182	RHC 1307	1.90	0.70	5.25	23.55	4.00	53.87	2.50	4.02	23.38	21.30	2.04	23.61	2.04	8.95	7.20	50	10	17
	DHY-286					6.39	73.33		5.95	39.58		3.00	39.58	3.62			76	3	
	DCH-32	2.15	0.65	6.05	26.05	11.22	62.75	3.35	12.10	42.33	25.35	7.24	42.76	6.25	9.90	7.95	102	5	23
	Ajeet 155	2.00	0.65	1.95	21.25		57.33	1.95		27.65	20.20		27.94		8.40	6.00		9	33
	NDLH 1938	1.90	0.85	5.45	22.60	8.25		2.20	8.49		20.65	6.87		4.96	8.10	6.20			20
	RCH-2 Bt (RC)					3.04			3.04			1.70		1.70			106		
	RCH-2 Non Bt (SC)					7.35			6.06			5.64		3.64			60		
	Bunny Bt (BR)																		
	Bunny Non Bt(BS)																		

BA – Banswara; BH – Bharuch; AK – Akola; NA – Nanded;

Table 26. Ent 1a. Br 04b (ZT): Preliminary screening of breeding materials for their reaction to key pests (Sucking pests) of cotton at Central zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade			Jassid / 3 leaves				Whitefly / 3 leaves				Thrips / 3 leaves		Aphids / 3 leaves	
		BA	AK	NA	BA	BH	AK	NA	BA	BH	AK	NA	BH	NA	BH	NA
9191	Zonal Check (NH 615)	II	I	II	9.33	4.40	1.30	4.00	21.67	1.20	12.20	6.85	0.60	9.70	20.20	13.20
9192	NDLH 20511	IV	I	II	11.67	4.60	3.50	3.90	23.67	2.30	8.10	7.80	2.60	9.30	20.40	12.30
9193	Local Check	IV	II	II	10.33	5.00	3.50	4.50	21.33	3.80	12.70	7.85	2.40	9.00	20.00	12.40
9194	CNH 11-11	II	II	II	8.67	4.20	3.10	4.00	18.33	2.40	6.10	7.60	2.00	7.35	20.40	12.70
9195	Quality Check (Suraj)	IV	II	III	14.00	4.40	3.30	3.90	29.00	3.10	7.00	7.80	2.70	9.00	24.10	10.95
	DHY-286	I	I		4.33	2.40	2.60		4.67	2.10	15.30		1.10		16.30	
	DCH-32	IV	III	IV	13.00	18.90	6.30	5.00	24.67	2.10	10.00	8.60	3.00	14.10	23.50	16.05
	Ajeet 155 Bt		I	II			3.30	3.70			8.40	7.80		8.95		17.05
	NDLH 1938			II		6.60		2.90		1.30		8.30	1.80	7.30	17.70	16.95
	RCH-2 Bt (RC)	III			9.00				19.00							
	RCH-2 Non Bt (SC)	IV			10.00				21.00							
	Bunny Bt (BR)					8.60				1.70			2.30		26.30	
	Bunny Non Bt (BS)					12.50				2.20			1.90		22.80	

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);
BA – Banswara; BH – Bharuch; AK – Akola; NA – Nanded;

Contd….

Table 26.1. Ent 1a. Br 04b (ZT): Preliminary screening of breeding materials for their reaction to key pests (Boll damage) of cotton at Central zone during 2019-20

Entry Code	Name of Entry	Natural Enemies / Plant		Green bole damage (%)		Open boll damage (%)					Open boll Locule damage (%)				Rosette Flower by PBW	Good open bolls (No./ Plant)		
		LBB	Chr	*H. a*	PBW	BH	AK	*H. a*	PBW		BH	AK	PBW					
		NA	NA	NA	NA			NA	BH	NA			BH	NA	NA	BA	AK	NA
9191	ZC (NH 615)	1.10	1.00	5.80	25.70	6.45	84.32	2.10	3.85	23.57	3.68	48.08	1.79	5.77	5.95	96	6	28
9192	NDLH 20511	1.40	1.10	5.85	24.15	2.98	79.17	2.90	3.41	24.45	1.29	42.71	1.39	6.30	4.75	84	2	29
9193	Local Check	1.40	1.20	5.10	25.10	4.79	72.08	3.00	2.95	20.55	2.31	29.06	1.25	8.21	4.95	103	5	25
9194	CNH 11-11	1.40	1.05	6.20	24.65	6.25	60.17	3.10	4.02	21.75	3.13	32.85	2.09	8.58	5.75	98	7	25
9195	QC (Suraj)	1.10	1.15	6.00	23.95	7.91	83.41	3.25	5.83	22.59	3.86	53.30	3.28	8.33	5.45	72	5	26
	DHY-286					6.39	62.55		5.95		3.00	33.87	3.62			76	3	
	DCH-32	11.50	11.50	6.80	25.65	11.22	59.17	3.55	12.10	24.65	7.24	42.67	6.25	9.65	7.90	113	5	22
	Ajeet 155 Bt	1.30	1.00	1.85	21.15		54.69	2.60		20.70		26.31		8.20	5.95		11	31
	NDLH 1938	1.55	1.10	5.50	21.50	8.25		2.40	8.49	21.55	6.87		4.96	8.35	6.10			25
	RCH-2 Bt (RC)															128		
	RCH-2 Non Bt (SC)															70		
	Bunny Bt (BR)					3.04			3.04		1.70		1.70					
	Bunny Non Bt (BS)					7.35			6.06		3.09		3.64					

BA – Banswara; BH – Bharuch; AK – Akola; NA – Nanded;

Table 27. Ent 1a. Br 06a (ZT): Preliminary screening of breeding materials for their reaction to key pests of cotton at Akola, Central zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade	Jassid / 3 leaves	Whitefly / 3 leaves	Av. % open boll damage at harvest	Open boll damage (%)	Open boll Locule damage (%)	Avg. no of bolls retained/Plant
						PBW		
9201	AKH 1302	II	2.40	7.30	75.73	36.80	37.01	8.40
9202	DSC 1851	II	3.30	8.80	56.75	28.88	28.88	5.30
9203	RHC HD 1433	II	2.80	8.90	64.02	41.19	41.48	6.70
9204	**Local Check**	I	1.80	8.60	54.5	24.79	25.06	6.40
9205	RAHC 1029	I	2.60	7.00	72.34	32.77	33.31	10.60
9206	AKH 1301	I	2.80	7.70	73.77	23.62	23.62	3.80
9207	GISV 312	II	4.10	7.10	69.56	32.12	32.58	4.30
9208	**Zonal Check (Suraj)**	II	7.60	8.60	94.12	53.53	53.53	2.70
9209	RHC HD 1406	II	3.30	8.10	72.62	37.76	38.23	4.10
	DHY-286	I	1.30	16.30	78.02	43.68	43.68	2.00
	DCH-32	III	9.80	8.00	73.33	32.50	32.50	3.00
	Ajeet 155 Bt	I	3.40	6.30	67.95	35.82	36.34	3.70

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);

Table 28. Ent 1a. Br 24b CVT (ZT): Preliminary screening of breeding materials for their reaction to key pests of cotton at Central zone during 2019-20

Entry Code	Name of Entry	JIG	Jassid / 3 leaves		Whitefly / 3 leaves		Aphids / 3 leaves	Av. % open boll damage at harvest		Open boll damage (%) PBW		Open boll Locule damage (%)		Avg. no of bolls retained/Plant
		AK	AK	KH	AK	KH	KH	AK	KH	AK	KH	AK	KH	AK
9221	CNA 1054	I	1.20	11.00	5.30	13.50	4.50	54.26	45.00	25.82	40.00	25.82	33.00	9.90
9222	AKA 14-51	I	1.10	11.50	5.10	14.50	4.00	55.51	20.00	33.25	45.00	33.49	36.25	7.70
9223	MDL 2667	I	1.40	13.00	4.00	16.50	4.50	37.19	35.00	24.52	45.00	24.52	32.50	6.30
9224	MDL 2663	I	1.30	16.00	4.00	14.00	4.00	41.59	15.00	25.80	50.00	26.68	35.00	4.80
9225	**Local Check**	I	1.80	13.50	2.90	12.00	3.00	36.52	20.00	21.77	40.00	22.01	37.50	9.50
9226	JLA-1207	I	1.20	11.50	3.60	11.50	2.50	43.13	25.00	24.67	25.00	25.60	36.25	10.70
9227	GAM 259	I	1.00	10.00	3.60	14.00	4.00	40.80	25.00	20.26	45.00	20.26	34.50	7.70
9228	**ZC (AKA 7)**	I	0.80	12.00	4.80	12.50	2.50	52.18	40.00	14.87	25.00	14.87	31.25	7.10
9229	DWDa 1802	I	1.30	9.50	3.80	13.00	3.00	54.11	40.00	19.70	35.00	19.98	39.25	7.80
9230	CNA 1031	I	1.50	11.50	3.80	14.00	5.50	40.76	55.00	31.12	45.00	31.82	44.50	4.60
	DHY-286	I	1.30		7.60			39.62		32.40		32.88		3.60
	DCH-32	III	6.80		5.50			48.09		21.37		21.75		6.50
	Ajeet 155 Bt	I	3.40		5.60			65.00		23.08		23.40		5.20

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);

AK – Akola; KH – Khandwa;

Table 29. Ent 1a. Br 24b-LL CVT (ZT): Preliminary screening of breeding materials for their reaction to key pests of cotton at Central zone during 2019-20

Entry Code	Name of Entry	JIG	Jassid / 3 leaves		Whitefly / 3 leaves		Aphids / 3 leaves	Av. % open boll damage at harvest		Open boll damage (%) PBW		Open boll Locule damage (%)		Avg. no of bolls retained/Plant
		AK	AK	KH	AK	KH	KH	AK	KH	AK	KH	AK	KH	AK
9231	PA 809	I	1.50	11.50	2.50	15.00	4.50	38.55	35.00	17.00	65.00	17.00	35.25	9.70
9232	PA 842	I	1.60	13.00	3.40	15.00	3.00	39.32	35.00	17.64	55.00	17.94	32.50	11.90
9233	PAIG 379	I	1.50	14.50	3.50	14.50	4.00	47.19	40.00	21.45	30.00	21.71	33.75	9.20
9234	PAIG 380	I	1.40	10.50	5.00	15.50	5.00	56.11	20.00	26.32	55.00	26.91	34.00	10.50
9235	PAIG 384	I	1.50	12.50	3.30	15.50	4.50	47.53	20.00	22.42	50.00	22.84	38.25	4.60
9236	PA 806	I	1.70	13.50	3.30	13.50	5.00	37.50	25.00	23.21	40.00	23.21	39.00	5.60
9237	PAIG 377	I	1.60	10.00	3.60	15.00	2.50	38.69	40.00	17.54	60.00	17.93	34.75	7.20
9238	PA 839	I	1.60	14.00	3.90	12.50	3.50	41.41	25.00	19.93	55.00	20.56	36.25	10.70
9239	PA 837	I	1.20	15.00	3.00	16.50	3.50	36.77	35.00	16.76	35.00	17.52	36.25	12.90
9240	PAIG 373	I	1.60	18.00	3.40	16.50	4.50	55.12	45.00	27.66	45.00	28.06	38.75	8.20
9241	**QC (PA 255)**	I	1.50	11.00	2.70	13.00	2.50	41.85	20.00	19.14	45.00	19.75	38.00	4.20
9242	CNA 1065	I	0.90	15.00	4.90	17.00	4.50	52.96	45.00	34.71	60.00	35.16	37.00	5.30
	DHY-286	I	1.40		14.30			90.00		56.04		57.71		1.40
	DCH-32	III	7.20		5.00			49.87		17.85		18.26		5.60
	Ajeet 155 Bt	I	3.60		5.50			53.26		23.82		24.81		7.40

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);

AK – Akola; KH – Khandwa;

Table 30. Ent 1a. Br 25b (ZT): Preliminary screening of breeding materials for their reaction to key pests of cotton at Akola, Central zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade	Jassid / 3 leaves	Whitefly / 3 leaves	Av. % open boll damage at harvest	Open boll damage (%)	Open boll Locule damage (%)	Avg. no of bolls retained/Plant
						PBW		
9251	AJCH 102	1.00	1.00	4.10	35.40	14.83	14.83	7.00
9252	NACH 560	1.00	1.00	3.20	23.35	10.55	10.86	14.60
9253	**Local Check**	0.80	0.80	4.20	35.19	17.94	18.90	13.70
9254	NACH 556	1.00	1.00	3.90	26.03	11.54	11.54	10.00
9255	**ZC (PKV DH 1)**	0.50	0.50	4.70	47.14	23.18	23.48	7.60
	DHY-286	2.10	2.10	16.00	90.97	50.69	51.39	2.60
	DCH-32	8.50	8.50	6.80	40.38	21.30	21.30	4.60
	Ajeet 155 Bt	4.30	4.30	10.40	72.98	34.22	36.17	4.00

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);

Table 31. Ent 1a. CC trial Hirsutum (ZT): Preliminary screening of breeding materials for their reaction to key pests of cotton at Khandwa, Central zone during 2019-20

Entry Code	Name of Entry	Jassid / 3 leaves	Whitefly / 3 leaves	Aphids / 3 leaves	Boll damage %	Open boll damage (%)	Open boll Locule damage (%)
						PBW	
9261	**ZC (Phule Yamuna)**	10.00	20.50	8.50	55.00	70.00	44.00
9262	LHCC 4	14.00	15.00	4.50	25.00	55.00	35.25
9263	**Local Check**	12.00	17.00	7.50	50.00	70.00	33.50
9264	DHCC 1801	15.50	16.00	4.50	35.00	60.00	39.25
9265	CNH 17395	15.50	26.00	8.50	45.00	55.00	45.25

Table 32. Ent 1a. CC Arboreum (ZT): Preliminary screening of breeding materials for their reaction to key pests of cotton at Khandwa, Central zone during 2019-20

Entry Code	Name of Entry	Jassid / 3 leaves	Whitefly / 3 leaves	Aphids / 3 leaves	Boll damage %	Open boll damage (%)	Open boll Locule damage (%)
						PBW	
9271	CNA 17522	12.50	19.50	7.00	50.00	55.00	42.75
9272	DDCC 1801	12.50	15.50	4.00	20.00	55.00	41.25
9273	**Local Check**	11.00	17.00	5.00	40.00	70.00	33.50
9274	CNA 1091	13.00	13.50	3.00	25.00	60.00	39.75
9275	**Zonal Check (AKA 7)**	16.50	16.00	5.00	30.00	65.00	45.75
9276	DDCC 1802	13.00	15.00	5.50	25.00	45.00	41.88

Table 33. Ent 1a. Br 03a (ZT): Preliminary screening of breeding materials for their reaction to key pests (Sucking pests) of cotton at South zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade		Jassid / 3 leaves		Whitefly / 3 leaves		Thrips / 3 leaves		Aphids / 3 leaves		Natural Enemies / Plant	Green boll damage (%)	
													LG	RC
		LG	RC	LG	RC	LG	RC	LG	RC	LG	RC	RC	PBW	
9501	RAH 1075	2	III	4.50	6.92	2.20	3.90	1.40	11.67	7.30	3.40	1.60	65.52	51.61
9502	BS 4-18	2	II	3.70	6.16	2.20	6.90	1.60	11.04	5.80	7.32	1.12	46.95	64.11
9503	GSHV 208	2	II	4.10	9.96	2.90	3.23	0.70	16.39	7.00	6.42	0.78	55.40	62.11
9504	CPD 1701	2	II	4.30	13.86	4.10	5.56	1.10	14.28	17.20	5.44	1.09	63.70	45.45
9505	**ZC (BGDS 1063)**	2	III	4.20	13.40	5.00	4.23	1.30	10.58	4.70	6.32	1.01	42.50	49.78
9506	GISV 322	1	II	2.90	7.77	2.50	5.90	3.20	15.10	5.00	7.13	1.70	61.40	63.78
9507	GJHV-554	2	II	3.90	11.74	2.50	5.56	1.10	13.39	9.50	4.35	1.01	54.94	58.11
9508	**Local Check**	2	III	4.20	12.40	2.20	4.90	1.80	14.33	5.60	7.43	1.21	47.56	57.11
9509	RAH 1076	2	II	4.20	9.20	2.10	3.90	1.80	10.53	1.90	5.46	1.04	42.59	44.11
9510	TSH 357	2	III	4.80	11.97	2.40	9.90	2.80	13.39	2.50	5.33	1.12	41.19	41.78
9511	TCH 1837	2	III	3.90	12.65	2.40	10.56	1.90	15.97	10.50	5.13	1.03	55.55	53.11
9512	**QC (Suraj)**	2	II	5.10	9.33	3.60	5.90	1.90	11.14	4.30	7.13	1.41	48.17	46.45
	Jaadoo	2		4.20		4.70		2.20		5.60			36.24	
	NDLH	2		3.30		4.90		1.60		3.10			56.74	
	DCH-32	4		8.20		4.90		1.30		5.10			54.21	

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves); LG – Lam Guntur; RC – Raichur;

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Table 33.1. Ent 1a. Br 03a (ZT): Preliminary screening of breeding materials for their reaction to key pests (Boll damage) of cotton at South zone during 2019-20

Entry Code	Name of Entry	Open boll damage (%)		Open boll Locule damage (%)		Good open bolls (No./ Plant)	
		PBW		PBW			
		LG	RC	LG	RC	LG	RC
9501	RAH 1075	65.52	42.65	14.33	52.51	28.65	7.25
9502	BS 4-18	46.95	57.65	8.61	51.97	27.65	5.23
9503	GSHV 208	55.40	57.65	9.46	49.58	30.25	1.45
9504	CPD 1701	63.70	44.64	8.09	55.49	23.05	13.25
9505	**ZC (BGDS 1063)**	42.50	47.85	4.54	49.08	27.65	7.36
9506	GISV 322	61.40	57.65	10.89	55.24	29.85	5.46
9507	GJHV-554	54.94	54.62	5.73	49.42	27.90	14.56
9508	**Local Check**	47.56	54.08	9.16	53.36	22.10	10.25
9509	RAH 1076	42.59	46.08	21.99	51.56	20.10	8.12
9510	TSH 357	41.19	40.79	23.44	55.55	28.90	5.14
9511	TCH 1837	55.55	52.35	14.80	52.94	21.50	6.26
9512	**QC (Suraj)**	48.17	51.52	21.11	52.97	18.30	3.34
	Jaadoo	36.24		11.89		21.10	
	NDLH	56.74		12.36		25.70	
	DCH-32	54.21		17.31		16.50	

LG – Lam Guntur; RC – Raichur;

Table 34. Ent 1a. Br 04 a (ZT): Preliminary screening of breeding materials for their reaction to key pests (Sucking pests) of cotton at South zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade		Jassid / 3 leaves		Whitefly / 3 leaves		Thrips / 3 leaves		Aphids / 3 leaves		NE / Plant	Green boll damage (%)	
													LG	RC
		LG	RC	LG	RC	LG	RC	LG	RC	LG	RC	RC	PBW	
9521	RHC 1217	2	III	2.80	8.04	3.10	5.86	2.00	11.84	4.80	3.81	1.12	50.58	55.03
9522	GSHV 185	2	II	3.50	6.58	2.60	5.11	2.20	17.92	3.40	4.60	1.23	56.89	53.87
9523	**Local Check**	2	IV	3.10	10.69	4.20	3.86	2.50	15.59	6.00	4.11	0.86	62.90	48.47
9524	SIMA-5	2	II	3.70	11.85	3.70	5.86	1.10	19.03	4.80	4.70	0.82	55.95	53.39
9525	**QC (Suraj)**	2	III	3.70	11.23	2.00	5.11	2.50	18.47	14.40	4.01	0.75	67.96	47.49
9526	CPD 1702	3	III	6.60	13.41	1.70	4.25	2.60	10.58	6.90	6.32	0.98	44.16	50.11
9527	TSH 325	2	II	3.20	7.78	1.70	6.00	1.50	15.10	1.70	7.15	1.50	59.76	63.78
9528	**ZC (BGDS 1063)**	2	III	3.90	11.58	1.30	1.55	2.90	12.12	3.10	4.46	0.64	64.82	59.12
9529	BS 1	2	III	3.30	11.52	1.10	3.87	2.10	11.82	3.10	4.53	0.36	41.03	48.16
9530	HS 298	2	IV	3.50	12.56	1.70	1.23	2.80	15.12	17.50	5.13	1.15	35.85	63.16
	Jaadoo	2		3.40		1.70		1.90		11.80			34.90	
	NDLH	2		3.10		1.30		1.20		14.80			63.75	
	DCH-32	4		7.10		1.90		1.20		13.80			66.25	

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);

LG – Lam Guntur; RC – Raichur;

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Table 34. 1. Ent 1a. Br 04 a (ZT): Preliminary screening of breeding materials for their reaction to key pests (Boll damage) of cotton at South zone during 2019-20

Entry Code	Name of Entry	Open boll damage (%)		Open boll Locule damage (%)		Good open bolls (No./ Plant)	
		LG	RC	LG	RC		
		PBW		PBW		LG	RC
9521	RHC 1217	30.87	58.60	12.63	58.09	23.90	12.12
9522	GSHV 185	27.52	57.44	16.06	62.44	24.10	8.35
9523	**Local Check**	25.91	52.04	16.77	60.56	20.70	6.15
9524	SIMA-5	26.94	56.96	15.72	61.45	19.10	5.24
9525	**QC (Suraj)**	21.20	51.06	10.97	57.88	22.70	5.26
9526	CPD 1702	19.89	48.12	12.52	50.02	26.90	5.35
9527	TSH 325	22.12	57.65	12.71	55.24	28.90	5.44
9528	**ZC (BGDS 1063)**	22.69	51.83	13.39	64.52	22.10	3.56
9529	BS 1	24.36	48.28	15.11	50.12	22.50	9.18
9530	HS 298	15.35	61.45	12.03	58.31	26.30	4.36
	Jaadoo	21.25		10.71		29.70	
	NDLH	24.34		12.73		25.50	
	DCH-32	37.17		22.40		18.90	

LG – Lam Guntur; RC – Raichur;

Table 35. Ent 1a. Br 05 a (ZT): Preliminary screening of breeding materials for their reaction to key pests (Sucking pests) of cotton at South zone during 2019-20

Entry Code	Name of Entry	JIG		Jassid / 3 leaves		Whitefly / 3 leaves		Thrips / 3 leaves		Aphids / 3 leaves		Natural Enemies / Plant	Green boll damage (%)	
													LG	RC
		LG	RC	LG	RC	LG	RC	LG	RC	LG	RC	RC	PBW	
9531	DHH 1902	3	II	5.60	5.02	2.00	5.23	1.30	8.02	14.60	4.11	0.97	49.75	49.75
9532	BGDHH 697	2	II	2.50	3.99	0.90	7.56	0.40	7.82	11.10	5.10	1.13	52.75	52.75
9533	ARBHH 1901	3	III	5.30	7.22	1.50	7.56	1.80	11.40	9.10	7.04	0.57	43.75	43.75
9534	**ZC (RAHH 455)**	3	II	6.50	6.12	1.30	8.34	1.60	12.28	10.80	7.10	0.44	7.42	7.42
9535	LAHH 36	2	II	2.30	4.57	1.80	5.90	1.30	3.56	5.80	2.10	1.81	20.08	20.08
9536	ARBHH 1902	3	IV	7.00	2.88	1.20	4.56	1.70	6.70	6.90	4.63	1.15	66.75	66.75
9537	**Local Check**	2	II	2.90	2.88	1.10	4.56	1.30	8.22	8.70	3.97	0.93	52.42	52.42
9538	DHH 1901	2	II	2.70	6.01	1.90	6.56	1.80	12.58	7.00	6.74	0.34	30.08	30.08
9539	RAHH 1952	2	III	2.50	9.06	1.00	6.23	1.30	14.41	5.80	7.41	0.43	38.42	38.42
9540	RAHH 1951	2	III	2.20	8.11	1.20	7.46	1.20	13.23	10.80	5.30	1.04	42.09	42.09
	Jaadoo	2		3.40		1.60		1.90		7.60				
	NDLH	2		3.30		1.50		0.60		5.00				
	DCH-32	4		8.40		1.20		1.50		3.10				

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);

LG – Lam Guntur; RC – Raichur;

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Table 35.1. Ent 1a. Br 05 a (ZT): Preliminary screening of breeding materials for their reaction to key pests (Boll damage) of cotton at South zone during 2019-20

Entry Code	Name of Entry	Open boll damage (%)		Open boll Locule damage (%)		Good open bolls (No./ Plant)	
		LG	RC	LG	RC		
		PBW		PBW		LG	RC
9531	DHH 1902	24.56	55.72	14.16	61.56	19.90	4.23
9532	BGDHH 697	20.80	46.85	13.70	55.83	18.90	4.45
9533	ARBHH 1901	22.10	60.71	12.28	56.10	19.50	5.25
9534	**ZC (RAHH 455)**	13.11	7.52	8.74	41.88	25.30	4.13
9535	LAHH 36	14.33	19.52	10.01	38.10	19.50	5.24
9536	ARBHH 1902	20.58	66.94	13.27	55.47	22.10	2.26
9537	**Local Check**	16.62	53.51	10.91	56.95	24.90	11.48
9538	DHH 1901	29.36	37.10	19.34	60.34	26.30	9.65
9539	RAHH 1952	17.09	43.88	10.89	61.46	19.50	3.45
9540	RAHH 1951	22.41	32.89	12.99	38.32	25.10	14.36
	Jaadoo	10.85		7.92		35.70	
	NDLH	26.79		15.39		24.50	
	DCH-32	30.32		17.16		16.90	

LG – Lam Guntur; RC – Raichur;

Table 36. Ent 1a. Br 06 a (ZT): Preliminary screening of breeding materials for their reaction to key pests of cotton at South zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade		Jassid / 3 leaves		Whitefly / 3 leaves		Thrips / 3 leaves		Aphids / 3 leaves		Natural Enemies / Plant	Green boll damage (%)		Open boll damage (%)		Open boll Locule damage (%)		Good open bolls (No./ Plant)	
													PBW	RC	LG	RC	LG	RC	LG	RC
		LG	RC	LG	RC	LG	RC	LG	RC	LG	RC	RC	LG		PBW		PBW			
9551	RHC HD 1433	2	II	3.40	5.32	1.00	5.87	1.10	5.87	7.30	6.83	0.66	48.87	44.10	27.06	46.74	11.09	56.13	19.50	7.24
9552	LHDP 5	2	III	2.80	7.00	1.20	5.21	2.60	5.21	5.90	5.87	0.74	64.15	41.10	12.99	36.02	10.85	57.62	24.30	7.36
9553	RAHC 1028	3	III	6.10	8.90	1.50	7.21	1.90	7.21	7.00	5.77	0.70	55.46	36.44	16.85	30.91	14.22	49.68	18.90	5.54
9554	DS C 1801	2	II	2.20	7.76	1.90	7.21	0.80	7.21	5.60	5.83	0.62	44.42	39.77	15.48	36.74	12.67	55.82	20.90	3.56
9555	**Local Check**	2	II	2.10	6.13	0.90	5.21	1.80	5.21	5.00	6.20	0.77	49.59	51.10	12.80	54.40	8.30	56.66	20.90	10.68
9556	RHC HD 1420	2	III	2.90	8.14	0.80	4.54	0.90	4.54	5.50	6.51	0.89	60.00	49.44	13.07	33.54	9.15	51.59	22.90	3.36
9557	LHDP 2	2	III	2.40	9.64	0.80	5.21	1.70	5.21	6.20	6.73	0.89	67.90	36.77	17.20	35.68	7.63	35.90	23.90	3.42
9558	**ZC (Suraj)**	2	IV	3.00	12.34	1.10	6.99	1.20	6.99	8.10	4.83	1.25	69.70	34.91	14.11	24.52	8.77	36.92	26.70	8.25
9559	RHC-HD 1438	2	III	2.80	6.38	2.10	5.21	0.70	5.21	5.00	6.83	0.74	52.99	49.10	18.94	36.42	11.96	58.73	23.70	5.36
	Jaadoo	2		2.80		1.80		1.40		7.30			60.00		16.56		11.08		19.30	
	NDLH	2		3.00		1.40		0.90		6.20			54.30		15.74		9.26		21.50	
	DCH-32	4		8.30		1.70		1.40		6.60			58.63		12.88		9.98		19.50	

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);

LG – Lam Guntur; RC – Raichur;

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Table 37. Ent 1a. Br 13a (ZT): Preliminary screening of breeding materials for their reaction to key pests of cotton at South zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade		Jassid / 3 leaves		Whitefly / 3 leaves	Thrips / 3 leaves	Aphids / 3 leaves	Natural Enemies / Plant	Green boll damage (%)		Open boll damage (%)			Open boll Locule damage (%)	
										H.a	PBW	*H.a*	PBW	CBE	PBW	CBE
		DW	CBE	DW	CBE	CBE	CBE	CBE	CBE	DW	DW	DW	DW		DW	
9571	CCB 26	IV	II	6.20	3.90	0.61	15.64	9.40	0.21	12.16	11.93	3.25	10.46	4.50	9.73	34.14
9572	CCB 51	IV	III	6.90	5.70	0.22	14.63	8.20	0.12	12.69	11.33	3.90	10.66	4.00	10.33	48.22
9573	**ZC (Suvin)**	III	II	7.90	3.90	0.45	12.12	7.30	0.05	12.52	11.00	3.30	11.00	5.50	11.00	36.33
9574	CCB 28	III	III	6.50	6.70	0.65	14.13	6.40	0.02	11.16	11.68	3.75	13.84	2.50	14.92	26.34
9575	CCB 29	III	II	7.30	3.60	0.52	14.36	5.40	0.03	10.85	12.03	2.68	12.01	3.00	12.01	21.33
9576	DB 1801	III	II	8.60	5.30	0.65	11.88	4.30	0.06	14.09	11.48	3.05	13.24	4.50	14.12	27.25
9577	CCB 64	IV	III	8.60	6.50	0.32	14.42	7.60	0.14	11.22	12.28	3.93	12.14	5.50	12.07	50.76

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves); DW – Dharwad; CBE – Coimbatore;

Table 38. Ent 1a. Br14a (ZT): Preliminary screening of breeding materials for their reaction to key pests of cotton at South zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade			Jassid / 3 leaves			Whitefly / 3 leaves		Thrips / 3 leaves		Aphids / 3 leaves		Natural Enemies / Plant	Green boll damage (%)		
															H. a	PBW	
		LG	DW	CBE	LG	DW	CBE	LG	CBE	LG	CBE	LG	CBE	CBE	DW	LG	DW
9581	CCB 51-2	4	IV	III	7.30	6.60	8.10	1.50	0.56	1.80	13.12	6.50	8.20	0.22	10.92	60.00	6.75
9582	DB-1701	4	IV	III	7.00	6.90	8.50	1.50	0.44	1.50	17.12	5.10	8.90	0.15	7.06	67.93	4.70
9583	SB SG 1-5	4	IV	II	6.30	6.20	7.50	1.40	0.36	1.00	16.65	6.70	9.20	0.06	12.28	66.23	5.25
9584	**ZC (Suvin)**	3	IV	II	4.20	7.90	6.30	1.20	0.64	1.30	15.21	6.20	6.10	0.04	13.71	55.00	6.25
9585	CCB 143B	4	IV	III	6.80	8.40	6.50	1.40	0.59	1.20	17.55	7.10	4.30	0.01	11.95	41.95	7.25
9586	CCB 129	4	IV	III	6.10	6.50	6.40	0.80	0.62	1.20	13.21	8.30	7.40	0.02	6.83	66.19	6.25
	Jaadoo	2			3.20			0.90		1.00		6.40				62.20	
	NDLH	2			2.70			1.60		0.80		5.30				58.54	
	DCH-32	4			8.50			0.70		1.10		6.90				55.00	

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves); LG – Lam Guntur; DW – Dharwad; CBE – Coimbatore;

Table 38.1. Ent 1a. Br 14a (ZT): Preliminary screening of breeding materials for their reaction to key pests (Boll damage) of cotton at South zone during 2019-20

Entry Code	Name of Entry	Open boll damage (%)				Open boll Locule damage (%)			Good open bolls (No./ Plant)
		H. a	PBW		CBE	PBW		CBE	
		LG	LG	DW		LG	DW		LG
9581	CCB 51-2	6.55	29.07	11.38	4.50	16.67	13.69	25.51	22.35
9582	DB-1701	3.85	29.36	12.85	4.00	15.17	11.93	28.36	27.15
9583	SB SG 1-5	3.75	26.19	12.63	5.50	14.48	11.31	31.31	24.55
9584	**ZC (Suvin)**	4.10	32.77	12.13	2.50	16.09	12.06	28.97	26.55
9585	CCB 143B	5.90	46.44	11.50	4.40	10.10	11.75	36.55	21.75
9586	CCB 129	5.00	25.00	11.50	4.50	14.75	11.25	41.10	24.55
	Jaadoo		28.07			13.77			31.15
	NDLH		32.41			19.78			21.95
	DCH-32		30.31			15.83			19.35

LG – Lam Guntur; DW – Dharwad; CBE – Coimbatore;

Table 39. Ent 1a. Br 15a (ZT): Preliminary screening of breeding materials for their reaction to key pests (Sucking pests) of cotton at South zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade				Jassid / 3 leaves				Whitefly / 3 leaves			Thrips / 3 leaves			Aphids / 3 leaves		
		LG	DW	CN	CBE	LG	DW	CN	CBE	LG	CN	CBE	LG	CN	CBE	LG	CN	CBE
9591	RHB 1623	3	III	II	II	4.30	5.45	3.30	6.30	0.80	1.65	0.56	0.80	1.50	11.21	5.70	5.25	7.30
9592	**ZC (DCH 32)**	4	III	I	II	7.50	6.40	0.75	3.80	1.70	0.7	0.44	2.70	0.90	12.11	4.80	2.30	8.60
9593	RHB 1624	3	III	II	III	4.60	7.10	2.80	6.60	2.20	1.95	0.38	0.50	1.65	11.12	5.60	7.40	9.20
9594	**Local Check**	4	III	II	III	6.70	9.10	2.90	5.70	2.30	1.4	0.46	0.60	1.40	12.65	4.00	8.35	6.40
9595	RHB 1002	3	III	II	II	4.50	5.40	2.60	4.90	2.30	2.05	0.32	1.90	1.90	13.82	4.60	7.50	9.60
	NDLH-1938	2		I	I	2.40		0.50	1.00	1.30	0.9	0.6	2.00	0.95	0.70	4.20	2.95	5.50
	DCH-32	4		IV	IV	8.70		9.20	8.50	1.10	5.9	0	1.30	2.25	0.00	3.40	19.40	8.40
	Jadoo	2		II		2.90		3.80		1.30	1.95		1.70	1.90		3.90	7.25	

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves); LG – Lam Guntur; DW – Dharwad; CN – Chamarajanagara; CBE – Coimbatore;

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Table 39.1. Ent 1a. Br 15a (ZT): Preliminary screening of breeding materials for their reaction to key pests (Boll damage) of cotton at South zone during 2019-20

Entry Code	Name of Entry	CLCV infected plants (%)	Natural Enemies / Plant		Green boll damage (%)				Open boll damage (%)				Open boll Locule damage (%)				Good open bolls (No./ Plant)
					H. a	PBW			DW	PBW			PBW			CBE	
		CN	CN	CBE	DW	LG	DW	CN		LG	DW	CN	LG	DW	CN		LG
9591	RHB 1623	29.41	2.30	0.25	7.01	52.50	5.79	6.58	3.85	33.69	10.47	7.65	18.26	9.31	8.61	33.34	20.75
9592	**ZC (DCH 32)**	21.05	1.53	0.16	10.94	67.50	3.80	4.60	2.95	26.59	10.65	5.62	12.98	9.15	8.42	26.65	28.95
9593	RHB 1624	12.50	2.12	0.09	7.62	55.52	5.75	6.50	4.10	42.26	11.99	7.80	15.61	11.80	8.25	38.89	19.95
9594	**LC**	5.55	2.32	0.08	7.36	52.86	6.29	6.58	4.70	29.37	11.05	7.56	16.31	11.42	8.05	40.12	21.75
9595	RHB 1002	5.26	1.89	0.04	8.98	70.00	6.30	7.60	3.80	17.03	11.93	8.76	11.64	11.75	9.58	45.15	26.55
	NDLH-1938	0.00	1.53	0.15		64.13		5.64		27.27		6.45	16.92		7.80	62.76	25.75
	DCH-32	17.64	3.56	0.02		50.64		21.44		40.02		23.40	22.17		25.15	75.94	19.35
	Jadoo	16.66	2.14			56.77		7.75		22.13		8.15	10.20		9.52		33.95

LG – Lam Guntur; DW – Dharwad; CN – Chamarajanagara; CBE – Coimbatore;

Table 40. Ent 1a. Br. 03b (ZT): Preliminary screening of breeding materials for their reaction to key pests (Sucking pests) of cotton at South zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade			Jassid / 3 leaves			Whitefly / 3 leaves		Thrips / 3 leaves		Aphids / 3 leaves		CLCV infected plants (%)	Natural Enemies / Plant	
		ND	DW	CN	ND	DW	CN	ND	CN	ND	CN	ND	CN	CN	ND	CN
9601	BGDS 1033	II	II	II	6.33	4.60	2.55	1.07	2.65	0.27	1.95	1.73	6.60	11.11	0.13	2.42
9602	**Local Check**	II	II	II	6.27	6.30	2.85	0.93	2.15	0.53	2.00	1.13	6.00	0.00	0.27	2.60
9603	RAH 1075	I	II	II	3.13	5.00	3.05	0.67	2.05	0.40	1.55	0.47	6.75	0.00	0.20	1.75
9604	GBHV-193	I	II	II	4.20	4.80	2.90	0.53	2.75	0.60	2.25	1.13	5.50	5.26	0.13	1.95
9605	**ZC (Sahana)**	I	II	II	4.93	7.20	3.00	1.20	2.10	0.20	1.65	2.60	5.45	0.00	0.13	2.31
9606	BS 6-18	I	II	II	4.53	4.50	2.20	1.07	2.20	0.20	1.70	0.67	6.55	10.52	0.27	2.69
9607	**QC (Suraj)**	II	II	II	6.07	4.40	1.80	1.20	1.15	0.33	0.85	1.53	5.35	0.00	0.20	2.00
9608	NDLH - 2035-5	I	II	II	3.47	5.60	3.05	1.13	2.65	0.13	1.45	0.67	5.80	0.00	0.13	2.14
	DCH-32	II			7.93			1.00		0.13		1.47			0.13	
	NDLH-1938	I			5.47			0.53		0.27		1.47			0.07	
	Jadoo	I			5.13			0.93		0.27		2.53			0.20	

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);
ND - Nandyal; DW – Dharwad; CN – Chamarajanagara;

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Table 40.1. Ent 1a. Br. 03b (ZT): Preliminary screening of breeding materials for their reaction to key pests (Boll damage) of cotton at South zone during 2019-20

Entry Code	Name of Entry	Green boll damage (%)				Open boll damage (%)				Open boll Locule damage (%)		
		H.a	PBW			*H.a*	PBW			PBW		
		DW	ND	DW	CN	DW	ND	DW	CN	ND	DW	CN
9601	BGDS 1033	11.95	40.00	10.45	6.89	3.20	13.73	9.60	7.58	4.69	9.18	8.15
9602	**Local Check**	6.50	31.67	10.90	7.80	4.30	16.03	8.45	8.79	8.42	7.23	9.60
9603	RAH 1075	12.19	15.00	10.45	6.90	3.35	11.51	7.73	8.04	4.40	6.36	9.50
9604	GBHV-193	8.20	31.67	11.33	7.65	3.95	11.92	8.66	8.23	5.76	7.33	8.78
9605	**ZC (Sahana)**	8.72	26.67	11.53	8.05	4.70	17.84	9.26	9.15	7.35	8.13	10.23
9606	BS 6-18	11.11	31.67	11.30	7.60	4.00	17.38	8.65	8.56	7.04	7.33	9.40
9607	**QC (Suraj)**	9.16	30.00	10.83	6.65	3.50	18.16	7.91	7.56	5.71	6.46	8.75
9608	NDLH - 2035-5	12.13	18.33	11.52	8.04	4.50	9.01	9.26	9.56	4.25	8.13	10.23
	DCH-32		45.00				23.21			5.56		
	NDLH-1938		36.67				23.24			4.79		
	Jadoo		30.00				16.47			3.75		

ND - Nandyal; DW – Dharwad; CN – Chamarajanagara;

Table 41. Ent 1a. Br. 04b (ZT): Preliminary screening of breeding materials for their reaction to key pests of cotton at South zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade			Jassid / 3 leaves			Whitefly / 3 leaves		Thrips / 3 leaves		Aphids / 3 leaves		CLCV infected plants (%)	Natural Enemies / Plant	
		ND	DW	CN	ND	DW	CN	ND	CN	ND	CN	ND	CN	CN	ND	CN
9611	RAH 1071	I	II	II	5.33	4.90	1.50	0.67	1.85	0.00	1.00	1.73	1.00	6.66	0.07	2.05
9612	**Local Check**	0	II	II	2.40	4.50	1.10	1.20	1.95	0.20	0.70	0.13	0.70	6.25	0.13	2.61
9613	BS 1	I	II	IV	5.40	6.40	9.00	0.60	6.30	0.00	1.65	2.00	1.65	60.00	0.00	3.89
9614	NDLH 20511	0	II	II	2.47	5.20	1.70	1.13	1.65	0.00	0.95	0.27	0.95	0.00	0.07	2.15
9615	**ZC (Sahana)**	II	II	II	6.27	5.50	2.10	1.20	1.10	0.13	1.10	1.80	1.10	0.00	0.07	2.04
9616	BGDS 1072	I	II	II	3.47	6.50	1.95	0.73	1.95	0.00	1.75	1.60	1.75	5.55	0.13	1.89
9617	GSHV 191	I	II	II	5.80	6.40	2.65	0.60	2.05	0.00	1.40	1.27	1.40	0.00	0.07	1.98
9618	**QC (Suraj)**	I	II	II	4.00	5.80	2.70	1.07	2.15	0.13	1.95	2.93	1.95	0.00	0.07	2.30
	DCH-32	II			7.53			0.67		0.27		1.20			0.07	
	NDLH-38	I			5.27			0.60		0.00		1.20			0.00	
	Jadoo	I			4.40			0.73		0.00		1.20			0.07	

Table 41.1. Ent 1a. Br.04b (ZT): Preliminary screening of breeding materials for their reaction to key pests (Boll damage) of cotton at South zone during 2019-20

Entry Code	Name of Entry	Green boll damage (%)				Open boll damage (%)				Open boll Locule damage (%)		
		H.a	PBW			*H.a*	PBW			PBW		
		DW	ND	DW	CN	DW	ND	DW	CN	ND	DW	CN
9611	RAH 1071	11.96	48.33	12.58	8.15	4.40	20.85	9.79	9.15	8.18	8.39	10.25
9612	**Local Check**	8.85	18.33	11.40	7.80	3.90	12.44	8.70	8.14	3.77	7.35	9.56
9613	BS 1	7.64	30.00	12.23	9.45	5.40	17.40	10.11	9.98	5.80	9.06	10.35
9614	NDLH 20511	7.65	20.00	10.25	6.50	3.75	14.95	7.63	8.72	5.45	6.31	9.56
9615	**ZC (Sahana)**	7.29	35.00	11.40	7.80	4.20	18.71	8.70	8.26	6.97	7.35	9.10
9616	BGDS 1072	11.12	21.67	11.75	8.50	4.85	16.61	9.38	9.05	7.01	8.19	12.30
9617	GSHV 191	7.53	26.67	12.25	9.50	5.60	15.42	10.13	10.25	8.88	9.06	11.30
9618	**QC (Suraj)**	12.16	30.00	11.28	7.55	4.20	20.22	8.64	8.63	7.46	7.32	9.56
	DCH-32		38.33				32.44			10.81		
	NDLH-38		41.67				15.55			5.51		
	Jadoo		30.00				14.61			7.73		

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);ND - Nandyal; DW – Dharwad; CN – Chamarajanagara;

Table 42. Ent 1a. Br. 05b (ZT): Preliminary screening of breeding materials for their reaction to key pests (Sucking pests) of cotton at South zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade			Jassid / 3 leaves			Whitefly / 3 leaves		Thrips / 3 leaves		Aphids / 3 leaves		Natural Enemies / Plant	
		ND	DW	CN	ND	DW	CN	ND	CN	ND	CN	ND	CN	ND	CN
9621	ARBHH 1951	**I**	III		4.53	7.40		1.13		0.33		0.53		0.07	
9622	**ZC (DHH 11)**	**II**	III	II	6.07	8.20	2.10	1.40	1.30	0.40	1.30	1.60	6.80	0.07	2.15
9623	ARBHH 1952	**I**	III	II	5.33	6.50	2.80	0.93	1.65	0.27	1.65	1.67	5.65	0.07	2.40
9624	RAHH 1952	**0**	III	II	3.47	5.50	3.00	0.73	1.60	0.00	1.60	0.60	6.75	0.07	1.89
9625	DHH 1951	**I**	III	II	4.13	7.30	2.95	0.60	1.10	0.27	1.10	0.00	7.75	0.07	1.75
9626	**Local Check**	**0**			3.80			0.80		0.00		0.20		0.00	
9627	BGDHH 697	**I**	II	II	5.60	4.40	2.60	1.07	1.85	0.13	1.85	1.47	5.80	0.13	2.30
9628	DHH 1952	**II**	II	II	6.00	6.50	2.80	1.07	2.30	0.07	2.30	2.73	5.75	0.20	2.60
9629	RAHH 1951	**II**	I	II	6.07	6.10	2.10	1.00	2.55	0.00	2.55	1.20	5.30	0.20	2.50
	DCH-32	II			8.33			1.13		0.00		1.87		0.00	
	NDLH-1938	I			5.40			0.67		0.27		1.87		0.00	
	Jadoo	II			6.73			0.73		0.00		0.87		0.07	

Table 42.1. Ent 1a. Br. 05b (ZT): Preliminary screening of breeding materials for their reaction to key pests (Boll damage) of cotton at South zone during 2019-20

Entry Code	Name of Entry	Green boll damage (%)				Open boll damage (%)				Open boll Locule damage (%)		
		H. a	PBW			*H.a*	PBW			PBW		
		DW	ND	DW	CN	DW	ND	DW	CN	ND	DW	CN
9621	ARBHH 1951	8.00	30.00	9.78		2.35	10.83	9.89		7.82	9.95	
9622	**ZC (DHH 11)**	8.14	33.33	10.29	3.56	3.15	10.38	10.15	4.58	9.86	10.07	8.20
9623	ARBHH 1952	7.90	35.00	9.73	4.58	2.30	9.67	10.36	5.45	12.43	10.68	7.56
9624	RAHH 1952	11.15	10.00	9.80	3.45	1.75	9.08	10.90	4.44	4.92	11.45	5.80
9625	DHH 1951	12.02	16.67	10.06	3.60	3.10	10.64	11.53	5.66	10.13	12.27	7.65
9626	**Local Check**		11.67				7.74			4.56		
9627	BGDHH 697	8.15	25.00	10.25	4.12	2.45	12.40	12.13	6.55	6.56	13.06	8.75
9628	DHH 1952	7.57	23.33	10.25	4.50	2.35	17.16	12.63	5.85	5.24	13.81	8.60
9629	RAHH 1951	7.90	28.33	9.90	3.50	2.20	15.26	12.95	5.54	6.82	14.48	6.45
	DCH-32		51.67				28.40			8.34		
	NDLH-1938		36.67				16.80			8.06		
	Jadoo		26.67				16.29			5.24		

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves); ND - Nandyal; DW – Dharwad; CN – Chamarajanagara;

Table 43. Ent 1a. Br. 06b (ZT): Preliminary screening of breeding materials for their reaction to key pests (Sucking pests) of cotton at South zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade			Jassid / 3 leaves			Whitefly / 3 leaves		Thrips / 3 leaves		Aphids / 3 leaves		CLCV infected plants (%)	Natural Enemies / Plant	
		ND	DW	CN	ND	DW	CN	ND	CN	ND	CN	ND	CN	CN	ND	CN
9631	AKH 1302	0	I	II	3.60	4.60	1.79	0.07	3.95	0.33	0.60	0.60	0.60	0.60	0.00	2.15
9632	DSC 1851	I	II	II	4.20	6.00	3.10	0.20	3.30	0.60	0.70	0.27	0.70	0.70	0.00	1.98
9633	**Local Check**	I	II	II	4.20	6.70	2.80	0.00	2.55	0.73	0.30	1.20	0.30	0.30	0.07	2.05
9634	RAHC 1029	0	II	II	3.07	5.30	2.60	0.07	3.00	0.00	0.45	0.00	0.45	0.45	0.13	3.05
9635	GISV 312	0	II	II	3.67	6.10	2.10	0.07	2.50	0.27	0.40	0.27	0.40	0.40	0.07	2.16
9636	RHC HD 1420	0	III	II	3.93	4.90	2.00	0.07	3.50	0.40	0.50	0.33	0.50	0.50	0.00	2.45
9637	AKH 1301	0	II	II	3.20	4.60	2.70	0.07	2.60	0.13	1.05	0.00	1.05	1.05	0.00	0.98
9638	CNH 1128	0	III	II	3.93	5.40	2.90	0.13	3.00	0.07	1.10	0.00	1.10	1.10	0.07	1.87
9639	BRCC 1621 S	0	IV	II	2.87	4.40	2.50	0.20	2.50	0.00	1.00	0.73	1.00	1.00	0.13	0.87
9640	**ZC (Suraj)**	0	III	II	4.27	6.20	3.10	0.07	2.40	0.00	0.50	0.00	0.50	0.50	0.07	2.45
	DCH-32	II			7.87			0.13		0.27		1.33			0.07	
	NDLH-1938	0			3.73			0.07		0.00		0.00			0.13	
	Jadoo	0			3.27			0.13		0.40		0.80			0.13	

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);
ND - Nandyal; DW – Dharwad; CN – Chamarajanagara;

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Table 43.1. Ent 1a. Br. 06b (ZT): Preliminary screening of breeding materials for their reaction to key pests (Sucking pests) of cotton at South zone during 2019-20

Entry Code	Name of Entry	Green boll damage (%)				Open boll damage (%)				Open boll Locule damage (%)		
		H.a	PBW			*H.a*	PBW			PBW		
		DW	ND	DW	CN	DW	ND	DW	CN	ND	DW	CN
9631	AKH 1302	7.01	21.67	10.80	5.60	3.00	14.44	11.40	7.25	5.01	11.70	9.25
9632	DSC 1851	11.76	31.67	11.13	6.25	3.65	17.74	11.56	7.50	7.59	11.78	8.15
9633	**Local Check**	8.14	38.33	10.99	5.98	3.25	49.79	11.00	7.01	11.02	11.00	8.94
9634	RAHC 1029	12.27	35.00	11.12	6.23	3.40	44.88	13.06	6.89	16.06	14.03	7.68
9635	GISV 312	12.91	33.33	10.73	5.45	3.35	22.24	13.36	6.53	9.03	14.68	7.89
9636	RHC HD 1420	8.02	30.00	11.08	6.15	3.35	17.28	12.54	7.25	8.20	13.27	8.40
9637	AKH 1301	12.59	31.67	11.15	6.30	3.45	17.55	10.58	7.15	7.59	10.29	8.25
9638	CNH 1128	9.14	45.00	10.25	4.50	2.70	18.59	10.63	5.60	10.51	10.81	6.58
9639	BRCC 1621 S	9.21	45.00	10.88	5.75	2.95	32.60	11.44	6.42	11.32	11.72	7.56
9640	**ZC (Suraj)**	12.12	35.00	10.90	5.80	3.25	19.17	11.45	6.52	12.71	11.73	8.25
	DCH-32		63.33				53.13			12.26		
	NDLH-1938		41.67				27.30			10.05		
	Jadoo		56.67				31.69			9.38		

ND - Nandyal; DW – Dharwad; CN – Chamarajanagara;

Table 44. Ent 1a. Br. 24b (ZT): Preliminary screening of breeding materials for their reaction to key pests (Sucking pests) of cotton at South zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade		Jassid / 3 leaves		White fly / 3 leaves	Thrips / 3 leaves	Aphids / 3 leaves	CLCV infected plants (%)	Natural Enemies / Plant	Green boll damage (%)			Open boll damage (%)			Open boll Locule damage (%)	
											H.a	PBW		*H. armigera*	PBW		PBW	
		DW	CN	DW	CN	CN	CN	CN	CN	CN	DW	DW	CN	DW	DW	CN	DW	CN
9651	GAM 260	I	I	2.50	0.10	0.10	0.00	3.00	0.00	0.80	7.02	5.30	2.60	4.85	4.65	13.67	4.33	14.83
9652	**Local Check**	I	I	2.60	0.25	0.20	0.20	3.25	0.00	0.67	7.49	5.13	3.25	2.5	5.06	14.67	5.03	14.89
9653	NDLA 3116-4	I	I	2.40	0.10	0.30	0.10	3.90	0.00	0.75	4.01	5.49	2.98	2.83	5.75	10.77	5.87	12.43
9654	MDL 2667	I	I	3.80	0.30	0.35	0.10	3.20	0.00	1.05	7.16	5.63	3.25	2.63	6.31	14.44	6.66	16.26
9655	**ZC (DLSa 17)**	I	I	2.00	0.10	0.35	0.25	3.30	0.00	1.35	3.65	6.28	4.56	3.2	5.14	13.47	4.57	15.20
9656	JLA-1227	I	I	2.50	0.00	0.50	0.30	4.65	10.52	1.45	3.75	5.28	3.56	3.18	5.14	13.38	5.07	13.64
9657	CNA 1054	I	I	3.00	0.30	1.00	0.30	2.95	0.00	0.89	4.05	5.17	3.33	3.18	5.58	12.30	5.79	13.53
9658	GAM 259	I	I	3.20	0.00	1.10	0.70	3.30	0.00	0.95	6.77	5.33	3.66	3.23	6.17	11.96	6.58	13.41
9659	DWDa 1801	I	I	2.10	0.45	1.40	0.00	3.00	5.26	1.11	6.06	6.28	4.56	3.35	7.14	13.15	7.57	14.78
9660	DWDa 1802	I		2.90							4.06	5.13		2.98	5.56		5.78	
9661	CNA 1031	I		2.40							3.96	5.15		3.13	6.08		6.54	

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);
DW – Dharwad; CN – Chamarajanagara;

Table 45. Ent 1a. Br. 24b LL (ZT): Preliminary screening of breeding materials for their reaction to key pests of cotton at South zone during 2019-20

Entry Code	Name of Entry	Jassid injury grade		Jassid / 3 leaves		Whitefly / 3 leaves	Thrips / 3 leaves	Aphids / 3 leaves	Natural Enemies / Plant	Green boll damage (%)			Open boll damage (%)			Open boll Locule damage (%)	
										H.a	PBW		*H.a*	PBW		PBW	
		DW	CN	DW	CN	CN	CN	CN	CN	DW	DW	CN	DW	DW	CN	DW	CN
9671	PA 837	I	I	2.30	0.10	0.20	0.10	4.00	1.25	4.15	5.50	0.50	3.15	5.25	2.50	5.13	3.75
9672	PA 833	I	I	2.40	0.00	0.20	0.10	3.10	1.05	7.90	6.00	0.78	3.23	5.00	2.40	4.50	4.50
9673	PAIG 377	I	I	2.40	0.10	0.00	0.00	4.50	0.95	4.15	5.50	0.00	3.18	5.75	1.50	5.88	3.50
9674	PA 839	I	I	2.30	0.20	0.10	0.10	3.80	0.75	3.85	5.50	0.35	3.13	6.25	3.50	6.63	4.60
9675	PA 778	I	I	2.90	0.10	0.00	0.00	3.95	0.50	3.91	5.00	0.48	3.15	6.50	2.45	7.25	3.56
9676	PAIG 380	I	I	1.90	0.30	0.00	0.00	4.75	0.78	4.17	5.79	0.57	3.13	7.39	3.45	8.20	4.75
9677	PAIG 384	I	I	1.90	0.00	0.10	0.10	3.60	0.00	6.35	5.44	0.87	2.45	5.22	4.25	5.11	3.56
9678	PA 806	I	I	2.90	0.25	0.00	0.00	4.90	0.25	5.45	5.80	0.60	2.75	6.40	2.30	6.70	4.25
9679	**ZC (DLSa 17)**	I	I	3.30	0.00	0.10	0.10	3.80	0.84	6.87	6.27	1.54	2.68	6.14	4.50	6.07	5.60
9680	PA 807	I	I	2.80	0.30	0.00	0.00	3.95	0.85	6.49	6.08	2.15	3.35	6.54	3.56	6.77	4.60
9681	PA 809	I	I	2.60	0.00	0.10	0.10	4.60	0.00	4.20	6.13	2.16	2.35	5.57	2.56	5.28	3.50
9682	CNA 1065	I	I	3.40	0.00	0.00	0.00	3.65		4.20	6.20	2.40	4.85	6.10	3.01	6.05	4.53

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);
DW – Dharwad; CN – Chamarajanagara;

Table 46. Ent 1a. Br. CC Hir (ZT): Preliminary screening of breeding materials for their reaction to key pests of cotton at South zone during 2019-20

Entry code	Name of Entry	Jassid injury grade	Jassid / 3 leaves	Whitefly / 3 leaves	Thrips / 3 leaves	Aphids / 3 leaves	Green boll damage due to PBW (%)	Open boll damage due to PBW (%)	Open boll Locule damage due to PBW (%)	Good open bolls (No./ Plant)
		LG	LG	LG	LG	LG	LG	LG	LG	LG
9701	LHCC 3	2	1.60	1.00	0.70	4.60	62.50	21.75	15.63	24.15
9702	LHCC 4	2	2.00	1.80	0.70	3.50	50.00	24.80	13.74	27.35
9703	LHCC 1	3	4.70	2.10	1.80	3.40	67.07	24.58	15.63	22.55
9704	CNH 17395	3	4.50	1.20	1.70	2.70	66.62	20.31	14.01	20.55
9705	**Zonal Check (Suraj)**	3	4.70	1.30	1.60	4.60	61.25	27.63	12.19	24.75
9706	16301 DB	2	2.60	1.20	1.20	6.10	54.36	22.86	17.51	21.95
9707	DHCC 1801	4	4.00	1.40	0.70	3.90	59.21	30.66	16.40	19.15
9708	LHCC 2	3	3.20	0.70	0.80	3.30	40.00	39.10	22.41	25.15
9709	**Local Check**	3	3.30	2.00	2.00	4.40	51.86	30.21	18.25	20.55
9710	16337 LB	3	4.30	0.80	1.10	5.20	58.75	19.75	13.18	23.75
9711	16315 LB	2	1.70	1.60	1.20	4.60	71.25	30.26	19.59	17.15
9712	DHCC 1802	4	6.20	1.40	1.40	2.80	55.40	24.13	16.43	21.95
	Jaadoo	3	2.60	1.90	0.90	4.70	53.75	17.97	13.1	31.75
	NDLH	3	2.20	1.60	1.00	3.90	58.05	22.05	16.85	24.15
	DCH-32	4	6.50	1.50	1.70	5.90	57.13	31.85	17.97	16.35

JIG-Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves);
DW – Dharwad; CN – Chamarajanagara;

Table 47. Ent 1b. Advanced screening of promising entries for development of repository for sucking pests at North Zone during 2019 – 20

Entry code	Mean Jassid injury grade				Leaf hopper/3 leaves				Whitefly population/ 3 leaves					Thrips population/ 3 leaves		
	BT	FA	HI	SG	BT	FA	HI	SG	BT	FA	HI	SR	SG	BT	FA	HI
F2462	II	II	II	I	2.30	0.67	14.80	1.63	2.10	13.00	9.87	16.22	4.17	17.83	22.17	23.00
F2596	I	II	II	I	2.30	1.33	19.03	0.70	1.57	17.33	13.93	17.78	7.30	15.33	25.67	24.23
F2662	I	II	II	I	1.53	1.83	17.20	1.20	1.63	8.67	12.03	16.67	4.13	17.33	14.17	24.67
GA	II	III	III		3.60	1.67	18.77		1.70	19.17	12.03	21.11		17.87	17.33	25.53
GSHV199	I	III	II	I	1.63	1.67	16.67	0.80	2.27	14.67	9.77		4.70	18.50	19.33	23.40
H1519	I	II	II	I	1.20	0.83	18.30	0.30	2.07	14.33	15.93	18.33	4.77	15.17	19.50	24.93
HS297	II	II	II	I	2.63	0.83	16.77	1.40	2.07	19.17	13.70	15.78	5.30	18.03	22.33	24.67
HS6	II		III		3.40		20.03		2.13		15.30	22.56		17.17		23.90
L1534	I	I	II	I	1.97	0.50	16.17	0.87	2.40	9.83	11.33	15.00	5.60	18.43	20.33	22.97
PBH116	II	II	III	I	2.70	2.17	18.73	0.93	1.93	9.33	14.30	18.56	4.77	16.70	17.67	23.17
PBH139	I	III	II	I	1.73	0.67	19.03	0.80	2.83	10.67	9.90	20.11	6.27	17.83	23.17	23.90
PBH39	I	III	II	I	1.47	1.67	19.63	0.60	1.87	13.50	12.20	18.22	6.50	17.47	19.83	23.43
PBH42	I	II	II	I	1.73	0.67	19.63	0.80	2.93	12.00	12.37	17.33	5.43	19.43	22.33	24.73
RAH1070	I	III	II	I	2.43	1.67	18.20	0.97	2.20	12.50	14.50	16.44	7.03	17.93	21.50	24.67
RCH650	II				2.57				1.70					18.60		
RS2013	II	II	II	I	2.43	1.50	18.20	0.47	1.63	18.83	9.50	17.78	5.43	17.73	24.17	23.47
RS2909	I	III	II	I	1.83	1.67	19.73	1.57	2.13	15.67	14.30	18.44	4.57	16.33	21.67	26.37
TCH1199	I	III	II	I	2.03	1.17	17.67	1.30	3.87	17.50	14.10	15.22	7.33	17.67	22.67	23.67
MRC 7017 BGII			II				20.37				14.30					25.20
GIVS-199												15.11				

JIG - Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves)

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

Table 48. Ent 1b. Advanced screening of promising entries for development of repository for sucking pests at Central Zone during 2019 – 20

S.No	Entry code	Mean Jassid injury grade					Mean leaf hopper/3 leaves						Whitefly population/ 3 leaves during peak infestation				Thrips population/ 3 leaves during peak infestation	Aphid population/ 3 leaves during peak infestation	
		JU	SU	AK	NA	RA	JU	SU	AK	NA	RA	KH	JU	SU	RA	KH	SU	SU	KH
1	**AKH 09-5**	I	1.00	I	II	I	4	4.09	17.67	4.68	5.5		14.9	8.10	3.67		38.00	27.20	
2	**AKH 2006-2**	I	1.50	I	II	I	3.8	5.00	14.56	4.38	5.9		14.6	10.70	4.03		40.80	33.50	
3	**BGDS 1063**	I	2.20		III	I	4	11.44		4.37	5.73		7.9	6.70	4		28.50	35.80	
4	**DCH-32**	III	4.30	III	IV	I	8.3	16.69	36.33	4.83	10.04		11.7	5.90	3.47		36.70	42.30	
5	**DHY-286 (JR)**		1.00					2.72						16.30			24.30	27.90	
6	**GISV-310**	I	1.30	II	III	I	3.4	5.06	26.78	4.22	5.8	15	15.4	3.00	4.03	14.33	31.40	22.50	2.67
7	**GISV-319**	II	1.00	I	II	II	5.9	3.38	16.22	4.97	7.23	14	16	3.70	4.07	14.33	25.40	26.80	4.33
8	**GISV 267**	I	1.00		II	I	3.5	4.16		4.92	5.27	12.33	13.7	3.40	3.6	15	23.00	31.30	4
9	**GISV 272**	I	1.00		II	IV	2.5	3.84		4.98	5.67	11.67	11.4	2.80	3.47	15	25.10	22.50	3.67
10	**GJHV 497**	I	1.00		II	I	3.7	4.44		4.6	7.6	14.33	11.5	3.80	3.87	12.33	30.60	40.00	3.67
11	**GJHV 516**	I	1.50		II	I	2	5.28		4.55	6.2	12	8.7	4.70	4.17	14.67	22.70	34.90	4
12	**GSV 173**	I	1.00		II	I	2.9	3.69		5	5.63	11.67	11.2	3.20	4	13.67	21.70	26.20	4
13	**JK-4**	I	2.00	I	II	I	3	5.69	17.22	4.82	6.2	15.33	8.3	6.20	4.07	12.67	35.20	37.70	3
14	**JK-5**	I	1.00	I	I	II	2.4	3.75	10.44	4.65	4.8		9.3	4.20	4.37		23.30	28.50	
15	**KHANDWA 2**	I	1.30	II	II	I	2.9	4.22	18	5.05	5.23		12.6	3.80	3.97		26.00	32.80	
16	**LHDP 1**	I	2.00		III	II	4.1	5.34		5.05	5.27	13.33	13.4	6.50	4.37	15.67	22.50	34.50	4.33
17	**NDLH 1938**	I	1.70		II	II	4	4.84		5.15	6.03	13.33	13.2	8.30	4.47	14	30.60	26.30	4.33
18	**NDLH 2010**	I	1.70		III	II	3.7	5.47		5.03	5.6		14.4	3.00	3.93		25.20	35.20	
19	**Phule 388**	I	2.10		II	IV	4.8	8.28		3.92	5.53		10.4	4.70	3.87		36.30	33.50	
20	**Phule 492**	I	1.80		II	III	4.7	7.34		4.55	5.77		10.5	5.80	4		32.50	41.50	
21	**Phule 688**	I	2.00		II	III	2.6	9.16		4.37	6		9.4	6.40	3.97		38.00	33.90	
22	**Phule Yamuna**	II	1.00		II	III	5	4.97		4.93	6.1		12.5	4.30	4.3		27.70	30.20	
23	**SAGAR SEEDS**											12				14.67			3.67
24	**TSH 0499**	I	2.30		III	I	2.6	11.69		4.53	5.9		12.6	5.10	4.63		39.70	34.20	

JIG - Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves)

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Table 49. Ent 1b. Advanced screening of promising entries for development of repository for sucking pests at South Zone during 2019 – 20

S.No	Entry code	Mean Jassid injury grade		Mean leaf hopper/3 leaves		Whitefly population/ 3 leaves during peak infestation
		DW	RC	DW	RC	RC
1	**AKH 13-51**	**II**	1.00	6.1	7.73	4.01
2	**AKH-09-5**	**III**	1.00	4.1	6.00	4.40
3	**AKH-13-01**	**II**	1.00	4	6.71	6.35
4	**AKH 2012-81**		1.00		6.71	4.24
5	**AKH-2012-84**	**I**		3.6		
6	**BGDS 1033**	**II**	1.33	4.1	6.51	6.58
7	**BGDS 1063**	**III**		3.5		
8	**Bunny Bt Check**	**III**	1.66	**6.13**	7.88	4.33
9	**BUNNY NON BT**		1.66		5.70	4.26
10	**CNH 09-62**	**III**	1.66	4	6.16	4.27
11	**CPD-1652**	**III**	2.00	5	6.80	2.89
12	**DCH 32 CHECK**	**IV**	3.00	**8.2**	10.99	2.44
13	**GBHV-195**	**III**	1.66	4.8	8.28	5.64
14	**GISV -272**	**II**	1.66	4.6	8.28	5.09
15	**GISV 319**	**II**	1.66	3.4	9.75	3.26
16	**GJHV-523**	**III**	1.66	4.6	7.73	3.51
17	**GSHV 185**	**II**	2.00	5.2	9.85	3.80
18	**KC 3**	**II**	1.00	5	6.28	3.94
19	**LHDP 1**	**II**		4.2		
20	**NDLH 1938**	**II**	1.66	6.6	6.71	4.04
21	**NDLH 2010**	**II**		4		
22	**Phule 388**	**III**		6.2		
23	**Phule 492**	**III**		5.7		
24	**Phule 688**	**II**		6.1		
25	**Phule Yamuna**	**II**		5.4		
26	**RACH 1039**	**II**	1.66	5.6	4.84	3.67
27	**RAHC 1040**	**III**	2.00	6.3	5.50	4.00
28	**TCH 1897**		2.33		7.73	5.04
29	**TSH 332**	**II**	2.33	5	6.71	3.64

JIG - Jassid Injury Grade (I-entire foliage free of curling and yellowing, II-curling of few leaves in lower portion of plant + marginal yellowing, III-curling of leaves almost all over the plant, IV-extreme curling, bronzing and drying of leaves)
LG- Lam Guntur, ND - Nnadyal, DW - Dharwad, RC - Raichur, CN - Chamarajanagar, SVPR - Srivilliputtur

Table 50. Ent 2. Seasonal dynamics of key pests of cotton (Sucking pests) under Unprotected condition to develop suitable forecasting model in North Zone – NBt Ganganagar Ageti during 2019 – 20

Standard week	Sucking Pests																	
	Jassid / 3 leaves					Whitefly / 3 leaves					Thrips / 3 leaves					Aphid / 3 leaves		
	BT	FA	HI	SR	SG	BT	FA	HI	SR	SG	BT	FA	HI	SR	SG	BT	FA	SG
22	-	-	1.33	0.50	0.00	-	-	3.67	**0.40**	0.00	-	-	6.13	5.60	0.00	-	-	0.00
23	-	0.00	1.67	**0.40**	0.00	-	0.25	8.60	3.70	0.00	-	0.08	21.20	5.05	0.00	-	0.00	0.00
24	0.00	0.00	1.20	0.78	0.00	0.00	0.27	10.67	3.60	0.00	0.00	0.67	25.33	4.10	0.00	0.00	0.00	0.00
25	0.50	0.00	4.53	**0.40**	1.80	0.67	0.20	18.20	3.20	6.40	0.00	0.33	18.00	3.60	11.40	0.00	0.00	0.00
26	0.93	0.07	4.47	1.10	2.40	1.80	1.27	18.47	13.20	11.40	1.06	1.13	31.27	23.60	22.40	0.00	0.00	0.00
27	0.00	1.53	7.60	0.90	2.20	1.46	2.13	17.20	15.20	13.90	7.60	2.07	43.20	**31.70**	30.60	0.00	0.00	0.00
28	0.73	3.00	5.27	2.40	2.67	2.00	10.13	17.20	16.90	15.30	15.80	8.60	53.73	19.10	14.20	0.00	0.00	0.00
29	2.70	3.10	7.20	2.40	1.80	1.30	11.00	18.87	11.40	20.40	18.60	9.20	33.53	17.20	19.20	0.00	0.00	0.00
30	5.46	12.90	9.33	4.30	2.70	2.00	8.00	16.53	**23.40**	15.10	48.06	8.10	37.33	24.10	17.10	0.00	0.00	0.00
31	8.60	10.20	4.33	2.50	4.20	3.66	8.70	30.53	11.70	15.00	55.80	15.70	16.80	5.80	9.00	0.00	0.00	0.00
32	7.06	7.50	8.13	4.70	3.90	4.46	4.10	37.20	16.10	8.30	52.60	8.50	24.27	15.10	8.10	0.00	0.00	0.00
33	10.26	5.30	6.20	**6.60**	0.20	7.46	2.40	37.80	17.20	4.60	64.40	6.70	22.80	17.90	11.50	0.00	0.00	0.00
34	4.60	4.50	7.33	3.80	0.80	7.40	2.00	34.33	11.40	9.80	8.66	6.10	15.40	16.20	10.50	0.00	0.00	0.00
35	2.87	4.70	2.07	3.30	0.60	4.47	2.30	33.40	7.40	4.50	0.20	6.50	4.33	7.00	3.40	0.00	0.00	0.00
36	6.00	2.50	0.73	2.90	0.40	7.00	1.80	19.33	11.30	5.60	3.40	0.80	0.80	3.90	1.70	0.00	0.00	0.00
37	1.20	3.10	1.07	3.00	0.70	7.80	3.80	28.27	17.00	10.40	0.00	0.00	1.80	2.60	3.60	0.00	0.00	0.00
38	1.67	0.50	1.87	3.00	0.50	2.00	3.80	32.13	17.00	5.60	0.00	0.00	2.53	2.60	1.40	0.00	0.00	0.00
39	1.13	2.70	0.87	2.10	0.40	4.93	1.20	16.93	11.20	13.20	0.00	0.00	0.80	1.30	2.30	0.00	0.00	0.00
40	1.86	3.30	1.27	1.80	0.20	2.47	1.30	19.93	14.10	4.10	0.00	0.00	1.93	3.30	2.00	0.00	0.00	0.00
41	1.80	2.10	1.13	1.40	1.50	3.06	1.40	14.67	14.00	2.20	0.00	0.00	1.20	0.60	1.60	0.00	0.00	0.00
42	0.80		1.67	0.80	1.10	1.20		8.87	8.30	1.30	0.00		2.53	**0.00**	1.00	0.00		0.00
43	0.00		0.93	1.60	0.00	0.00		2.93	6.70	0.00	0.00		2.33	**0.00**	0.00	0.00		0.00
44			0.60	0.50	0.00			4.00	5.40	0.00			1.47	**0.00**	0.00			0.00
45					0.00					0.00					0.00			0.00
46					0.00					0.00					0.00			0.00

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

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Table 50.1. Ent 2. Seasonal dynamics of key pests of cotton (Bollworms) under Unprotected condition to develop suitable forecasting model in North Zone – NBt Ganganagar Ageti during 2019 – 20

Standard week	Predators/ plant*					*H. armigera*				*Earias*spp. larvae / 5 plants		*S. litura*larvae / 5 plants		% Parasitism on Bollworms	Fruiting Body damage %			
						Eggs / 5 plants	Larvae / 5 plants	Eggs / 5 plants	Larvae / 5 plants	SR	SG	SR	SG	SG	*H. armigera*	*E. vittella*		
	BT	FA	HI	SR	SG	SR		SG							SG	HI	SR	SG
22			0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
23	-	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
24	0.30	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
25	0.40	0.07	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
26	1.30	0.00	0.67	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
27	2.80	0.20	0.53	0.80	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
28	3.20	0.73	0.40	0.78	0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
29	4.00	0.50	0.53	0.10	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
30	1.40	0.50	0.47	2.18	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
31	2.00	1.40	0.47	0.55	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
32	3.20	4.00	0.40	1.00	0.78	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	3.00	4.40	0.40	1.68	0.67	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	2.40	2.80	0.33	1.33	1.44	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	2.00	3.10	0.33	1.03	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	4.40
36	3.20	2.60	0.73	1.00	0.44	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	26.00	1.53	8.40
37	2.10	3.70	0.33	0.98	0.78	0.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	42.00	0.91	18.40
38	2.20	3.10	0.67	1.05	0.78	0.00	0.00	0.00	0.00	0.21	2.00	0.00	0.00	0.00	0.00	20.00	5.63	22.40
39	1.60	2.00	0.40	1.23	0.57	0.00	0.00	0.00	0.00	1.12	2.00	0.00	0.00	0.00	0.00	28.00	6.18	17.80
40	0.80	2.00	0.20	1.08	0.22	0.00	0.00	0.00	0.00	2.10	3.00	0.00	0.00	0.00	0.00	16.00	5.33	13.80
41	0.30	1.40	0.20	1.95	0.67	0.00	0.00	0.00	0.00	1.84	3.00	0.00	0.00	0.00	0.00	12.00	5.47	20.80
42	0.20		0.40	1.33	0.44	0.00	0.00	0.00	0.00	3.21	4.00	0.00	0.00	0.00	0.00	8.00	2.42	24.40
43	0.10		0.20	2.35	0.00	0.00	0.00	0.00	0.00	3.58	1.00	0.00	0.00	0.00	0.00	10.00	8.16	8.60
44			0.20	0.45	0.00	0.00	0.00	0.00	0.00	4.12	2.00	0.00	0.00	0.00	0.00	6.00	0.90	10.40
45					0.00			0.00	0.00		0.00		0.00	0.00	0.00			0.00
46					0.00			0.00	0.00		0.00		0.00	0.00	0.00			0.00

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

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Table 50.2. Ent 2. Seasonal dynamics of key pests of cotton (Trap catches and Boll damage) under Unprotected condition to develop suitable forecasting model in North Zone – NBt Ganganagar Ageti during 2019 – 20

Standard week	Trap catches/week													Pink bollworm larvae/20 green bolls	Boll damage on boll basis			Boll damage on locule basis		
	H. armigera			PBW				SBW			*S. litura*				Green boll damage/20 bolls (%)		Open boll damage/ 20 bolls (%)	Locule damage in 20 green bolls (%)	Open boll Locule damage in 20 bolls %	
	HI	SR	SG	BT	HI	SR	SG	HI	SR	SG	HI	SR	SG	SG	BT	SG	SG	SG	BT	SG
22	-	1.29	0.00	-	-	0.00	0.00	-	0.00	0.00	-	4.19	0.00	-	-	-	-	-	-	-
23	-	2.29	0.00	-	-	0.00	0.00	-	0.00	0.00	-	4.95	0.00	-	-	-	-	-	-	-
24	-	2.71	0.00	-	-	0.00	0.00	-	0.00	0.00	-	6.48	0.00	-	-	-	-	-	-	-
25	2.67	4.57	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	139.33	7.86	14.50	-	-	-	-	-	-	-
26	2.67	2.81	0.00	-	0.33	0.00	0.00	0.67	0.48	0.00	58.00	10.00	87.50	-	-	-	-	-	-	-
27	3.67	0.54	0.00	-	2.67	0.00	0.00	1.00	0.00	2.50	67.33	1.86	246.00	-	-	-	-	-	-	-
28	3.00	0.69	2.00	-	1.67	1.22	0.00	1.00	0.00	1.50	89.00	2.71	103.00	0.00	-	0.00	0.00	0.00	-	0.00
29	2.00	0.74	0.00	-	1.67	0.00	2.00	1.00	0.00	3.50	63.33	8.62	48.00	0.00	-	0.00	0.00	0.00	-	0.00
30	1.67	0.00	1.00		0.67	2.33	0.00	0.67	0.00	6.00	83.33	3.10	55.00	0.00	-	0.00	0.00	0.00	-	0.00
31	2.33	0.73	0.00		2.67	2.22	1.00	2.00	0.52	7.50	53.33	6.14	23.50	0.00	-	0.00	0.00	0.00	-	0.00
32	2.00	2.05	0.00	-	1.33	1.22	0.00	1.67	0.00	9.00	101.67	2.29	28.00	0.00	-	0.00	0.00	0.00	-	0.00
33	1.00	3.19	1.00	-	0.67	1.00	2.50	0.67	0.00	7.00	40.00	5.48	39.00	0.00	-	0.00	0.00	0.00	-	0.00
34	1.00	0.63	0.00	-	0.00	0.66	0.00	0.00	0.00	6.00	21.67	2.24	55.50	0.00	-	0.00	0.00	0.00	-	0.00
35	1.00	0.43	0.00	-	1.00	0.88	3.50	1.00	3.90	15.00	38.00	4.52	39.00	0.00	-	0.00	0.00	0.00	-	0.00
36	1.67	0.79	0.00	-	0.00	0.11	2.50	7.67	0.56	6.00	5.67	2.29	7.50	0.00	-	0.00	0.00	0.00	-	0.00
37	1.67	1.57	0.00	-	0.67	18.44	2.00	5.33	2.24	46.50	10.00	3.86	11.00	0.00	-	0.00	0.00	0.00	-	0.00
38	3.33	2.38	0.00	-	2.67	8.80	3.50	3.33	2.29	57.00	10.00	4.00	8.00	1.00	-	5.00	0.00	1.89	-	0.00
39	4.67	2.14	0.00	-	2.00	18.44	4.00	3.00	2.43	9.00	7.33	3.24	29.50	1.00	-	10.00	0.00	4.58	-	0.00
40	1.67	0.69	0.00	-	0.00	12.00	13.50	6.67	2.81	34.50	9.33	2.33	45.50	2.00	8.33	15.00	0.00	8.83	3.55	0.00
41	4.00	1.71	0.00	7.00	1.67	9.40	16.50	11.33	2.24	54.00	24.00	2.00	25.50	3.00	11.33	15.00	0.00	7.49	5.00	0.00
42	5.67	0.74	0.00	6.00	3.00	9.60	19.50	12.67	3.57	134.50	32.33	2.76	41.50	1.00	12.67	10.00	0.00	3.80	1.16	0.00
43	6.33	2.19	0.00	8.00	1.67	8.44	21.50	9.67	10.19	46.50	14.00	3.38	16.50	0.00	17.33	0.00	0.00	0.00	7.33	0.00
44	7.67	2.14	0.00	6.00	2.00	8.33	25.50	8.33	5.57	71.50	9.67	3.86	35.50	0.00	-	0.00	0.00	0.00	-	0.00
45	-	-	0.00	8.00	-	-	32.50	-	-	52.00	-	-	41.50	0.00	-	0.00	20.00	0.00	-	13.87
46	-	-	0.00	-	-	-	9.50	-	-	38.50	-	-	29.00	0.00	-	0.00	0.00	0.00	-	0.00

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

Table 51. Ent 2. Seasonal dynamics of key pests of cotton (Sucking pests) under Unprotected condition to develop suitable forecasting model in North Zone – RCH 650 BG II during 2019 – 20

Standard week	Sucking Pests																		Predators/ plant*				
	Jassid / 3 leaves					Whitefly / 3 leaves					Thrips / 3 leaves					Aphid / 3 leaves							
	BT	FA	HI	SR	SG	BT	FA	HI	SR	SG	BT	FA	HI	SR	SG	BT	FA	SG	BT	FA	HI	SR	SG
22	-	-	0.80	**0.00**	0.00	-	-	3.13	**1.44**	0.00	-	-	5.87	7.90	0.00	-	-	0.00	-	-	0.13	0.00	0.00
23	-	0.00	1.13	0.70	0.00	-	0.83	10.00	3.78	0.00	-	5.92	26.13	8.50	0.00	-	0.00	0.00	-	0.83	0.20	0.00	0.00
24	0.00	0.00	1.20	0.80	0.00	0.90	1.06	10.80	4.80	0.00	0.00	7.53	24.13	4.80	0.00	0.00	0.00	0.00	0.20	1.06	0.20	0.00	0.00
25	0.00	0.07	4.13	0.60	0.00	1.13	0.27	15.80	3.80	4.67	2.40	4.87	18.13	1.80	12.40	0.00	0.00	0.00	0.60	0.27	0.40	0.00	0.00
26	0.06	1.33	6.27	0.60	0.40	4.60	1.93	11.20	14.50	14.67	1.06	8.67	26.73	11.00	13.80	0.00	0.00	0.00	1.00	1.93	0.53	0.05	0.00
27	0.00	2.80	5.93	0.20	0.80	0.53	2.27	7.40	7.10	28.10	1.73	8.53	42.33	**35.20**	17.90	0.00	0.00	0.00	1.60	2.27	0.60	0.45	1.80
28	0.60	2.27	3.00	2.00	0.60	4.60	6.33	12.40	10.60	23.80	5.86	13.93	69.33	24.80	4.40	0.00	0.00	0.00	2.80	6.33	0.60	0.60	0.90
29	1.26	4.50	6.13	2.10	0.20	0.13	10.90	18.07	7.60	15.90	19.11	12.80	33.20	14.10	12.00	0.00	0.00	0.00	3.00	10.90	0.33	0.15	1.00
30	4.40	9.60	8.93	3.00	0.80	1.66	13.20	16.67	10.30	26.40	46.93	17.60	38.00	17.10	14.80	0.00	0.00	0.00	4.20	13.20	0.27	0.08	0.80
31	5.20	8.80	5.00	3.10	2.40	4.13	8.10	26.80	18.40	8.30	55.13	16.30	21.07	9.20	13.50	0.00	0.00	0.00	5.00	8.10	0.27	0.30	1.20
32	7.86	3.40	8.47	6.20	1.40	4.06	5.30	33.53	12.20	3.40	52.00	14.30	24.40	16.70	7.30	0.00	0.00	0.00	4.30	5.30	0.60	0.60	1.00
33	10.80	5.50	5.47	5.50	0.20	9.40	5.10	35.20	13.90	4.30	38.33	16.50	21.53	15.20	8.00	0.00	0.00	0.00	3.10	5.10	0.47	1.03	1.11
34	5.20	4.20	9.27	4.00	0.90	7.33	6.10	37.27	10.20	8.80	13.13	7.50	14.53	15.00	11.80	0.00	0.00	0.00	2.30	6.10	0.20	1.55	1.00
35	1.60	3.30	1.13	3.60	0.60	3.73	5.40	33.80	7.20	3.30	0.00	4.30	4.00	4.80	3.50	0.00	0.00	0.00	2.20	5.40	0.60	0.95	0.67
36	4.40	1.70	0.73	2.70	0.50	5.20	2.50	18.20	7.50	7.20	0.53	0.00	1.20	4.10	1.50	0.00	0.00	0.00	2.50	2.50	0.20	0.95	0.67
37	2.06	0.20	1.60	2.80	0.70	8.80	3.00	25.67	14.60	18.60	0.00	0.00	1.27	3.00	4.10	0.00	0.00	0.00	2.10	3.00	0.20	1.00	1.11
38	2.07	0.20	0.80	2.90	0.40	3.93	2.40	32.60	14.20	11.50	0.00	0.00	1.40	3.00	3.00	0.00	0.00	0.00	1.60	2.40	1.07	1.25	0.78
39	2.60	0.60	1.13	2.20	0.80	4.53	2.20	21.27	11.80	13.20	0.00	0.00	1.20	1.90	2.60	0.00	0.00	0.00	1.00	2.20	0.20	1.35	1.22
40	1.67	1.00	1.27	2.40	1.40	5.00	1.80	20.27	14.20	8.80	0.00	0.00	1.60	0.80	3.33	0.00	0.00	0.00	0.60	1.80	0.20	1.13	1.11
41	3.00	0.90	0.47	1.40	2.10	4.93	2.00	12.40	15.40	4.50	0.00	0.00	0.33	0.50	4.11	0.00	0.00	0.00	0.60	2.00	0.20	1.65	1.00
42	0.86	-	1.60	1.50	0.60	1.13	-	9.67	12.30	1.30	0.00	-	2.27	0.10	2.50	0.00	-	0.00	0.20	-	0.27	1.73	1.11
43	0.43	-	1.20	2.00	0.00	1.00	-	1.07	9.20	0.00	0.00	-	1.07	0.00	0.00	0.00	-	0.00	0.00	-	0.20	1.78	0.00
44	-	-	0.93	0.80	0.00	-	-	2.47	7.10	0.00	-	-	1.27	0.00	0.00	-	-	0.00	-	-	0.47	0.60	0.00
45	-	-	-	-	0.00	-	-	-	-	0.00	-	-	-	-	0.00	-	-	0.00	-	-	-	-	0.00
46	-	-	-	-	0.00	-	-	-	-	0.00	-	-	-	-	0.00	-	-	0.00	-	-	-	-	0.00

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

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Table 51.1. Ent 2. Seasonal dynamics of key pests of cotton (Bollworms) under Unprotected condition to develop suitable forecasting model in North Zone – RCH 650 BG II during 2019 – 20

Standard week	*H. armigera*					*Eariass*pp. larvae / 5 plants		*S. litura* larvae / 5 plants		% Parasitism on Bollworms	**Fruiting Body damage %		
	Eggs / 5 plants	Eggs / 5 plants	Larvae / 5 plants	Eggs / 5 plants	Larvae / 5 plants	SR	SG	SR	SG	SG	*H. armigera*	*E. vittella*	
	FA	SR		SG							SG	HI	SG
22		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00
23	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00
24	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00
25	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00
26	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00
27	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00
28	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00
29	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00
30	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00
31	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00
32	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00
38	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00
39	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00	0.00
40	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00
41	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00
42	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00
43	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.00	0.00
44	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00	0.00
45	-	-	-	0.00	0.00	-	0.00	-	0.00	0.00	0.00	-	0.00
46	-	-	-	0.00	0.00	-	0.00	-	0.00	0.00	0.00	-	0.00

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

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Table 51.2. Ent 2. Seasonal dynamics of key pests of cotton (Trap catches and Boll damage) under Unprotected condition to develop suitable forecasting model in North Zone – RCH 650 BG II during 2019 – 20

Standard week	Trap catches / week												Flower damage/ 50 flowers (%)	Pink bollworm larvae/20 green bolls		Boll damage on boll basis		Boll damage on locule basis		
	H. armigera			PBW			SBW			*S. litura*						Green boll damage/20 bolls (%)		Locule damage in 20 green bolls (%)	Open boll Locule damage in 20 bolls %	
	FA	SR	SG	FA	SR	SG	FA	SR	SG	FA	SR	SG	SG	BT	SG	BT	SG	SG	BT	SG
22		1.29	0.00		0.00	0.00	-	0.00	0.00		4.19	0.00	0.00	-	0.00	-	0.00	0.00	-	0.00
23	0.0	2.29	0.00	0.0	0.00	0.00	6.0	0.00	0.00	16.0	4.95	0.00	0.00	-	0.00	-	0.00	0.00	-	0.00
24	0.0	2.71	0.00	0.0	0.00	0.00	5.0	0.00	0.00	13.0	6.48	0.00	0.00	-	0.00	-	0.00	0.00	-	0.00
25	0.0	4.57	0.00	0.0	0.00	0.00	12.0	0.00	0.00	25.0	7.86	14.50	0.00	-	0.00	-	0.00	0.00	-	0.00
26	0.0	2.81	0.00	0.0	0.00	0.00	5.0	0.48	0.00	4.0	10.00	87.50	0.00	-	0.00	-	0.00	0.00	-	0.00
27	0.0	0.54	0.00	4.0	0.00	0.00	2.0	0.00	2.50	0.0	1.86	246.00	0.00	-	0.00	-	0.00	0.00	-	0.00
28	1.0	0.69	2.00	3.0	1.22	0.00	55.0	0.00	1.50	5.0	2.71	103.00	0.00	-	0.00	-	0.00	0.00	-	0.00
29	3.0	0.74	0.00	3.0	0.00	2.00	0.0	0.00	3.50	0.0	8.62	48.00	0.00	-	0.00	-	0.00	0.00	-	0.00
30	0.0	0.00	1.00	5.0	2.33	0.00	2.0	0.00	6.00	15.0	3.10	55.00	0.00	-	0.00	-	0.00	0.00	-	0.00
31	0.0	0.73	0.00	0.0	2.22	1.00	20.0	0.52	7.50	4.0	6.14	23.50	0.00	-	0.00	-	0.00	0.00	-	0.00
32	0.0	2.05	0.00	0.0	1.22	0.00	31.0	0.00	9.00	11.0	2.29	28.00	0.00	-	0.00	-	0.00	0.00	-	0.00
33	0.0	3.19	1.00	0.0	1.00	2.50	20.0	0.00	7.00	16.0	5.48	39.00	0.00	-	0.00	-	0.00	0.00	-	0.00
34	2.0	0.63	0.00	0.0	0.66	0.00	32.0	0.00	6.00	49.0	2.24	55.50	0.00	-	0.00	-	0.00	0.00	-	0.00
35	3.0	0.43	0.00	0.0	0.88	3.50	32.0	3.90	15.00	41.0	4.52	39.00	0.00	-	0.00	-	0.00	0.00	-	0.00
36	1.0	0.79	0.00	0.0	0.11	2.50	40.0	0.56	6.00	35.0	2.29	7.50	0.00	-	0.00	-	0.00	0.00	-	0.00
37	3.0	1.57	0.00	0.0	18.44	2.00	34.0	2.24	46.50	38.0	3.86	11.00	0.00	-	0.00	-	0.00	0.00	-	0.00
38	2.0	2.38	0.00	0.0	8.80	3.50	30.0	2.29	57.00	52.0	4.00	8.00	0.00	-	0.00	-	0.00	0.00	-	0.00
39	0.0	2.14	0.00	8.0	18.44	4.00	45.0	2.43	9.00	70.0	3.24	29.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	2.0	0.69	0.00	12.0	12.00	13.50	78.0	2.81	34.50	58.0	2.33	45.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.0	1.71	0.00	0.0	9.40	16.50	60.0	2.24	54.00	70.0	2.00	25.50	0.00	0.00	0.00	5.33	0.00	0.00	2.00	0.00
42	-	0.74	0.00	-	9.60	19.50	-	3.57	134.50	-	2.76	41.50	0.00	1.00	0.00	6.67	0.00	0.00	1.86	0.00
43	-	2.19	0.00	-	8.44	21.50	-	10.19	46.50	-	3.38	16.50	0.00	-	0.00	-	0.00	0.00	-	0.00
44	-	2.14	0.00	-	8.33	25.50	-	5.57	71.50	-	3.86	35.50	0.00	-	0.00	-	0.00	0.00	-	0.00
45	-	-	0.00	-	-	32.50	-	-	52.00	-	-	41.50	0.00	-	0.00	-	0.00	0.00	-	0.00
46	-	-	0.00	-	-	9.50	-	-	38.50	-	-	29.00	0.00	-	0.00	-	0.00	0.00	-	0.00

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

Table 52. Ent 2. Seasonal dynamics of key pests of cotton (Sucking pests) under Unprotected condition to develop suitable forecasting model in North Zone – HS 6 during 2019 – 20

Standard week	Sucking Pests																		Predators/ plant*				
	Jassid / 3 leaves					Whitefly / 3 leaves					Thrips / 3 leaves					Aphid / 3 leaves							
	BT	FA	HI	SR	SG	BT	FA	HI	SR	SG	BT	FA	HI	SR	SG	BT	FA	SG	BT	FA	HI	SR	SG
22	-	-	1.27	0.00	0.00	-	-	3.73	0.60	0.00			3.67	6.10	0.00			0.00			0.27	0.00	0.00
23	-	0.00	1.80	0.67	0.00	-	0.25	8.40	5.80	0.00	-	4.67	21.27	9.70	0.00	-	0.00	0.00	-	0.00	0.20	0.00	0.00
24	0.00	0.00	1.47	1.00	0.20	0.00	0.53	10.33	5.20	5.40	0.00	5.00	22.33	3.90	8.40	0.00	0.00	0.00	0.20	0.00	0.27	0.00	0.00
25	0.00	0.00	4.67	0.50	0.40	1.33	0.60	17.27	3.90	8.60	0.00	4.73	19.47	4.30	15.80	0.00	0.00	0.00	1.00	0.20	0.53	0.00	0.00
26	0.06	0.60	4.93	1.00	0.80	3.33	1.73	14.33	11.60	9.40	0.73	7.47	29.07	27.10	28.40	0.00	0.00	0.00	2.40	0.27	0.73	0.05	0.00
27	0.33	2.87	7.20	0.70	1.20	2.00	2.73	25.73	14.00	17.50	3.73	8.87	36.93	30.20	30.40	0.00	0.00	0.00	2.90	0.86	0.47	0.95	1.33
28	0.60	2.87	4.93	2.00	0.80	5.86	8.47	20.93	12.00	18.10	9.40	12.40	76.80	31.20	13.30	0.00	0.00	0.00	3.60	1.33	0.53	0.83	0.67
29	1.86	5.70	7.33	1.90	0.70	0.40	12.20	19.60	15.10	29.50	25.60	14.60	41.20	20.40	15.90	0.00	0.00	0.00	2.00	2.10	0.40	0.15	0.78
30	6.46	9.90	9.27	4.10	2.00	4.86	12.60	17.87	29.50	16.30	31.60	21.60	37.40	23.00	20.50	0.00	0.00	0.00	2.20	4.70	0.33	0.18	0.67
31	7.00	6.20	5.40	2.30	3.10	3.66	10.10	24.87	17.70	18.20	60.13	12.90	21.40	13.60	11.80	0.00	0.00	0.00	3.00	9.10	0.47	0.83	1.44
32	5.66	4.60	6.67	5.80	2.80	4.53	5.70	27.80	15.30	12.50	42.00	11.50	20.13	18.40	12.20	0.00	0.00	0.00	3.60	7.00	0.33	0.13	0.89
33	7.00	-	5.87	5.60	1.50	4.93	-	35.47	16.90	6.90	56.53	-	22.73	18.70	8.40	0.00	0.00	0.00	1.90	10.00	0.53	1.58	1.00
34	4.53	-	7.80	4.10	0.40	8.20	-	36.20	10.50	6.50	12.00	-	15.73	16.80	15.50	0.00	0.00	0.00	1.10	8.90	0.33	1.58	1.00
35	2.33	-	1.80	4.30	1.00	4.13	-	36.80	8.50	4.10	0.00	-	4.33	8.00	6.00	0.00	0.00	0.00	1.50	9.60	0.80	0.88	0.78
36	5.27	-	0.80	3.20	0.40	5.33	-	20.73	11.70	8.50	0.93	-	0.47	4.70	1.20	0.00	0.00	0.00	1.00	8.10	0.67	0.80	0.44
37	1.60	-	1.73	3.30	1.10	7.87	-	26.73	17.50	12.30	0.00	-	1.07	1.40	4.00	0.00	0.00	0.00	0.90	6.70	0.47	1.23	0.89
38	2.40	-	1.80	3.30	0.20	3.00	-	34.20	17.50	8.30	0.00	-	2.73	3.80	3.30	0.00	0.00	0.00	0.80	6.00	0.73	1.23	0.57
39	1.06	-	1.07	2.10	0.40	5.60	-	22.80	15.10	11.50	0.00	-	1.33	2.30	2.00	0.00	0.00	0.00	0.60	3.20	0.27	0.98	0.67
40	1.67	-	1.00	2.10	0.40	1.93	-	19.40	14.70	3.80	0.00	-	1.87	0.90	1.70	0.00	0.00	0.00	0.60	3.20	0.40	1.13	0.11
41	2.46	-	1.27	1.40	1.50	3.00	-	10.27	14.30	2.70	0.00	-	1.53	1.00	1.70	0.00	0.00	0.00	0.20	2.90	0.20	1.58	0.33
42	0.66	-	1.00	1.70	0.60	0.93	-	7.07	13.20	1.60	0.00	-	1.67	0.00	1.60	0.00	-	0.00	0.00	-	0.27	1.55	0.44
43	0.00	-	0.67	1.70	0.00	0.21	-	1.87	6.80	0.00	0.00	-	1.20	0.00	0.00	0.00	-	0.00	0.00	-	0.20	2.00	0.14
44	-	-	0.80	0.50	0.00	-	-	3.13	6.50	0.66	-	-	1.13	0.00	0.00	-	-	0.00	-	-	0.20	0.70	0.00
45	-	-	-	-	0.00	-	-	-	-	0.00	-	-	-	-	0.00	-	-	0.00	-	-	-	-	0.00
46	-	-	-	-	0.00	-	-	-	-	0.00	-	-	-	-	0.00	-	-	0.00	-	-	-	-	0.00

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

Contd…

Table 52.1. Ent 2. Seasonal dynamics of key pests of cotton (Bollworms) under Unprotected condition to develop suitable forecasting model in North Zone – HS 6 during 2019 – 20

Standard week	*H. armigera*								*Earias*spp. larvae / 5 plants				*S. litura* larvae / 5 plants			% Parasitism on Bollworms	**Fruiting Body damage %			
	Eggs / 5 pl	Larvae / 5 pl	Eggs / 5 pl	Larvae / 5 pl	Eggs / 5 pl	Larvae / 5 pl	Eggs / 5 pl	Larvae / 5 pl	BT	FA	SR	SG	BT	SR	SG	SG	*H. armigera*	*E. vittella*		
	BT		FA		SR		SG										FA	HI	SR	SG
22					0.00	0.00	0.00	0.00			0.00	0.00		0.00	0.00	0.00	-	-	0.00	0.00
23	-	-	-	-	0.00	0.00	0.00	0.00	-	-	0.00	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00
24	-	-	-	-	0.00	0.00	0.00	0.00	-	-	0.00	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00
25	-	-	-	-	0.00	0.00	0.00	0.00	-	-	0.00	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00
26	-	-	-	-	0.00	0.00	0.00	0.00	-	-	0.00	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00
27	-	-	-	-	0.00	0.00	0.00	0.00	-	-	0.00	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00
28	-	-	-	-	0.00	0.00	0.00	0.00	-	-	0.00	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00
29	-	-	-	-	0.00	0.00	0.00	0.00	-	-	0.00	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00
30	-	-	-	-	0.00	0.00	0.00	0.00	-	-	0.00	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00
31	0.00	-	-	-	0.00	0.00	0.00	0.00	0.40	-	0.00	0.00	-	0.00	0.00	0.00	-	-	0.00	0.00
32	0.00	0.20	-	-	0.00	0.00	0.00	0.00	1.00	-	0.00	1.00	-	0.00	0.00	0.00	-	0.00	0.00	0.00
33	0.00	0.00	-	-	0.00	0.00	0.00	0.00	1.90	-	0.00	0.00	-	0.00	0.00	0.00	0.43	0.00	0.00	0.00
34	0.00	0.20	-	-	0.00	0.00	0.00	0.00	1.20	-	0.00	2.00	1.50	0.00	0.00	0.00	-	0.00	0.00	2.80
35	0.00	-	-	-	0.00	0.00	0.00	0.00	1.20	-	0.00	2.00	1.20	0.00	0.00	0.00		0.00	0.00	6.40
36	0.00	-	4.00	-	0.00	0.00	0.00	0.00	1.60		0.00	1.00	1.60	0.00	0.00	0.00	0.53	10.00	0.34	14.80
37	0.00	0.20	3.00	-	0.00	0.00	0.00	0.00	1.00	1.00	0.00	2.00	3.00	0.00	0.00	0.00	1.78	30.00	2.80	21.40
38	0.00	0.40	2.00	-	0.00	0.00	0.00	0.00	0.40	1.50	0.00	2.00	2.20	0.00	0.00	0.00	6.36	14.00	2.42	12.60
39	-	0.20	2.00	-	0.00	0.00	0.00	0.00	0.20	2.00	0.50	1.00	2.60	0.00	0.00	0.00	2.97	30.00	6.84	18.40
40	-	-	-	-	0.00	0.00	0.00	0.00	-	2.50	0.21	2.00	2.00	0.00	0.00	0.00	4.89	8.00	4.91	15.40
41	-	-	-	-	0.00	0.00	0.00	0.00	-	1.50	1.21	2.00	3.00	0.00	0.00	0.00	3.87	14.00	7.80	13.80
42	-	-	-	-	0.00	0.00	0.00	0.00	-	-	1.28	3.00	-	0.00	0.00	0.00	-	12.00	4.76	9.80
43	-	-	-	-	0.00	0.00	0.00	0.00	-	-	2.12	2.00	-	0.00	0.00	0.00	-	12.00	5.39	12.40
44	-	-	-	-	0.00	0.00	0.00	0.00	-	-	1.22	1.00	-	0.00	0.00	0.00	-	4.00	2.22	8.80
45	-	-	-	-	-	-	0.00	0.00	-	-		0.00	-	-	0.00	0.00	-	-	-	0.00
46	-	-	-	-	-	-	0.00	0.00	-	-		0.00	-	-	0.00	0.00	-	-	-	0.00

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

Contd…

Table 52.2. Ent 2. Seasonal dynamics of key pests of cotton (Boll damage) under Unprotected condition to develop suitable forecasting model in North Zone during 2019 – 20

Standard week	Flower damage/ 50 flowers (%)	Pink bollworm larvae/20 green bolls			Boll damage on boll basis		Boll damage on locule basis			
					Green boll damage/20 bolls (%)		Open boll damage/ 20 bolls (%)	Locule damage in 20 green bolls (%)	Open boll Locule damage in 20 bolls %	
	SG	BT	FA	SG	BT	SG	SG	SG	BT	SG
22	-		-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-
28	0.00	-	-	0.00	-	0.00	0.00	0.00	-	0.00
29	0.00	-	-	0.00	-	0.00	0.00	0.00	-	0.00
30	0.00	-	-	0.00	-	0.00	0.00	0.00	-	0.00
31	0.00	-	-	0.00	-	0.00	0.00	0.00	-	0.00
32	0.00	-	-	0.00	-	0.00	0.00	0.00	-	0.00
33	0.00	-	-	0.00	-	0.00	0.00	0.00	-	0.00
34	0.00	-	-	0.00	-	0.00	0.00	0.00	-	0.00
35	0.00	-	-	0.00	-	0.00	0.00	0.00	-	0.00
36	0.00	-	-	0.00	-	0.00	0.00	0.00	-	0.00
37	0.00	-	-	0.00	-	0.00	0.00	0.00	-	0.00
38	0.00	1.00	-	1.00	5.00	10.00	0.00	4.78	1.12	0.00
39	0.00	2.00	-	1.00	12.33	15.00	0.00	9.25	2.46	0.00
40	0.00	5.00	-	1.00	18.33	5.00	0.00	1.86	7.16	0.00
41	0.00	2.00	-	2.00	16.66	5.00	0.00	2.33	3.67	0.00
42	0.00	4.00	2.00	2.00	20.66	10.00	0.00	5.64	6.50	0.00
43	0.00	2.00	-	0.00	15.33	0.00	0.00	0.00	3.67	0.00
44	0.00	-	6.00	0.00	-	0.00	0.00	0.00	-	0.00
45	0.00	-	-	0.00	-	0.00	15.00	0.00	-	6.98
46	0.00	-	5.00	0.00	-	0.00	0.00	0.00	-	0.00

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

Contd…

Table 52.3. Ent 2. Seasonal dynamics of key pests of cotton (Trap catches) under Unprotected condition to develop suitable forecasting model in North Zone during 2019 – 20

Standard week	Trap catches / week														
	H. armigera				PBW				SBW						
	BT	FA	SR	SG	BT	FA	SR	SG	BT	FA	SR	SG	FA	SR	SG
22	-		1.29	0.00		-	0.00	0.00	-	-	0.00	0.00	-	4.19	0.00
23	-	0.00	2.29	0.00	-	0.00	0.00	0.00	-	6.00	0.00	0.00	16.00	4.95	0.00
24	2.00	0.00	2.71	0.00	-	0.00	0.00	0.00	0.00	5.00	0.00	0.00	13.00	6.48	0.00
25	1.00	0.00	4.57	0.00	-	0.00	0.00	0.00	2.00	12.00	0.00	0.00	25.00	7.86	14.50
26	2.00	0.00	2.81	0.00	-	0.00	0.00	0.00	0.00	5.00	0.48	0.00	4.00	10.00	87.50
27	0.00	0.00	0.54	0.00	-	4.00	0.00	0.00	0.00	2.00	0.00	2.50	0.00	1.86	246.00
28	0.00	1.00	0.69	2.00	-	3.00	1.22	0.00	3.00	55.00	0.00	1.50	5.00	2.71	103.00
29	6.00	3.00	0.74	0.00	-	3.00	0.00	2.00	6.00	0.00	0.00	3.50	0.00	8.62	48.00
30	3.00	0.00	0.00	1.00	-	5.00	2.33	0.00	6.00	2.00	0.00	6.00	15.00	3.10	55.00
31	1.00	0.00	0.73	0.00	-	0.00	2.22	1.00	12.00	20.00	0.52	7.50	4.00	6.14	23.50
32	6.00	0.00	2.05	0.00	-	0.00	1.22	0.00	20.00	31.00	0.00	9.00	11.00	2.29	28.00
33	4.00	0.00	3.19	1.00	-	0.00	1.00	2.50	14.00	20.00	0.00	7.00	16.00	5.48	39.00
34	0.00	2.00	0.63	0.00	-	0.00	0.66	0.00	13.00	32.00	0.00	6.00	49.00	2.24	55.50
35	0.00	3.00	0.43	0.00	-	0.00	0.88	3.50	15.00	32.00	3.90	15.00	41.00	4.52	39.00
36	2.00	1.00	0.79	0.00	-	0.00	0.11	2.50	18.00	40.00	0.56	6.00	35.00	2.29	7.50
37	4.00	3.00	1.57	0.00	-	0.00	18.44	2.00	26.00	34.00	2.24	46.50	38.00	3.86	11.00
38	2.00	2.00	2.38	0.00	4.00	0.00	8.80	3.50	15.00	30.00	2.29	57.00	52.00	4.00	8.00
39	0.00	0.00	2.14	0.00	8.00	8.00	18.44	4.00	13.00	45.00	2.43	9.00	70.00	3.24	29.50
40	1.00	2.00	0.69	0.00	6.00	12.00	12.00	13.50	16.00	78.00	2.81	34.50	58.00	2.33	45.50
41	0.00	0.00	1.71	0.00	12.00	0.00	9.40	16.50	12.00	60.00	2.24	54.00	70.00	2.00	25.50
42	0.00	-	0.74	0.00	8.00	-	9.60	19.50	10.00	-	3.57	134.50	-	2.76	41.50
43	0.00	-	2.19	0.00	-	-	8.44	21.50	-	-	10.19	46.50	-	3.38	16.50
44	-	-	2.14	0.00	-	-	8.33	25.50	-	-	5.57	71.50	-	3.86	35.50
45	-	-		0.00	-	-	-	32.50	-	-	-	52.00	-	-	41.50
46	-	-		0.00	-	-	-	9.50	-	-	-	38.50	-	-	29.00

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

Table 53. Ent 2. Seasonal dynamics of key pests of cotton (Abiotic factors) under Unprotected condition to develop suitable forecasting model in North Zone during 2019 – 20

Std.week	Abiotic factors																		
	Temperature (^{0}C)										Relative Humidity (%)								
	BT		FA		HI		SR		SG		BT		FA		HI		SR	SG	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Morning	Evening
22	-	-	-	-	43.8	25.2	44.49	29.54	47.24	30.51	-	-	-	-	53.00	18.00	35.40	39.71	16.14
23	43.80	26.17	43.56	26.20	43.50	25.80	43.90	29.61	46.81	27.49	46.86	23.86	50.29	26.43	55.00	17.00	38.20	42.14	16.86
24	42.74	25.80	41.71	26.31	41.80	26.00	43.03	29.64	44.60	28.79	52.43	36.86	52.00	23.29	67.00	36.00	39.60	52.57	30.43
25	36.90	25.16	37.00	25.64	35.70	24.60	37.61	26.03	41.11	26.70	66.86	46.43	67.86	39.43	78.00	43.00	57.10	67.29	47.29
26	39.99	27.49	38.45	28.28	39.10	25.50	39.66	26.93	41.06	29.73	57.57	42.29	62.50	40.63	77.00	44.00	51.00	57.00	36.14
27	37.29	26.10	37.03	27.96	38.60	26.20	38.41	27.11	43.31	32.69	69.43	65.00	71.71	54.00	74.00	56.00	57.50	59.71	40.00
28	37.27	27.07	33.60	28.04	37.20	27.30	36.59	26.20	40.46	32.29	78.57	61.57	78.14	63.57	72.00	57.00	63.70	56.29	43.71
29	34.61	25.21	32.39	26.31	32.50	23.70	33.19	21.99	37.59	27.86	81.71	71.43	86.71	69.14	93.00	70.00	73.60	77.57	66.29
30	34.63	25.57	33.93	27.21	33.20	25.30	33.24	22.09	36.19	29.03	86.14	69.14	81.43	63.71	88.00	73.00	75.00	81.00	62.43
31	34.32	25.45	34.00	26.99	33.80	25.10	34.71	22.93	35.69	27.96	87.83	67.83	84.14	67.86	86.00	67.00	73.00	83.71	71.57
32	35.78	26.30	34.69	27.76	34.60	27.00	36.83	24.66	37.73	28.53	80.50	57.33	83.43	64.29	87.00	68.00	63.90	78.57	60.86
33	33.32	25.07	33.33	26.14	33.30	25.50	34.19	21.90	37.64	27.76	84.83	73.33	87.00	66.14	89.00	70.00	73.20	75.29	56.29
34	36.87	26.27	35.16	26.59	35.60	25.80	35.83	27.16	39.73	27.79	88.33	58.67	82.14	58.00	86.00	56.00	65.30	69.71	50.14
35	36.30	27.22	35.94	26.96	36.20	27.40	36.14	27.36	38.57	28.14	84.00	62.67	82.14	62.57	83.00	55.00	69.00	79.43	65.86
36	35.97	27.12	35.17	27.20	35.70	27.00	36.12	27.00	39.49	28.51	83.50	61.50	85.86	61.00	89.00	59.00	69.00	79.86	56.29
37	37.03	26.52	35.59	27.16	37.00	27.10	36.90	27.44	40.73	28.44	83.50	59.33	86.14	24.14	87.00	51.00	66.10	78.29	47.14
38	34.50	24.43	33.47	25.04	35.10	25.20	34.66	25.10	38.29	26.04	81.33	66.00	83.71	60.86	84.00	49.00	67.70	76.57	52.00
39	32.17	23.37	31.94	23.69	33.40	24.30	33.56	22.16	35.77	24.59	87.17	68.17	84.00	60.43	84.00	57.00	68.20	83.71	65.29
40	30.74	19.76	30.03	20.37	31.80	21.00	31.79	21.00	34.14	22.87	86.60	57.20	89.57	59.43	92.00	50.00	70.10	82.57	55.86
41	33.03	19.07	32.70	18.34	32.70	17.60	32.92	19.59	35.73	21.13	83.50	51.50	86.14	40.43	90.00	39.00	56.70	72.71	47.14
42	31.55	18.17	-	-	34.10	18.40	32.58	19.90	34.27	19.11	79.50	52.67	-	-	79.00	34.00	56.10	77.43	43.86
43	32.23	14.93	-	-	31.90	14.90	32.00	17.20	34.20	17.46	83.17	42.67	-	-	79.00	31.00	56.10	77.00	47.43
44	-	-	-	-	30.70	16.20	31.06	16.37	32.30	18.09	-	-	-	-	90.00	35.00	57.60	78.29	53.00
45	-	-	-	-	-	-	-	-	28.47	14.07	-	-	-	-	-	-	-	80.43	60.00
46	-	-	-	-	-	-	-	-	24.00	14.54	-	-	-	-	-	-	-	89.86	72.00

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

Contd…

Table 53.1. Ent 2. Seasonal dynamics of key pests of cotton (Abiotic factors- Rainfall) under Unprotected condition to develop suitable forecasting model in North Zone during 2019 – 20

Std.week	Abiotic factors				
	Rainfall in mm				
	BT	FA	HI	SR	SG
22	-	-	0.0	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00
24	0.00	12.80	55.10	52.60	26.40
25	32.00	18.80	20.30	14.00	5.80
26	0.00	0.00	29.70	0.00	3.60
27	52.00	26.70	1.80	12.50	0.00
28	18.00	6.10	13.40	8.40	0.00
29	288.00	100.00	81.50	72.60	17.40
30	39.40	1.60	23.70	86.90	24.50
31	5.20	24.40	17.70	0.00	34.50
32	0.00	12.40	63.00	5.20	0.20
33	27.40	20.20	15.40	39.50	2.00
34	0.00	0.00	0.00	0.00	4.20
35	9.80	6.60	0.00	0.00	9.80
36	1.00	45.80	27.70	0.00	0.00
37	0.00	0.00	0.00	0.00	0.00
38	42.00	0.00	0.00	0.00	0.00
39	3.00	1.00	2.20	0.00	21.40
40	5.00	3.70	2.60	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00
42	7.20	-	0.00	1.20	0.00
43	0.00	-	0.00	0.00	0.00
44	-	-	0.00	0.00	0.00
45	-	-	-	-	7.80
46	-	-	-	-	7.50

BT – Bathinda; FA – Faridkot; HI – Hisar; SR – Sirsa; SG – Sriganganagar;

Table 54. Ent 2. Seasonal dynamics of key pests of cotton (Leafhopper) under Unprotected condition to develop suitable forecasting model in Central Zone – NBt DCH 32 during 2019 – 20

Standard week		Sucking pests							
		Jassid / 3 leaves							
	BA	JU	SU	BH	AK	NA	RA	KH	BW
27	-			0					
28	0.67			0			0.04		
29	1.67			0			1.06		
30	3.00	3.8	1.20	0			2.26	5	
31	3.67	6.0	2.60	0			**12.46**	11	
32	6.00	8.4	4.45	2.15			7.7	14	0.00
33	8.33	14.0	6.75	5.8		6.2	10.42	10	1.00
34	10.33	6.4	8.80	9.45	4	3.1	7.56	12	0.96
35	13.67	12.0	10.20	8.85	7.1	4.5	10.06	10	2.60
36	15.33	13.1	13.65	10.7	10.8	5.9	17.86	10	5.48
37	10.67	18.1	15.40	15.9	22.3	8.7	**18.86**	12	7.80
38	8.33	14.7	19.45	18.7	13.1	10.8	6.02	8	8.04
39	6.00	11.6	20.20	13.2	4.6	3.2	11.06	10	10.16
40	5.33	12.6	24.60	20.8	4.3	6.5	8	10	17.00
41	4.00	10.3	26.65	21.2	1.8	10	10.74	11	21.00
42	2.67	13.0	36.40	17.3	1.9	8	14.26	14	22.36
43	2.00	11.2	32.40	21.4	0.6	6	9.88	18	16.16
44	2.00	10.4	33.65	17.5	3.7	7	9.45	19	6.48
45	1.33	7.0	30.20	22.6	6.1	6	8.15	12	4.80
46	1.00	11.6	29.40	17.3	4.1	3	8.44	11	2.00
47	0.67	10.5	25.40	32.3	2.9	2	7.2	7	2.08
48	0.33	7.9	20.60	23.4	4.1	0.6	4.02	12	1.00
49	-	7.4	18.60	42.8	5.8	1		8	1.04
50	-	3.3	14.75	31.9	4.9	1.2		10	0.16
51	-	9.0	9.85	27.1	3.7	0.4		7	0
52	-	1.2	4.20	40.9	2.6	0.8		5	0
1					4.5			4	
2					0.9			6	
3					1.8				

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

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Table.54.1 Ent 2.1 Seasonal dynamics of key pests of cotton (Whitefly) under Unprotected condition to develop suitable forecasting model in Central Zone – NBt DCH 32 during 2019 – 20

Standard week	Sucking pests								
		Whitefly / 3 leaves							
	BA	JU	SU	BH	AK	NA	RA	KH	BW
27	-			0					
28	-			0			0		
29	-			0			1.12		
30	-	0.8	0.20	0			0.76	14	
31	-	0.9	0.40	0			4.4	16	
32	-	2.3	0.65	0			1.12	12	0
33	-	1.7	1.40	0.1		2.1	1.62	17	0
34	0.33	2.7	2.00	0.2	0.5	0.6	1.78	14	0.12
35	2.67	4.2	3.85	0.2	0.8	1.2	6.86	22	0.24
36	5.33	5.5	6.40	0.4	2	1.4	6.22	20	0.90
37	9.00	5.5	7.20	6.2	2.8	1.1	5.24	14	1.00
38	11.33	5.6	7.00	0.1	4	8.8	4.08	12	0.48
39	13.00	8.9	6.00	0	1.8	8.7	**10.44**	22	1.00
40	15.67	6.9	8.55	0	2.7	10.3	6.26	17	2.04
41	20.33	8.8	4.80	0	1.2	11.5	5.24	18	2.60
42	22.67	4.9	6.20	0	1.9	22.2	8.7	14	3.20
43	16.67	5.6	2.40	0.8	2.6	10	4.2	16	3.00
44	12.33	7.0	3.60	5.8	1	19.4	6.44	12	2.04
45	7.67	5.1	8.40	0	1.5	12.4	4.85	16	3.08
46	4.33	4.9	6.20	5.6	1.9	10.2	5.76	14	2.80
47	3.67	5.8	2.70	1.3	1.9	8.4	6.9	12	1.96
48	2.67	3.6	3.00	0.6	0.8	5.8	**9.32**	11	0.80
49	-	2.4	1.65	3.1	1.7	5.6		0	0.64
50	-	2.1	0.65	5	1.2	2		2	0
51	-	1.3	0.00	2.5	1.6	1.6		4	0
52	-	1.1	0.00	1.2	1.1	1.2		4	0
1					0.9			6	
2					2.1			4	
3					2				

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

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Table 54.2.Ent 2.2 Seasonal dynamics of key pests of cotton (Thrips& Aphids) under Unprotected condition to develop suitable forecasting model in Central Zone – NBt DCH 32 during 2019 – 20

SMW	Sucking pests															
	Thrips / 3 leaves								Aphid / 3 leaves							
	JU	SU	BH	AK	NA	RA	KH	BW	JU	SU	BH	AK	NA	RA	KH	BW
27			0								0					
28			0			0					0			14.02		
29			0			12.6					0			29.26		
30	4.0	0.60	0			20.26	4		0.0	1.20	0			66.76	2	
31	8.4	1.65	0			108.62	2		0.0	2.60	0			52.32	3	
32	12.3	3.25	0			88.32	3	0.00	0.0	2.00	0			112.64	4	41.8
33	21.2	6.40	0		8.9	50.46	5	0.30	0.0	3.20	0		11.7	57.1	5	27.08
34	15.9	12.65	0	0.5	3.7	74.22	4	8.66	0.0	3.65	0	0.6	15.2	69.16	6	23.00
35	13.2	22.20	4.6	0.8	6.5	118.62	4	8.00	0.0	4.60	0	1	8.7	61.74	3	3.12
36	15.0	29.60	6.15	2	5.3	79.6	2	11.78	0.0	6.85	0	1.6	5.5	39.22	4	2.06
37	15.1	34.20	9.8	2.8	13.9	49.55	5	13.60	0.7	10.90	3.8	0.8	8.1	43.44	4	4.40
38	16.6	32.85	3.9	4	25.5	31.54	7	11.60	0.3	15.40	1.7	0	5.2	9..36	2	2.76
39	9.7	25.60	1.7	1.8	13.7	8.4	8	10.84	3.2	15.60	3	0.1	2.7	25.7	4	1.98
40	7.9	19.25	2.3	2.7	12.3	15.88	7	5.38	5.1	19.60	3.2	0.6	2.1	30.68	3	1.62
41	4.3	13.60	5	1.2	1.4	14.96	7	4.00	4.5	26.20	3.3	0.1	10.5	29.24	5	1.08
42	4.2	9.40	1.5	1.9	1.7	15.42	4	3.06	0.0	32.80	7.1	0.2	2.2	27.4	4	1.16
43	2.7	5.50	0.5	2.6	0.5	6.82	6	2.96	2.4	34.20	9.35	0	2.9	42.94	6	1.28
44	1.2	3.00	0.5	1	0.8	2.76	4	2.40	3.4	36.60	15.15	0	3.8	34.54	2	1.52
45	0.7	2.20	3.2	1.5	2	1.52	4	2.16	3.0	38.00	21.25	0	2.5	79.14	8	1.00
46	2.6	1.60	0	1.9	2	2	1	2.50	3.1	45.60	25.65	0	2	85.2	4	1.16
47	1.3	0.80	0	1.9	1	1.46	2	2.76	3.7	48.40	28.1	0.1	2	93.55	4	0.98
48	1.9	0.85	0.7	0.8	0	1.32	3	2.06	2.8	56.80	31.55.	0.4	3.5	104.2	6	0
49	0.7	0.20	2.3	1.7	0		0	1.00	3.5	60.65	33.3	0.1	4.2		3	0
50	0.6	0.00	5.1	1.2	0		0	0.64	4.9	63.85	35.95	0.9	2.1		3	0
51	0.0	0.00	3.4	1.6	0		0	0	15.2	54.20	36.85	1.1	2.5		4	0
52	0.0	0.00	5.4	1.1	0		3	0	14.6	36.20	37.15	1.9	4.2		6	0
1				0.9			0					1.7			2	
2				2.1			0					16.2			1	
3				2								9.3				

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW – Bhawanipatna

Contd…

Table 54.3. Ent 2. Seasonal dynamics of key pests of cotton (*H. armigera*) under Unprotected condition to develop suitable forecasting model in Central Zone – NBt DCH 32 during 2019 – 20

Standard week	Predators/ plant*						*H. armigera*												
							Larvae / 5 plants	Larvae / 5 plants	Larvae / 5 plants	Eggs/5 plants	Larvae / 5 plants	Eggs/5 plants	Larvae / 5 plants	Eggs/5 plants	Larvae / 5 plants	Eggs/5 plants	Larvae / 5 plants	Eggs/5 plants	Larvae / 5 plants
	SU	BH	AK	NA	RA	BW	JU	SU	BH	AK	AK	NA	NA	RA	RA	KH	KH	BW	BW
27		0							0.00										
28		0			0				0.00					0	0				
29		0			0.78				0.00					0	0				
30	0.00	0.00			3.2		0.00	0.00	0.00					0.76	0	0	0		
31	0.00	0.00			4.12		0.00	0.00	0.00					0.82	0.6	0	0		
32	0.00	0.10			5.64	0.1	0.00	0.00	0.00					1	0.76	0	0	0.0	0.0
33	0.10	0.10		0	3.84	4.26	0.00	0.00	0.00			2	0.8	1.15	1.1	0	0	0.0	0.0
34	0.10	0.20	0.00	1.2	3.86	6.64	0.00	0.00	0.00	0	0	4	1	0.92	1.16	2	0	0.0	0.0
35	0.30	0.25	0.10	1.5	2.38	2.00	0.25	0.00	0.00	0	0	8	2	1.3	0.8	3	0	0.0	0.0
36	0.50	0.10	0.90	3.7	2.7	1.44	0.25	0.10	0.00	0	0	10	1.4	1.25	0.64	2	0	0.0	0.0
37	0.90	0.20	1.50	3.7	2.1	0.33	0.25	0.20	0.00	0	0.2	12	2	1.1	0.55	1	0	0.10	0.0
38	1.10	0.20	0.20	0.7	2.32	0.35	0.50	0.80	0.00	0	0	10	3	1.4	0.38	1	0	0.33	0.0
39	1.05	0.20	0.00	3	2.64	0.60	0.50	0.80	0.00	0	0.1	8	2	1.1	0.6	4	0	0.66	0.33
40	1.20	0.25	0.90	0.9	2.58	2.00	0.75	1.40	0.00	0	0	8	4	1.75	1	2	2	0.33	0.66
41	1.30	2.10	0.80	0.7	2.49	0.39	0.75	1.40	0.00	0	0.1	10	2	1.3	1.4	2	2	0.0	0.66
42	2.00	1.60	1.30	1.3	2.7	0.19	0.50	1.80	0.25	0	0	4	2	0.7	0.92	3	1	0.0	1.00
43	2.50	1.65	0.60	1.3	4.12	0.34	0.25	2.60	0.25	0	0	2	1	0.25	0.7	4	3	0.0	0.33
44	2.30	1.30	0.70	2.6	3.48	0.26	0.25	2.80	0.00	0	0.1	4	2	0	0	4	1	0.0	0.33
45	2.05	1.80	0.70	2.85	3.1	0.14	0.25	2.40	0.00	0	0	8	2	0	0	1	2	0.0	0.0
46	2.90	1.10	1.00	2.7	3.06	0.13	0.25	1.60	0.00	0	0	2	4	0	0.3	1	1	0.0	0.0
47	3.50	1.20	0.50	1.1	3.73	0.16	0.25	1.00	0.00	0	0	5	4	0	0	0	0	0.0	0.0
48	3.85	0.50	0.60	0.3	4.48	0.08	0.25	0.40	0.00	0	0	2	2	0	0	0	1	0.0	0.0
49	4.00	0.45	1.00	0.4		0.00	0.25	0.00	0.00	0	0.3	0	1			1	0	0.0	0.0
50	3.40	0.25	0.90	0.5		0.06	0.00	0.00	0.00	0	0	1	1			0	0	0.0	0.0
51	3.25	0.00	0.70	0.4		0.00	0.00	0.00	0.00	0	0	0.6	0.5			0	0	0.0	0.0
52	3.40	0.00	0.80	0.2		0.00	0.00	0.00	0.00	0	0	0.5	0.3			0	0	0.0	0.0
1			0.8							0	0					0	0		
2			0.4							0	0					0	0		
3			0.6							0	0								

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

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Table. 54.4. Ent 2.4 Seasonal dynamics of key pests of cotton (Boll worms) under Unprotected condition to develop suitable forecasting model in Central Zone – NBt DCH 32 during 2019 – 20

Standard week	*Earias*spp. larvae / 5 plants								*S. litura* larvae / 5 plants						% Parasitism on bollworms
	JU	SU	BH	AK	NA	RA	KH	BW	JU	SU	BH	NA	RA	BW	NA
27			0.00								0.00				
28			0.00			0					0.00		0		
29			0.00			0					0.00		0		
30	0.00	0.00	0.00			0.56	0		0.00	0.00	0.00		0		
31	0.00	0.00	0.00			1.15	0		0.00	0.00	0.00		0.8		
32	0.00	0.00	0.00			1.18	0	0.0	0.00	0.00	0.00		0.92	0.0	
33	0.00	0.00	0.00		4	1.7	1	0.0	0.00	0.00	0.00	4	1.22	0.0	0.8
34	0.25	0.00	0.00	0	5	**1.85**	2	0.0	0.00	0.00	0.00	2	1.4	0.0	0.4
35	0.00	0.20	0.00	0	8	1.1	3	0.0	0.00	0.00	0.00	3	2.05	0.0	2
36	0.00	0.60	0.00	0	8	1	4	0.0	0.00	0.00	0.00	4	2.28	0.0	4
37	0.00	0.60	0.00	0	7.5	1.7	3	0.0	0.00	0.20	1.25	2	1.46	0.0	6
38	0.00	1.00	0.00	0	3	0.94	4	0.0	0.00	0.20	2.50	4	1.1	0.33	8
39	0.00	1.20	0.00	0.2	4	0.88	1	0.66	0.00	0.60	3.75	2	0.95	0.66	4
40	0.00	1.60	0.00	0	3	0.7	2	1.66	0.00	0.80	0.50	5	0.7	1.33	6
41	0.00	1.20	0.00	0	2	0	3	1.33	0.00	1.20	0.25	4	1.24	2.60	5
42	0.00	1.00	0.00	0	1	0	4	2.00	0.00	1.20	3.00	3	0.8	4.00	2
43	0.00	0.50	0.00	0	2	0	3	2.33	0.00	1.60	0.75	5	1.1	2.33	8
44	0.00	0.60	0.00	0	3	0	1	1.00	0.00	1.80	0.75	6	0.8	1.00	12
45	0.00	0.00	0.00	0	2	0	3	0.66	0.00	2.00	1.50	6	0	0.33	12.4
46	0.00	0.00	0.00	0	1	0	1	0.33	0.00	1.60	0.50	4	0	0.0	16
47	0.00	0.00	0.25	0	1	0	1	0.0	0.00	1.20	1.75	3	0	0.0	18
48	0.50	0.00	0.00	0	2	0	2	0.0	0.00	0.60	1.50	2	0	0.0	16
49	0.00	0.00	0.00	0.1	2		0	0.0	0.00	0.20	2.75	2		0.0	12
50	0.00	0.00	0.00	0.1	1		0	0.0	0.00	0.00	1.00	1		0.0	4
51	0.00	0.00	0.00	0.2	0.7		0	0.0	0.00	0.00	3.50	1		0.0	3.4
52	0.00	0.00	0.00	0	0.5		0	0.0	0.00	0.00	3.25	0.6		0.0	2.6
1				0.1			0								
2				0			0								
3				0.1											

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

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Table 54.5. Ent 2 Seasonal dynamics of key pests of cotton (Fruiting body damage) under Unprotected condition to develop suitable forecasting model in Central Zone – NBt DCH 32 during 2019 – 20

Standard week	**Fruiting Body damage %									Mean Flower damage/ 50 flowers (%)
	H. armigera			Fruiting Body damage %	*H. armigera& E. vittella*	*E. vittella*			*H. armigera& E. vittella*	
	SU	AK	NA	RA	KH	SU	AK	NA	BW	NA
28				0						
29				0						
30	0.00			0	0	0.00				
31	0.00			0	0	0.00				
32	0.00			0	0	0.00			0.0	
33	0.00		2	1.4	0	0.00		4	0.0	10
34	0.00	0	6	2.94	0	0.00	0	8	0.0	**12**
35	0.00	0	8	5.76	0	3.40	0	12	0.0	6
36	1.23	0	10	6.5	0	4.55	0	14	0.0	**4**
37	1.66	0	12	5	0	7.90	0	12	0.0	2
38	2.66	0	14	4.1	0	9.65	0.74	8	0.08	2
39	3.00	0	12	3.2	50	9.30	0	6	0.64	4
40	6.44	0	14	15.63	40	12.44	0	4	3.00	4
41	8.20	0	15	17.28	45	8.60	0	6	5.00	4
42	10.42	0	14	45.8	40	4.95	0	2	7.86	6
43	16.25	0	16	53.68	55	3.26	0	4	6.36	4
44	22.60	0	12	63.56	65	2.00	0	7	5.44	**8**
45	19.00	0	10	62.53	70	0.00	0	6	5.00	4
46	12.44	0	8	80.25	75	0.00	0	5	5.14	**6**
47	5.29	0	4	82	80	0.00	0	4	4.00	8
48	3.20	0.27	5	**87**	85	0.00	0.81	2	3.96	10
49	0.00	0.59	2		50	0.00	0.47	3	2.24	**12**
50	0.00	0.55	1		50	0.00	1.1	2	1.00	12
51	0.00	0	0.7		45	0.00	1.36	1.7	0.0	**8**
52	0.00	0	0.4		50	0.00	0	1.2	0.0	8
1		0.68			50		1.19			
2		0			35		0			
3		0.35					2.09			

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

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Table 54.6. Ent 2. Seasonal dynamics of key pests of cotton (PBW and Boll damage) under Unprotected condition to develop suitable forecasting model in Central Zone – NBt DCH 32 during 2019 – 20

Standard week	Mean Pink bollworm larvae/20 green bolls								Boll damage				SCY (Q/ha)
									Green boll damage/20 bolls (%)		Locule damage in 20 green bolls (%)		
	JU	SU	BH	AK	NA	RA	KH	BW	AK	NA	AK	NA	NA
29			0.00			-							
30	0.00	0.00	0.00			-	0						
31	0.00	0.00	0.00			-	0						
32	0.00	0.00	0.00			-	0	0.0					
33	0.00	0.00	0.00		2	-	0	0.0		0		0	
34	0.00	0.00	0.00	0	1	-	0	0.0	0	**0**	0	**0**	
35	0.00	0.00	0.00	0	0.4	-	0	0.0	0	0	0	0	
36	0.00	0.00	0.00	0	0.8	-	0	0.0	0	**2**	0	**0**	
37	0.00	0.00	1.00	0	1	-	0	0.0	0	4	0	0	
38	0.00	0.00	0.00	0	1.2	-	0	0.0	0	6	0	0	
39	1.00	0.00	0.00	0	0.8	-	10	0.0	0	8	0	5.75	
40	0.00	0.00	0.00	0	0.8	2.82	8	0.0	0	10	0	7.3	
41	1.00	2.00	0.00	0	1.2	7.55	9	0.0	0	12	0	6.55	
42	2.00	2.00	0.00	0	1	10.6	8	0.0	0	10	0	9.2	
43	2.00	3.00	0.25	0	1.4	15.22	11	0.0	0	12	0	9.8	
44	4.00	4.00	0.50	2	2	18.55	13	0.0	0	**14**	0	**10.7**	
45	4.00	5.00	0.50	0	2.4	25.75	14	0.0	0	12	0	10.9	
46	5.00	5.00	0.75	2	3	27.12	15	0.0	10	**16**	0	**11.2**	
47	6.00	8.00	1.50	2	4	30.22	16	0.0	10	22	0	11.8	
48	6.00	8.00	1.00	5	4.5	**41.7**	17	0.33	15	24	5.8	12.6	
49	8.00	7.00	1.50	22	5		10	0.0	45	**26**	15.94	**12.7**	
50	9.00	9.00	1.00	16	6		10	0.0	40	32	13.85	13.1	
51	8.00	6.00	1.00	17	4		9	0.0	75	**44**	25.35	**14**	
52	10.00	7.00	0.00	15	6		10	0.0	70	46	19.72	14.6	**7.64**
1				14			10		70		19.44		
2				8			7		50		11.69		
3				10					60		16.67		

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

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Table 55. Ent 2. Seasonal dynamics of key pests of cotton (Leafhopper, whitefly) under Unprotected condition to develop suitable forecasting model in Central Zone – Bt BG II during 2019 – 20

Standard week	Sucking pests												
		Jassid / 3 leaves							Whitefly / 3 leaves				
	BA	JU	SU	BH	AK	NA	RA	BA	JU	SU	BH	AK	NA
27	-			0				-			0		
28	0.33			0			0	-			0		
29	1.33			0			1.9	-			0		
30	5.33	3.9	1.20	0			1.66	-	0.8	0.20	0		
31	3.00	2	3.65	0			8.48	-	0.7	0.20	0		
32	5.33	3.8	4.20				4.26	-	1	2.00	0		
33	8.00	8.2	4.00	0		5.1	6.12	-	1	2.20	0		1.4
34	9.67	5	5.65	0	5	3.1	2.72	1.67	2.4	4.20	0	0	0.5
35	12.33	6.5	7.20	0	6.7	4.3	3.48	4.33	3.1	5.25	0	0.3	1.1
36	13.67	5.8	8.80	0	10.5	5.1	8.88	4.67	3.2	3.25	0	0.8	1.1
37	9.67	11.6	10.65	0.9	24.6	7.7	**12.62**	8.33	8.9	4.00	0.2	2.8	1
38	8.00	9.8	12.60	10	14.5	9	9.64	10.67	7.7	6.20	0	4.6	7.8
39	5.33	4	14.55	2.7	3.8	3.6	5.08	12.00	6.1	9.60	0	16.6	5.7
40	3.67	3.2	13.45	2.4	5	5.5	5.6	13.67	5.3	12.80	0	4.3	8.3
41	3.33	5.4	12.60	1	2	9.1	8.6	17.33	9.2	15.20	0	10.2	9.2
42	2.33	7.2	13.00	3.1	1.7	8.1	**9.22**	22.00	5.5	13.50	0	19.2	10.1
43	1.33	7.1	15.20	15.8	3.4	5	6.32	19.33	4	11.35	3.2	3.1	8.2
44	0.67	10.5	14.65	20.5	1	7.6	5.3	10.33	5.5	12.20	2.8	4.8	14.2
45	0.67	3.2	13.80	3	1.6	6.3	4.35	6.33	5.4	9.60	0.9	3.7	9.3
46	0.33	4.9	8.65	18.7	2.4	3.2	4.24	4.00	5.2	8.00	3.4	4.8	8.1
47	0.33	2.7	7.95	10.2	1.4	1.8	3.66	3.00	2.9	6.40	4.7	2.8	6.4
48	0.33	4	7.55	2.5	1.7	0.5	2.9	2.33	4.6	5.20	6.2	3	5.5
49	-	2.6	6.00	7.2	1.3	1.1		-	2.4	3.00	4.9	2.7	4.1
50	-	2	4.20	1.1	0.7	1		-	2.1	3.00	3.8	2.2	2.1
51	-	1.4	2.20	3.8	1.7	0.4		-	2.1	0.00	11.8	2	1.3
52	-	1.2	1.00	0	0.9	0.4		-	1.2	0.00	0	1.5	1
1					2.2							2.1	
2					4							1.7	
3					1.6							2.2	

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW – Bhawanipatna

ontd…Table 55.1. Ent 2. Seasonal dynamics of key pests of cotton (Thrips and Aphids) under Unprotected condition to develop suitable forecasting model in Central Zone – Bt BG II during 2019 – 20

Standard week	Sucking pests												
		Thrips / 3 leaves						Aphid / 3 leaves					
	BA	JU	SU	BH	AK	NA	RA	JU	SU	BH	AK	NA	RA
27	-			0						0			
28	-			0			0			0			13.26
29	-			0			12.92			0			21.52
30	-	2.9	0.00	0			19.22	0	0.00	0			57.15
31	-	3.5	3.20	0			94.64	0	0.00	0			51.26
32	-	5.9	6.65	0			86.98	0	0.00	0			115.58
33	-	13.8	11.35	0		7.4	48.36	0	1.35	0		9.3	49.54
34	-	10.6	14.50	0	0.3	3.8	67.7	0	2.35	0	0.2	12.1	66.1
35	-	12.1	18.20	0	1.6	5.3	108.48	0	5.40	0	0.4	6.2	59.42
36	-	9.1	22.65	0	2.2	4.3	68.28	0	4.60	0	0.6	5.1	31.64
37	-	16.4	28.60	0.6	3.5	11.3	47.42	0.3	9.65	8.7	0.3	6.1	41.78
38	-	15.4	45.50	0	3.7	18.4	29.66	0.3	16.60	9.1	0.1	5.1	10.3
39	-	3.6	50.60	0.4	1.7	9.6	7.18	2.8	20.20	7.2	0.3	2.2	18.64
40	-	3.2	40.40	1.5	2.6	10.2	13.18	1.9	22.65	18.1	0.5	2.3	25.68
41	-	3	31.20	0	1.8	1.2	11.42	2.5	26.50	9.5	0.1	7.5	28.58
42	-	3.3	19.30	11	1.7	1.4	12.64	0.1	26.65	11.1	0	2.3	26.14
43	-	2.2	14.20	0	1.4	0.3	5.22	2	28.00	8.4	0.3	2.1	40.96
44	-	1.4	11.60	0.3	1.6	0.4	2.86	2.8	31.20	10.1	0	2.4	30.8
45	-	1.1	6.00	1.9	3.7	1	1.55	4.1	34.60	17.6	0	2.3	78.4
46	-	2.2	3.50	0.5	2.8	1.2	2.4	1.7	36.00	9	0.1	2.1	79.78
47	-	0.5	3.00	0	2	1.1	0.88	3.9	40.55	56.2	0	2	90.54
48	-	1.9	2.80	2.6	2.5	0.3	1	2.4	55.60	65.4	0.5	3.4	97.42
49	-	0.7	1.75	2.7	2	0		5.9	56.60	93.2	0.1	3.2	
50	-	0.5	0.00	3.4	1.5	0		2.3	60.40	91.7	0	2.1	
51	-	0	0.00	4.9	0.8	0		14	45.50	96.1	1.7	2.5	
52	-	0	0.00	0	2.2	0		14.6	30.20	0	3.5	1.8	
1					1.7						9		
2					1.5						6.6		
3					1.8						21.3		

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW – Bhawanipatna

Table 55.2. Ent 2. Seasonal dynamics of key pests of cotton (*H. armigera*) under Unprotected condition to develop suitable forecasting model in Central Zone – Bt BG II during 2019 – 20Contd…

Standard week	Predators/ plant*				*H. armigera*								
					Larvae / 5 plants	Larvae / 5 plants	Larvae / 5 plants	Eggs/5 plants	Larvae / 5 plants	Eggs/5 plants	Larvae / 5 plants	Eggs/5 plants	Larvae / 5 plants
	SU	BH	AK	NA	RA	JU	BH	AK	AK	NA	NA	KH	KH
29		**0**			2.88		0.00						
30	0.10	0.00			2.52	0.00	0.00					0	0
31	0.10	0.00			3.84	0.00	0.00					0	0
32	0.10	0.00			**5.42**	0.00	0.00					0	0
33	0.20	0.00		0	4.18	0.00	0.00			0.2	0.7	0	0
34	0.60	0.00	0.00	1	2.85	0.00	0.00	0	0	0.35	0.6	0	0
35	0.60	0.00	0.10	1.3	2.48	0.00	0.00	0	0	0.2	0.6	0	0
36	0.80	0.00	1.10	1.4	3.32	0.25	0.00	0	0	0.4	0.6	0	0
37	0.90	0.10	0.70	2.4	1.98	0.00	0.00	0	0.2	0.4	0.4	0	0
38	0.95	0.20	0.10	1.1	2.96	0.50	0.00	0	0	0.6	0.6	0	0
39	1.40	0.10	0.60	2.1	2.34	0.25	0.00	0	0	0.2	0.6	0	0
40	1.85	0.20	0.90	0.9	1.82	0.50	0.00	0.3	0.1	0.4	0.4	0	0
41	2.25	0.45	1.30	0.6	3.1	0.50	0.00	0	0	0.6	0.8	0	0
42	2.95	0.40	1.00	1.1	2.7	0.50	0.00	0	0	0.8	0.6	4	1
43	2.65	0.40	0.20	0.7	2.74	0.25	0.00	0	0	0.6	0.8	1	0
44	2.65	1.20	0.90	1.5	2.9	0.25	0.00	0	0	0.8	0.8	3	1
45	3.60	0.55	1.00	2.25	3.15	0.50	0.00	0	0	0.6	0.8	2	0
46	3.85	0.20	0.90	1.6	3.12	0.25	0.25	0	0	0.6	0.6	1	0
47	3.30	0.30	0.70	0.7	2.68	0.00	0.00	0	0	0.4	0.8	2	2
48	3.80	0.10	0.50	0.2	4.2	0.25	0.00	0	0	0.2	0.8	0	0
49	3.70	0.00	0.30	0.4		0.00	0.00	0	0	0.2	0.2	0	0
50	3.60	0.00	0.50	0.4		0.00	0.00	0	0	0.2	0.4	0	0
51	3.00	0.00	0.40	0.2		0.00	0.00	0	0	0	0.2	0	0
52	2.05	0.00	0.30	0.1		0.00	0.00	0	0	0	0	0	0
1			0.8					0	0			0	0
2			0.8					0	0			0	0
3			0.7					0	0				

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW – Bhawanipatna

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Table 55.3. Ent 2. Seasonal dynamics of key pests of cotton (Boll worms) under Unprotected condition to develop suitable forecasting model in Central Zone – Bt BG II during 2019 – 20

Standard week	*Eariass*pp. larvae / 5 plants						*S. litura* larvae / 5 plants				% Parasitism
	JU	SU	BH	AK	NA	KH	JU	SU	BH	NA	NA
27			0.00						0.00		
28			0.00						0.00		
29			0.00						0.00		
30	0.00	0.00	0.00			0	0.00	0.00	0.00		
31	0.00	0.00	0.00			0	0.00	0.00	0.00		
32	0.00	0.00	0.00			0	0.00	0.00	0.00		
33	0.00	0.00	0.00		0.2	0	0.00	0.00	0.00	0	0.8
34	0.00	0.00	0.00	0	0.7	0	0.00	0.00	0.00	0.3	0.4
35	0.00	0.00	0.00	0	0.8	0	0.00	0.00	0.00	0.2	0
36	0.00	0.00	0.00	0	0.9	0	0.00	0.00	0.00	0.5	0.3
37	0.00	0.00	0.00	0	0.4	3	0.00	0.00	0.00	0.2	0.6
38	0.00	0.00	0.00	0	0.8	2	0.00	0.00	0.25	0.4	0.9
39	0.00	0.00	0.00	0	0.3	0	0.00	0.00	0.50	0.6	0.1
40	0.00	0.00	0.00	0	0.5	1	0.00	0.00	0.25	0	0.1
41	0.00	0.00	0.00	0	0.95	0	0.00	0.00	0.25	0.4	0
42	0.00	0.00	0.00	0	0.1	0	0.00	0.00	0.25	0.2	0.1
43	0.00	0.00	0.00	0	0.5	2	0.00	0.00	0.00	0	0.3
44	0.00	0.00	0.00	0	0.9	0	0.00	0.00	0.75	0.9	0
45	0.00	0.00	0.00	0	0.7	0	0.00	0.00	0.75	0.95	0.4
46	0.00	0.00	0.00	0	0.1	0	0.00	0.00	0.25	0	1.3
47	0.00	0.00	0.00	0	0.2	0	0.00	0.00	0.00	0.1	1
48	0.00	0.00	0.25	0	0.2	0	0.00	0.00	0.00	0.5	1.5
49	0.00	0.00	0.00	0	0.4	0	0.00	0.00	0.75	0.5	0
50	0.00	0.00	0.00	0	0.4	0	0.00	0.00	0.00	0.2	7
51	0.00	0.00	0.00	0.1	0.3	0	0.00	0.00	0.00	0.4	3.4
52	0.00	0.00	0.00	0	0	0	0.00	0.00	0.00	0.2	1.6
1				0		0					
2				0		0					
3				0.1							

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW – Bhawanipatna

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Table 55.4. Ent 2. Seasonal dynamics of key pests of cotton (Fruiting body damage and PBW) under Unprotected condition to develop suitable forecasting model in Central Zone – Bt BG II during 2019 – 20

Standard week	**Fruiting Body damage %						Mean Flower damage/ 50 flowers (%)	Mean Pink bollworm larvae/20 green bolls						
	H. armigera				*E. vittella*									
	AK	NA	RA	KH	AK	NA	NA	JU	SU	BH	AK	NA	RA	KH
27										0.00				
28			--							0.00			--	
29			--							0.00			--	
30			--	0				0.00	0.00	0.00			--	0
31			--	0				0.00	0.00	0.00			--	0
32			--	0				0.00	0.00	0.00			--	0
33		1	--	0		1	6	0.00	0.00	0.00		0	--	0
34	0	2	--	0	0	1.2	**6**	0.00	0.00	0.00	0	0	--	0
35	0	1.8	--	0	0	1.6	5.1	0.00	0.00	0.00	0	0.4	--	0
36	0	1.9	--	0	0	2.5	**2**	0.00	0.00	0.00	0	0.9	--	0
37	6.25	2	--	0	0	1.6	2	0.00	0.00	0.00	0	0.4	--	0
38	0	2.1	--	0	0	1	2	0.00	0.00	1.00	0	0.6	--	0
39	0	2.9	--	0	0	1.2	3	0.00	0.00	0.00	0	0.9	--	0
40	0	1.5	7.3	0	0	2.9	4	0.00	0.00	0.00	0	0.9	2	0
41	0	0.9	10	25	0	2.5	4	1.00	2.00	0.00	0	0.2	4.6	5
42	0	1.95	35.6	35	0	2.1	3	1.00	2.00	0.00	0	0.8	9.85	7
43	0	2	43.74	20	0	1.5	4	2.00	4.00	0.00	0	2.4	13.68	4
44	0	2.7	54.37	15	0	2.2	**5**	1.00	4.00	0.00	0	2.3	16.25	3
45	0	1.2	60.42	20	0	2.4	4	2.00	4.00	0.00	0	2.7	22.8	4
46	0	1.4	68.45	35	0	2.1	**5**	2.00	6.00	0.00	3	1.3	25.66	7
47	0	1.5	74.98	40	0	1	6	3.00	6.00	0.00	0	2.2	28.32	8
48	0	1.6	**79.28**	55	0	0.3	8	2.00	4.00	0.75	3	3.4	**32.55**	11
49	0	1.9		70	0	0.6	**10**	4.00	5.00	0.00	3	5		14
50	0.53	1.4		60	0	0.4	11	4.00	6.00	0.25	16	8.3		12
51	0	0.4		55	0.63	0.3	**6**	5.00	5.00	0.25	11	6.2		11
52	0	0.1		50	0.68	0.2	7	6.00	3.00	0.00	12	6		10
1	0.48			60	1.9						12			12
2	0			65	1.07						14			13
3	0				3.23						13			

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW – Bhawanipatna

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Table 55.5. Ent 2. Seasonal dynamics of key pests of cotton (Boll damage) under Unprotected condition to develop suitable forecasting model in Central Zone – Bt BG II during 2019 – 20

Standard week	Boll damage on boll basis			Boll damage on locule basis			SCY (Q/ha)
	Green boll damage/20 bolls (%)		Open boll damage/ 20 bolls (%)	Locule damage in 20 green bolls (%)		Open boll Locule damage in 20 bolls %	
	mean		At Harvest	mean		At Harvest	
	AK	NA	NA	AK	NA	NA	NA
33		0			0		
34	0	**0**		0	**0**		
35	0	0		0	0		
36	0	**0**		0	**0**		
37	0	2		0	0		
38	0	4		0	0		
39	0	6		0	3.2		
40	0	7		0	4		
41	0	10		0	4.1		
42	0	8		0	7.1		
43	0	9		0	7.2		
44	0	**11**		0	**7.8**		
45	0	10		0	8.2		
46	0	**13**		0	**8.7**		
47	0	19		0	9.1		
48	10	22		2.56	9.2		
49	5	**24**		1.28	**10.4**		
50	10	29		2.47	10.8		
51	40	**30**		10	**11.2**		
52	50	32	**14.3**	11.11	11.4	**6.8**	**10.54**
1	55			13.92			
2	65			16.88			
3	55			15.85			

AK -Akola, NA - Nanded,

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Table 55. 6. Ent 2. Seasonal dynamics of key pests of cotton (Trap catches) under Unprotected condition to develop suitable forecasting model in Central Zone – Bt BG-II during 2019 – 20

Standard week	Trap catches													
		H. armigera						PBW						
	BA	JU	SU	BH	NA	RA	BW	BA	JU	SU	BH	NA	RA	BW
27	-			0.00				-			0.00			
28	-			0.00		0		-			0.00		0	
29	-			0.00		4		-			0.00		0	
30	-	0	1.00	0.00		7		-	0	1.50	0.00		0	
31	-	0	0.00	0.00		14		-	0	4.50	0.00		0	
32	-	0	5.50	0.00		8	0.0	-	0	2.50	0.00		0	0.00
33	-	0	8.50	0.00	3	4	0.0	-	0	1.00	0.00	18	0	0.00
34	-	3	6.50	0.00	4	7	0.0	-	0	6.50	0.00	13	5	0.00
35	4	3	13.50	0.00	4	4	0.0	-	0	16.50	0.00	3	9	0.00
36	3	3	10.50	0.00	5	2	0.0	-	0	22.50	0.00	2	17	0.00
37	5	2	19.50	0.00	7	4	0.0	-	0	30.50	0.00	1	26	0.00
38	2	4	22.50	3.00	8	3	0.0	-	0	36.00	1.00	2	8	0.00
39	-	4	23.50	5.00	13	3	0.60	-	0	45.50	1.00	1	14	0.00
40	-	6	28.50	3.00	13	2	0.0	-	0	69.00	0.00	4	27	0.00
41	-	6	21.50	0.00	6	3	1.04	-	0	79.50	0.00	3	30	0.00
42	-	2	30.50	1.00	29	1	0.0	-	21	86.50	1.00	3	24	0.00
43	-	3	61.50	2.00	4	0	1.00	-	34	101.50	0.00	4	38	0.00
44	-	2	65.50	2.00	2	0	1.50	2	25	122.50	3.00	4	62	0.00
45	-	3	54.50	0.00	1	0	0.0	4	45	132.50	4.00	12	116	0.00
46	-	2	36.50	1.00	3	0	0.0	3	58	155.50	2.00	17	138	0.00
47	-	2	18.50	2.00	7	0	0.0	2	76	178.50	9.00	17	153	0.00
48	-	2	6.50	3.00	1	0	0.0	-	88	205.50	15.00	18	178	0.00
49	-	2	6.00	7.00	2		0.0	-	102	256.50	11.00	10		0.00
50	-	1	3.00	5.00	5		0.0	-	139	308.00	14.00	11		0.00
51	-	0	1.50	21.00	4		0.0	-	145	247.00	46.00	10.3		0.00
52	-	0	0.00	26.00	3.4		0.0	-	182	212.00	101.00	9.4		0.00

AK -Akola, NA - Nanded,

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Table 55.7. Ent 2. Seasonal dynamics of key pests of cotton (Trap catches- SBW and *S. litura*) under Unprotected condition to develop suitable forecasting model in Central Zone – Bt BG-II during 2019 – 20

Standard week	Trap catches													
		SBW							*S. litura*					
	BA	JU	SU	BH	NA	RA	BW	BA	JU	SU	BH	NA	RA	BW
27	-			0.00				-			0.00			
28	-			0.00		6		7			0.00		0	
29	3			0.00		15		17			0.00		0	
30	6	0	0.00	0.00		14		23	0	3.50	0.00		0	
31	3	0	0.00	0.00		8		34	0	4.50	0.00		0	
32	5	0	1.50	0.00		4	0.0	36	0	6.50	0.00		12	0.0
33	-	0	5.50	0.00	1	3	0.0	38	0	4.00	0.00	44	28	0.0
34	-	3	4.50	0.00	2	9	0.0	41	0	15.50	0.00	38	60	0.0
35	-	0	2.50	0.00	5	3	0.0	58	1	25.50	0.00	32	31	0.0
36	-	0	3.50	0.00	9	8	0.0	45	2	25.00	0.00	67	26	0.96
37	-	0	4.50	7.00	2	7	1.00	19	2	39.50	13.00	64	70	2.60
38	-	0	5.50	19.00	3	6	1.00	22	3	112.00	26.00	96	39	2.50
39	-	0	12.50	3.00	9	4	2.00	27	2	146.50	38.00	34	28	3.50
40	-	0	13.50	6.00	2	6	2.86	36	8	163.00	4.00	22	32	3.00
41	-	0	10.50	3.00	10	3	1.50	42	5	195.50	2.00	74	38	3.86
42	-	0	6.50	6.00	10	2	1.00	53	1	225.50	30.00	47	52	2.00
43	-	0	10.50	3.00	8	0	0.50	22	2	186.50	3.00	15	59	3.00
44	-	0	8.50	1.00	6	0	3.00	14	2	145.50	8.00	11	58	4.88
45	-	0	6.00	7.00	2	0	0.50	6	3	126.00	15.00	4	26	2.00
46	-	0	4.50	0.00	4	0	0.0	4	2	111.00	4.00	9	12	0.0
47	-	0	3.50	2.00	7	0	0.0	-	1	89.50	19.00	7	8	0.0
48	-	0	0.00	27.00	7	0	0.0	-	1	53.00	46.00	8	0	0.0
49	-	0	1.50	9.00	4		0.0	-	1	26.50	28.00	5		0.0
50	-	0	0.00	0.00	6		0.0	-	1	15.00	10.00	4		0.0
51	-	0	0.00	20.00	3.4		0.0	-	0	23.50	36.00	2.6		0.0
52	-	0	0.00	30.00	3		0.0	-	0	26.50	31.00	1.9		0.0

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW – Bhawanipatna

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Table 55.8. Ent 2. Seasonal dynamics of key pests of cotton (Abiotic factors - Temperature) under Unprotected condition to develop suitable forecasting model in Central Zone – Bt BG-II during 2019 – 20

Standard week	Abiotic factors													
	Temperature (⁰C)													
	JU		SU		BH		AK		NA		RA		BW	
	min	max	min	max	min	max	min	max	min	max	min	max	min	max
27					26.0	31.0								
28					27.1	34.2					24.81	31.11		
29					26.7	35.2					23.53	34.03		
30	25.5	31.9	26.90	33.20	26.4	32.9					23.44	30.97		
31	24.9	28.3	27.80	30.10	24.8	28.6					22.96	27.31		
32	25.5	28.9	27.30	29.50	25.3	29.1					23.16	27.46	25.0	29.8
33	25.3	30.6	26.50	29.30	25.5	31.2			19	30.4	22.91	31.06	24.6	31.0
34	24.8	32.4	26.90	30.70	26.1	33.1	20	29.6	18.6	31.4	21.07	32.49	24.5	31.6
35	25.5	30.9	26.80	31.60	25.5	30.5	19.9	29.1	19.1	30.9	22.8	32.43	24.3	31.9
36	25.4	31.1	24.90	29.10	26.2	31.9	20.6	29.6	17.7	30.1	23	30	24.4	28.4
37	25.3	29.8	25.10	29.50	25.8	29.5	19.9	29	19.7	30.7	23.2	28.74	24.7	32.4
38	25.1	32.6	25.40	29.30	25.2	32.9	19.4	30.3	17.9	29.4	21.64	29.09	24.2	32.6
39	24.3	31.0	26.10	29.40	25.0	30.9	19.5	30.6	19	31	22.37	30.43	24.0	32.1
40	23.9	32.5	25.40	30.70	24.6	32.2	20	32.3	19.1	30.9	20.9	31.23	23.1	32.1
41	23.4	34.9	26.20	31.10	24.8	34.6	17.9	32.3	19.3	32	21.13	31.54	22.9	30.5
42	22.7	35.2	26.00	32.00	23.7	35.2	16.5	30.5	18	31.3	19.21	29.63	22.3	31.2
43	24.8	32.6	23.70	35.20	22.9	31.8	17.6	26.8	18.7	29.4	20.37	24.74	22.3	29.0
44	23.7	34.0	23.90	33.00	23.8	34.9	18	30.3	18.6	30.6	22.6	26.31	21.2	31.1
45	22.0	33.3	24.00	34.10	23.2	31.9	16.4	31.3	18.6	31.6	18.9	31	18.9	28.4
46	20.3	32.6	23.00	32.60	21.1	33.4	11.9	30.2	17	31.3	17.06	29.97	15.5	29.5
47	17.9	32.5	21.50	32.90	19.6	33.5	13.4	30.3	16.7	28.9	15.2	30	15.5	29.2
48	19.2	31.3	22.00	33.40	20.1	32.8	15.6	30.3	16.4	29.3	15.9	30.5	16.0	29.5
49	19.4	31.6	21.30	33.10	20.5	30.9	14.8	29	15.9	28.4			13.6	27.8
50	15.7	29.5	21.10	32.40	15.9	29.9	16.6	29.5	15.3	30.1			15.2	29.7
51	14.7	28.7	17.70	30.80	17.0	28.8	15.8	27.2	12.9	29.6			14.1	27.4
52	12.6	28.2	18.00	24.40	14.5	29.7	13.5	25.9	13.1	28.3			13.0	25.8
1							13.1	23.1						
2							12.2	26.9						
3							14.1	27.8						

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW – Bhawanipatna

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Table 55.9. Ent 2. Seasonal dynamics of key pests of cotton (Abiotic factors – Relative Humidity) under Unprotected condition to develop suitable forecasting model in Central Zone – Bt BG-II during 2019 – 20

Standard week	Abiotic factors													
	RH %													
	JU		SU		BH		AK		NA		RA		BW	
	morning	evening	morning	evening	morning	evening	morning	evening	morning	evening	morning	evening	morning	evening
27					88.7	80.1								
28					83.9	58.0					77.43	60.14		
29					85.3	56.1					69.57	48.71		
30	91.0	79.0	79.00	73.00	88.4	76.3					78.57	64		
31	96.0	95.0	83.00	86.00	93.3	90.6					85.71	78.71		
32	96.0	92.0	91.00	88.00	87.6	82.6					83.86	71.43	91.4	84.9
33	96.0	84.0	97.00	92.00	88.7	69.3			76.9	75.7	74.71	60.29	84.9	81.9
34	90.0	73.0	84.00	80.00	89.0	62.1	90	76	78.9	63.7	73.14	48.71	87.1	84.0
35	96.0	88.0	82.00	73.00	92.4	73.1	91	72	81.6	70.1	73.71	54	86.4	85.9
36	94.0	86.0	83.00	82.00	88.9	77.9	92	77	84	75	77	66	92.0	90.4
37	96.0	85.0	87.00	84.00	89.7	88.1	90	75	88.3	75.1	79.43	72	86.3	74.1
38	89.0	77.0	85.00	84.00	86.0	68.9	94	70	80.9	72.4	84.43	77.57	81.7	77.1
39	93.0	84.0	82.00	83.00	87.6	78.1	94	67	85.4	79.4	84.57	68.29	83.6	77.6
40	87.0	65.0	82.00	79.00	84.0	68.7	90	57	81.4	70	79.29	58.86	86.3	73.9
41	80.0	49.0	75.00	77.00	76.4	46.6	88	48	77.6	80.3	79.29	50.29	87.6	70.3
42	77.0	43.0	77.00	67.00	68.9	43.6	91	58	79.9	79.4	78.43	64	79.1	68.9
43	64.0	52.0	69.00	61.00	81.1	51.4	95	79	85.4	82.3	90.14	83.29	89.9	78.3
44	80.0	54.0	84.00	69.00	61.6	36.0	93	61	86.6	77.1	81.29	57.43	85.7	74.4
45	70.0	46.0	74.00	64.00	84.7	53.4	90	50	83.1	69.9	77.86	48.14	18.9	71.1
46	82.0	51.0	77.00	67.00	72.3	40.1	90	40	83	65.7	74.57	49.43	15.5	58.7
47	80.0	39.0	75.00	68.00	75.6	40.4	89	40	79.3	72.9	74	45	15.5	64.9
48	70.0	43.0	77.00	65.00	75.4	47.9	90	44	75.1	74.4	74	45	84.9	67.9
49	66.0	44.0	74.00	66.00	65.9	47.9	83	37	64	66.7			77.3	64.6
50	74.0	36.0	76.00	70.00	79.3	42.7	89	49	72.7	65.4			77.4	65.1
51	74.0	39.0	68.00	73.00	82.1	52.4	90	49	79.4	64.3			84.7	62.1
52	56.0	32.0	76.00	72.00	77.0	57.3	81	47	83.5	67.5			82.9	60.8
1							89	57						
2							82	41						
3							80	46						

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW – Bhawanipatna

Contd…

Table 55.10. Ent 2. Seasonal dynamics of key pests of cotton (Abiotic factors-Rainfall) under Unprotected condition to develop suitable forecasting model in Central Zone – Bt BG-II during 2019 – 20

Standard week	Abiotic factors						
	Rainfall in mm						
	JU	SU	BH	AK	NA	RA	BW
27			90				
28			1.2			3.8	
29			38			23.8	
30	114.3	74.00	137.2			20.2	
31	213.3	112.00	177			36.8	
32	180.6	432.00	70.2			20.8	163.6
33	22.9	166.00	70		53.8	0	122.8
34	3.9	16.00	0.4	28.5	45.8	1.4	57.6
35	49.6	0.00	26.8	54.5	85.9	75	60.2
36	248.0	114.00	50	9	11.4	15	102.2
37	180.5	106.00	70.4	18	83.2	21.8	8.2
38	24.6	176.00	29	118.1	100.8	94.1	11.6
39	196.2	27.00	129.2	82	40	5.23	45.6
40	36.8	47.00	31.6	6.4	44	1	21.4
41	0.0	10.00	0	0	13.8	0.57	25.6
42	1.0	0.00	0	11.2	155.8	6	0.0
43	0.0	0.00	0	67.5	102.6	22.03	22.3
44	4.4	20.00	18.3	11.8	8.8	0.57	7.0
45	0.0	14.00	8	0	2.6	3.34	0.0
46	11.2	23.00	0	0	0	0	0.0
47	0.0	0.00	0	0	0	0	0.0
48	0.0	0.00	0	0	0	0	0.0
49	0.0	0.00	0	0	0		0.0
50	0.0	0.00	0	1.2	0		0.0
51	0.0	0.00	0	0	0		0.0
52	0.0	0.00	0	13	0		0.0
1				0			
2				0			
3				0			

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW – Bhawanipatna

Table 56. Ent 2. Seasonal dynamics of key pests of cotton (Leafhopper and Whitefly) under Unprotected condition to develop suitable forecasting model in South Zone – NBt DCH 32 during 2019 – 20

Standard week	Sucking Pests												
	Jassid / 3 leaves							Whitefly / 3 leaves					
	LG	ND	DW	RC	CN	CBE	SVPR	LG	DW	RC	CN	CBE	SVPR
30			0.00		1.25				0.00		0.00		
31			1.30		1.70				0.00		0.00		
32			1.0		1.30				0.1		1.25		
33			1.2		2.15				0.0		1.60		
34	0.6		1.0	5.34	3.20			0.08	0.0		1.50		
35	3.84		8.7	5.65	7.20			0.88	2.2		3.20		
36	5.28		6.7	5.36	6.80			0.36	1.7	2.32	3.10		
37	7.84		4.4	5.88	5.20			0.28	0.4	2.45	2.50		
38	10.0		7.1	6.23	2.50	9.55	2.80	1.2	0.9	2.14	1.80	0.53	0.40
39	22.12	7.63	7.4	4.34	1.75	10.85	5.20	1.72	1.5	1.72	1.00	0.63	0.60
40	17.88	8.80	6.4	4.12	2.50	12.32	9.80	0.56	1.5	2,12	1.20	0.41	1.20
41	19.56	9.10	3.8	8.56	1.26	13.68	5.80	1.08	1.3	2.16	0.60	0.45	1.60
42	9.56	8.30	3.7	12.12	1.30	14.31	2.00	0.56	1.1	2.55	0.75	1.49	0.20
43	16.68	11.80	3.3	13.34	4.40	7.02	5.40	0.2	0.3	2,34	1.50	0.18	0.40
44	8.56	9.20	3.5	15.38	4.10	8.7	6.80	1.12	1.5	2.56	2.10	1.57	1.20
45	5.92	11.00	3.5	14.23	2.25	9.58	7.20	0.28	1.2	3.27	1.80	1.49	1.20
46	8.8	8.60	3.9	12.86	3.20	3.94	14.20	0.88	1.0	3.33	2.00	1.57	1.00
47	4.4	6.10	3.8	9.78	2.50	3.42	7.40	1.12	1.4	3.45	1.60	1.66	0.60
48	4.8	7.20	3.3	5.86	2.40	3.12	9.20	2.2	1.7	4.65	0.40	1.02	1.80
49	6.0	6.8	4.0	4.55	3.15	3.05	7.40	3.76	1.3	5.67	0.20	0.4	2.80
50	7.84	7.8	3.8	3.34	1.52	0.5	4.80	3.88	1.3	6.77	0.00	0.26	1.00
51	5	6.4	3.5	3.23	0.20	0.4	3.20	0.4	1.1	8.26	0.00	0	1.00
52	3	6	4.2	3.13	0.00	0.7	4.00	0.92	1.4	7.83	0.00	0	0.40
1	4.4	4.6				0.3	2.00	0.2				0	0.00
2	2	3.8				0.6		0.96				0	
3	3.32					1.7		0.8				0	
4						1.4						0	

LG – Lam Guntur; ND – Nandyal; DW – Dharwad; RC – Raichur; CN – Chamarajanagara; CBE – Coimbatore; SVPR – Srivilliputtur;

Contd….

Table 56.1. Ent 2. Seasonal dynamics of key pests of cotton (Sucking pests) under Unprotected condition to develop suitable forecasting model in South Zone – NBt DCH 32 during 2019 – 20

Standard week	Sucking Pests														
	Thrips / 3 leaves							Aphid / 3 leaves						Mirid bug/25 squares	
	LG	ND	DW	RC	CN	CBE	SVPR	LG	DW	RC	CN	CBE	SVPR	DW	CN
25					0.00						0.00			**0**	
26					0.00						0.00			**0**	
27					0.00						0.00			**0**	
28			0.00		0.00				0.00		0.00			**0**	
29			0.00		1.50				0.00		0.00			**0**	
30			0.00		2.50				0.00		5.60			**0**	
31			4.20		2.25				0.00		10.20			0	
32			6.20		1.00				10.80		5.40			**0**	
33			6.50		2.15				0.60		5.25			**0**	
34	6.04		5.30	5.56	2.50			4.04	1.80		25.25			**1.2**	0.00
35	5.84		16.80	6.42	6.25			2.44	1.60	3.25	34.80			**1.3**	5.00
36	19.84		15.40	22.14	7.80			2.24	2.40	10.45	55.15			**1.1**	17.00
37	23.72		14.80	28.32	5.26			5.52	5.00	5.25	50.50			**2.4**	18.00
38	16.04		15.00	22.45	4.30	11.02	5.40	4.08	1.00	3.23	35.30	12.22	0.00	**3.7**	21.00
39	5.04		14.10	3.12	1.40	11.48	3.00	3.32	2.00	4.56	21.25	16.8	0.00	**4.3**	20.00
40	4.96		15.70	4.25	1.80	12.31	3.20	4.68	1.80	3.82	20.40	20.92	0.20	**5.2**	24.00
41	5.72		9.30	2.50	0.80	10.44	1.40	3.56	0.80	2.45	18.50	5.6	0.60	**6.7**	18.00
42	0.52		8.30	1.12	2.30	8.47	1.60	2.56	0.90	2.14	17.26	0.59	0.00	5.7	25.00
43	1.4		4.30	2.70	2.75	14.94	1.40	3.36	0.40	3.22	12.30	7.02	0.00	7.2	12.00
44	1.84		4.60	2.02	2.10	8.72	2.60	5.64	1.60	3.45	8.25	2.16	1.20	7.8	9.00
45	0.52		1.70	2.24	2.10	7.69	1.80	2.48	0.00	5.42	10.30	2.61	0.20	6.9	8.00
46	0.48		1.70	2.46	0.75	6.31	0.80	3.12	1.30	6.38	12.12	2.71	2.20	5.7	9.00
47	1.36		2.20	1.50	0.60	5.57	5.20	2.52	0.60	8.24	8.26	2.45	0.20	4.9	7.00
48	2.4		2.10	0.90	0.20	4.35	2.00	3.8	0.80	6.22	9.25	3.56	0.40	3.7	
49	4.36		3.00	0.72	0.00	3.29	5.60	7.32	0.70	15.28	7.50	4.6	0.00	3.1	
50	1.6		1.60	1.20	0.00	2.4	3.40	5.68	1.40	18.45	4.25	3.86	0.00		
51	5.32		2.40	0.63	0.00	0.42	1.40	1.72	1.90	16.26	3.50	5.54	0.00		
52	3.44		3.30	0.52	0.00	0.76	1.20	2.92	1.00	15.34	2.50	3.4	0.00		
1	2.32					0.52	1.00	3.12				4.22	0.00		
2	4.4					0		5.36				2.6			
3	2.4					0		1.36				4.2			
4						0						6.4			

LG – Lam Guntur; ND – Nandyal; DW – Dharwad; RC – Raichur; CN – Chamarajanagara; CBE – Coimbatore; SVPR – Srivilliputtur;

Contd….

Table 56.2. Ent 2. Seasonal dynamics of key pests of cotton (Predators) under Unprotected condition to develop suitable forecasting model in South Zone – NBt DCH 32 during 2019 – 20

Standard week	Twisted flower buds due to midge (%)	Predators/ plant*				
	DW	DW	RC	CN	CBE	SVPR
23	0.0					
24	0.0					
25	0.0			0.00		
26	0.0			0.00		
27	0.0			0.00		
28	0.0	0		0.00		
29	0.0	0		0.00		
30	0.2	5.6		0.00		
31	0.5	10.2		0.00		
32	0.2	5.4		1.20		
33	0.6	5.25		0.80		
34	1.1	25.25		3.60		
35	0.8	34.8		5.25		
36	1.2	55.15	0.55	6.50		
37	2.1	50.5	0.59	4.15		
38	1.2	35.3	0.38	4.50	0.2	0.00
39	1.7	21.25	0.77	4.10	0.6	0.00
40	0.5	20.4	0.28	3.50	1.67	0.00
41	0.2	18.5	0.71	2.10	0.5	0.30
42	0.3	17.26	0.95	2.15	1.65	0.10
43	0.0	12.3	1.01	4.20	0.09	0.00
44	0.0	8.25	0.59	3.10	1.1	0.00
45	0.0	10.3	0.58	1.10	2.16	0.20
46	0.0	12.12	0.59	0.80	1.56	0.00
47	0.0	8.26	0.71	0.00	1.61	0.20
48	0.0	9.25	0.88	0.00	1.66	0.00
49		7.5	0.71	0.00	1.25	0.20
50		4.25	0.72	0.00	3.1	0.40
51		3.5	1.14	0.00	3.15	0.20
52		2.5	1.35	0.00	3.05	0.10
1		0			5.15	0.00
2		0			7.3	
3					5	
4					6.45	

LG – Lam Guntur; ND – Nandyal; DW – Dharwad; RC – Raichur; CN – Chamarajanagara; CBE – Coimbatore; SVPR – Srivilliputtur;

Contd…

Table 56.3. Ent 2. Seasonal dynamics of key pests of cotton (Boll Worms) under Unprotected condition to develop suitable forecasting model in South Zone – NBt DCH 32 during 2019 – 20

Standard week	Boll worms														
	H. armigera								*Eariass*pp. larvae / 5 plants			*S. litura* larvae / 5 plants			
	Eggs / 5 plants	Larvae / 5 plants	Larvae / 5 plants	Eggs / 5 plants	Larvae / 5 plants	Eggs / 5 plants	Larva/5 plants	Eggs/5 plants							
	LG		DW	RC		CN		SVPR	DW	CN	SVPR	LG	CN	CBE	SVPR
29			0.0			0.00	0.00		0.0	0.00			0.00		
30			0.0			0.00	0.00		0.0	0.00			0.00		
31			0.0			0.00	0.00		0.0	0.00			0.00		
32			0.1			0.00	0.00		0.0	0.00			0.00		
33			0.5			0.00	0.00		0.0	0.00			0.00		
34			1.3			0.00	0.00		0.0	0.00		0	0.00		
35			2.4			0.20	0.00		0.0	0.00		0	0.00		
36			3.7			0.80	0.40		0.0	0.00		0	0.00		
37			4.9			1.20	0.60		0.1	0.00		0	0.00		
38			5.2	0.46		2.20	1.00	0.00	0.3	0.00	0.00	0.2	0.00	0	0.00
39	0.4	0.3	5.9	0.62	0.23	0.00	1.80	0.00	1.3	0.00	1.00	0.8	0.00	0	0.00
40	0.1	1.12	5.6	0.68	0.48	0.00	0.00	0.00	2.4	0.00	3.00	1.2	0.00	0	0.00
41		0.8	4.3	0.92	0.52	0.00	0.00	0.00	3.3	0.00	1.00	0.8	0.00	0	0.00
42		0.5	2.9	1.04	0.33	0.00	0.00	0.00	2.3	0.00	2.00	0.6	0.00	0	2.00
43		0.2	1.9	0.58	0.54	0.00	0.00	0.00	1.2	0.00	1.00	0.5	0.00	0	7.00
44			1.8	0.56	0.32	0.00	0.00	0.00	0.8	0.00	2.00	0.1	0.00	0	2.00
45			2.6	0.35		0.00	0.00	0.00	0.2	0.00	0.00	0	0.00	0	11.00
46			1.7			0.00	0.00	0.00	0.0	0.00	0.00	0	0.00	0	9.00
47			0.6			0.00	0.00	0.00	0.0	0.00	0.00	0	0.00	0.66	3.00
48			0.1			0.00	0.00	0.00	0.0	0.00	0.00	0	0.00	1	10.00
49			0.0			0.00	0.00	0.00	0.0	0.00	0.00	0	0.00	0.33	2.00
50			0.0			0.00	0.00	0.00	0.0	0.00	0.00	0	0.00	2	0.00
51			0.0			0.00	0.00	0.00	0.0	0.00	0.00	0	0.00	0	0.00
52			0.0			0.00	0.00	0.00	0.0	0.00	0.00	0	0.00	0	0.00
1			0.0					0.00	0.0		0.00	0		0	0.00
2												0		0	
3												0		0	
4														0	

LG – Lam Guntur; ND – Nandyal; DW – Dharwad; RC – Raichur; CN – Chamarajanagara; CBE – Coimbatore; SVPR – Srivilliputtur;

Contd…

Table 56.4. Ent 2. Seasonal dynamics of key pests of cotton (Boll Damage) under Unprotected condition to develop suitable forecasting model in South Zone – NBt DCH 32 during 2019 – 20

Standard week	Leaf Folder damage (%)	Stem weevil (%)	**Fruiting Body damage %				Mean Flower damage/ 50 flowers (%)	Mean Pink bollworm larvae/20 green bolls					Green boll damage/20 bolls (%)			Open boll damage/ 20 bolls (%)	Locule damage in 20 green bolls (%)	
			H. armigera				mean		mean						mean	ND		mean
	CBE	CBE	ND	RC	CN	SVPR	RC	LG	DW	RC	CBE	SVPR	LG	ND	DW	OV	LG	DW
29					0.00				**0**						0.6	0.0		0.0
30					0.00				**0**						1.3	0.0		0.0
31					0.00				**0.08**						1.7	0.0		0.0
32					0.00		0.00		**0.36**	0.00					2.3	0.2		0.2
33					0.00		**0.00**		**0.64**	0.00					4.6	0.5		0.3
34					0.00		**0.00**	0	**1.48**	0.00			0		5.4	1.6	0	0.6
35					0.00		**0.00**	0	**1.68**	0.00			0		6.2	3.6	0	2.3
36					0.80		**0.00**	0	**2.08**	0.00			0		4.6	4.5	0	5.4
37					1.80		3.24	0	**2.68**	0.00			0		5.7	5.5	0	5.9
38	0	0			2.40	0.00	3.44	0	**3.16**	0.00	0	0.00	0		4.6	6.7	0	6.9
39	0	0	0.00		2.60	0.00	6.58	0	3.44	0.00	0	0.00	0		3.8	7.3	0	8.2
40	0	0	0.00		1.60	0.00	6.45	0	3.72	0.00	0	0.00	0		5.2	8.6	0	9.3
41	0	0	0.00	4.58	0.00	0.00	5.83	0	4.16	2.14	0	0.00	0		5.4	9.1	0	11.3
42	0	0	0.00	3.61	0.00	0.00	0.00	0	4.36	3.82	0	0.00	0		6.1	10.2	0	12.5
43	0	0	0.00	3.56	0.00	0.00	0.00	0	4.52	4.23	0	0.00	0.0		6.9	11.3	0.00	13.4
44	1	1.2	0.00	5.59	0.00	0.00	0.00	0	4.68	4.68	0	1.00	0.0		8.2	12.3	0.00	15.2
45	4	1.92	0.00	3.34	0.00	0.00	3.42	0	4.88	5.22	0	0.00	0.0		8.7	14.3	0.00	16.6
46	3.66	5.68	12.00	3.68	0.00	0.00	5.56	0	4.44	8.36	0	0.00	0.0		5.4	15.2	0.00	17.2
47	5.33	9.51	16.00	1.57	0.00	0.00	4.24	2	5.12	9.25	2.3	1.00	10.0		3.2	16.2	5.60	18.6
48	6.66	13.26	24.00		0.00	0.00	2.25	4	6.28	12.23	3.1	2.00	30.0		2.1	17.2	13.33	19.3
49	7.33	18.59	32.00		0.00	0.00	0.00	10	7.72	13.66	4.66	3.00	30.0		0.8	15.3	17.65	21.5
50	8.66	21.68	36.00		0.00	0.00	0.00	16	8.24	16.78	6.44	0.00	50.0		0.2	14.3	27.03	16.3
51	9	22.16	68.00		0.00	0.00	0.00	12	8.68	16.65	8.25	0.00	40.0		0.3	13.2	25.03	19.7
52	10.33	22.28	44.00		0.00	0.00	0.00	20	8.16	17.28	9.08	0.00	60.0		0.1	11.2	35.22	18.3
1	12.33	22.47	52.00			0.00		22	7.24		11.2	0.00	70.0			10.0	51.29	14.6
2	13.66	22.56	40.00					52			12.4		100.0				86.97	
3	12.33	22.68						30			14.69		90.0				76.67	
4	13.8	22.71									16.3							

LG – Lam Guntur; ND – Nandyal; DW – Dharwad; RC – Raichur; CN – Chamarajanagara; CBE – Coimbatore; SVPR – Srivilliputtur;

Table 57. Ent 2. Seasonal dynamics of key pests of cotton (Sucking pests) under Unprotected condition to develop suitable forecasting model in South Zone – Bt BG II during 2019 – 20

Standard week	Sucking Pests												
	Jassid / 3 leaves				Whitefly / 3 leaves			Thrips / 3 leaves			Aphid / 3 leaves		
	LG	ND	DW	SVPR	LG	DW	SVPR	LG	DW	SVPR	LG	DW	SVPR
28			0.00			0.00			0.00			0.00	
29			0.00			0.00			0.00			0.00	
30			0.00			0.00			0.00			0.00	
31			1.10			0.20			5.90			6.50	
32			1.7			0.00			8.30			0.80	
33			4.6			1.70			12.10			1.60	
34	0.8		1.5		0.08	0.00		7.48	8.10		7.68	0.60	
35	2.2		7.0		0.36	1.50		12.2	11.80		5.28	0.70	
36	2.56		4.4		0.76	1.40		22.24	8.70		2.24	0.70	
37	5.12		3.2		0.52	1.50		28.32	6.40		3.48	2.10	
38	3.76		3.1	2.00	0.8	1.50	0.20	14.2	2.70	0.00	2.8	0.70	0.00
39	8.64	6.50	3.7	0.80	3	1.50	0.80	11.8	1.60	0.00	3.48	1.00	0.00
40	7.32	5.50	3.0	5.40	4.8	1.50	1.20	9.28	2.00	0.20	4.08	0.50	0.40
41	6.96	6.30	3.3	2.20	1.52	1.20	0.80	3.4	1.60	0.80	3.8	0.80	1.60
42	6.88	7.50	4.8	3.00	2.92	1.00	0.00	0.6	3.62	0.60	3.68	1.20	0.20
43	7.76	6.20	6.7	3.40	7.8	0.80	0.00	0.88	2.30	4.20	2.92	1.60	0.00
44	3.72	6.30	5.7	1.60	4.84	0.60	2.60	2.44	2.10	1.80	2.04	2.30	2.00
45	2.8	7.50	6.7	3.80	4.92	1.10	1.20	1.29	1.78	2.80	1.08	4.50	0.40
46	1.16	8.90	7.2	4.40	8.08	0.90	0.40	0.48	1.20	0.20	2.04	3.70	0.00
47	0.88	6.50	5.7	2.80	7.16	1.30	1.40	2.84	1.60	1.20	1.36	2.70	1.40
48	1.92	6.70	5.9	2.60	6.52	0.70	0.20	1.6	0.30	1.00	3.16	3.80	0.60
49	6	3.60	4.9	3.80	5.76	1.20	1.20	4.36	0.70	2.80	7.16	4.60	0.40
50	3.6	4.20	5.7	3.00	3.24	1.80	1.40	1.92	1.10	1.40	2.76	5.70	0.00
51	2.64	5.20	4.7	1.20	1.36	1.10	0.00	4.24	1.30	0.80	1.96	7.80	0.00
52	1.04	4.00	6.8	0.80	1.68	0.90	0.00	6.2	1.90	0.80	14.52	8.80	0.00
1	2.04	3.20		0.60	2.08		0.00	5.48		0.45	3.2		0.00
2	1.08	3.00			1.84			7.24			2.96		
3	2.28				1.72			6.48			1.16		

LG- Lam Guntur, ND - Nnadyal, DW - Dharwad, RC - Raichur, CN - Chamarajanagar, SVPR – Srivilliputtur

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Table 57.1. Ent 2. Seasonal dynamics of key pests of cotton (Boll worms) under Unprotected condition to develop suitable forecasting model in South Zone – Bt BG II during 2019 – 20

Standard week	Mirid bug/25 squares	Twisted flower buds due to midge (%)	Predators/ plant*	*H. armigera*				*Eariass*spp. larvae / 5 plants		*S. litura* larvae / 5 plants			Leaf Folder damage (%)	Stem weevil (%)
				Larvae / 5 plants	Larvae / 5 plants	Eggs/5 plants	Larvae / 5 plants							
	DW	DW	SVPR	LG	DW	SVPR		DW	SVPR	LG	CBE	SVPR	CBE	CBE
29	0.0	0.0			0.0			0.0						
30	0.0	0.0			0.0			0.0						
31	0.0	0.4			0.2			0.0						
32	1.0	0.6			0.1			0.0						
33	1.3	0.4			0.1			0.0						
34	1.8	1.6			0.1			0.0		0				
35	2.7	0.8			0.1			0.0		0				
36	3.7	1.3			0.2			0.0		0				
37	4.8	1.3			0.1			0.1		0				
38	5.2	1.8	**0.3**		0.1	0.00	0.00	0.1	0.00	0.1		0.00		
39	6.1	0.8	**0**	0.24	0.1	0.00	0.00	0.1	0.00	0.5	0	0.00	0	0
40	5.3	0.3	**0.1**	0.92	0.2	0.00	0.00	0.1	1.00	0.7	0	0.00	0	0
41	6.7	0.0	**0.1**	0.54	0.1	0.00	0.00	0.2	4.00	0.5	0	4.00	0	0
42	6.4	0.0	0	0.12	0.0	0.00	0.00	0.1	3.00	0.4	0	6.00	0	0
43	7.2	0.0	0.2		0.0	0.00	0.00	0.0	1.00	0.1	0	9.00	0	0
44	7.5	0.0	0		0.0	0.00	0.00	0.0	3.00	0.1	0	11.00	1.02	1.3
45	8.1	0.0	0.4		0.0	0.00	0.00	0.0	0.00	0	0	15.00	4.2	1.86
46	7.3	0.0	0.2		0.0	0.00	0.00	0.0	0.00	0	0	2.00	3.55	5.46
47	6.4	0.0	0		0.0	0.00	1.00	0.0	0.00	0	0.72	6.00	5.38	9.42
48	6.1	0.0	0		0.0	0.00	1.00	0.0	0.00	0	1.02	0.00	6.62	13.66
49	5.1		0		0.0	0.00	2.00	0.0	0.00	0	0.22	0.00	7.41	18.61
50			0		0.0	0.00	1.00	0.0	0.00	0	1.8	0.00	8.61	21.72
51			0.2		0.0	0.00	0.00	0.0	0.00	0	0	0.00	9.08	22.2
52			0.2		0.0	0.00	0.00	0.0	0.00	0	0	0.00	10.12	22.26
1			0		0.0	0.00	0.00	0.0	0.00	0	0	0.00	12.39	22.49
2										0	0		13.56	22.52
3										0	0		12.46	22.69
4											0		13.78	22.75

LG- Lam Guntur, ND - Nnadyal, DW - Dharwad, RC - Raichur, CN - Chamarajanagar, SVPR – Srivilliputtur

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Table 57.2. Ent 2. Seasonal dynamics of key pests of cotton (PBW and Boll damage) under Unprotected condition to develop suitable forecasting model in South Zone – Bt BG II during 2019 – 20

Standard week	**Fruiting Body damage %		Mean Pink bollworm larvae/20 green bolls					Mean Boll damage on boll basis			Mean Boll damage on locule basis	
								Green boll damage/20 bolls (%)		Open boll damage/ 20 bolls (%)	Locule damage in 20 green bolls (%)	
		H. armigera	mean					mean		DW	mean	
	ND	SVPR	LG	ND	DW	CBE	SVPR	LG	DW	OV	LG	DW
29					**0**				0.6	0.0		0.0
30					**0**				1.2	0.0		0.0
31					**0**				2.6	0.0		0.0
32					**0**				3.7	0.0		0.0
33					**0.16**				2.9	0.3		0.3
34			0		**0.12**			0	3.8	0.5	0	0.3
35			0		**0.76**			0	2.1	1.5	0	2.9
36			0		**1.08**			0	5.8	2.3	0	3.2
37			0		**1.44**			0	8.6	3.5	0	4.2
38		0.00	0		**1.76**		0.00	0	3.9	4.6	0	6.1
39	0.00	0.00	0	0.00	2.04	0	0.00	0	4.2	6.8	0	7.6
40	0.00	0.00	0	0.00	2.52	0	0.00	0	5.1	7.3	0	8.6
41	0.00	0.00	0	0.00	3.04	0	0.00	0	6.2	8.6	0	10.4
42	0.00	0.00	0	0.00	3.24	0	0.00	0	7.1	9.7	0	11.9
43	0.00	0.00	2	0.00	3.76	0	2.00	10.00	8.3	10.3	5.32	12.7
44	0.00	0.00	0	0.00	4.32	0	0.00	0.00	7.5	12.5	0.00	14.7
45	0.00	0.00	2	0.00	5.52	0	0.00	10.00	6.3	13.1	4.76	15.7
46	8.00	0.00	2	2.00	5.84	0	1.00	10.00	5.9	14.3	4.38	17.5
47	12.00	0.00	4	3.00	6.68	2.1	0.00	20.00	4.7	15.3	12.50	18.4
48	16.00	0.00	10	4.00	6.92	3.2	1.00	30.00	3.1	16.4	15.88	18.5
49	32.00	0.00	12	10.00	7.28	4.09	0.00	40.00	2.9	17.3	19.76	20.4
50	20.00	0.00	10	5.00	8.88	5.56	1.00	50.00	1.8	18.7	22.29	21.2
51	56.00	0.00	16	14.00	9.24	6.32	0.00	60.00	1.7	19.2	31.22	22.4
52	40.00	0.00	48	9.00	9.88	7.49	0.00	80.00	1.2	15.3	37.50	22.1
1	44.00	0.00	26	11.00	9.64	8.25	0.00	70.00		18.3	35.50	19.3
2	36.00		40	9.00		10.38		90.00			50.98	
3			22			11.21		80.00			40.00	
4						12.45						

LG- Lam Guntur, ND - Nnadyal, DW - Dharwad, RC - Raichur, CN - Chamarajanagar, SVPR – Srivilliputtur

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Table 57.3. Ent 2. Seasonal dynamics of key pests of cotton (Trap catches) under Unprotected condition to develop suitable forecasting model in South Zone – Bt BG II during 2019 – 20

Standard weeks	Trap catches / week																		
	H. armigera					PBW						SBW			*S. litura*				
	LG	ND	DW	RC	SVPR	LG	ND	DW	RC	CN	SVPR	ND	DW	SVPR	LG	ND	DW	RC	SVPR
29			0					0					0				0		
30			0					0					0				0		
31			0					0		0.00			0				0		
32			0					0		0.00			0				0		
33			0					0		0.00			0				0		
34	1.85		0			5.5		0.9		0.00			0		10.58		14.9		
35	2.10		5			4.5		0.29		0.00			0		28.67		12.17		
36	4.80		0			2		2.24		6.60			0		36.90		8.29		
37	6.10		1.3			1.75		3.65		9.10			0		54.20		13.35		
38	9.20		1.23	5.68	0.00	2.25		4.32	4.55	10.40	0.00		0	1.00	57.80		8.16		2.00
39	16.00	0.43	1.78	6.12	0.00	2.25	0.00	5.89	4.74	12.80	0.00	0.00	0	0.00	68.20	30.57	6.72	0.35	11.00
40	11.12	0.57	2.23	6.22	0.00	1.75	0.00	6.87	8.76	14.18	0.00	0.71	0.2	3.00	29.00	27.14	4.17	0.45	8.00
41	9.75	0.43	3.54	5.35	0.00	2	0.55	8.5	11.8	20.30	0.00	0.00	0.4	0.00	54.65	22.24	2.42	2.12	18.00
42	8.10	0.57	2.14	5.38	0.00	2	1.26	8.8	14.8	23.14	0.00	0.00	0.7	0.00	60.50	19.56	1.01	0.00	7.00
43	15.30	1.00	3.52	4.38	0.00	7	0.96	9.8	16.7	25.25	0.00	0.00	0.9	0.00	42.30	20.43	2.03	0.44	3.00
44	11.00	0.71	4.18	4.33	0.00	11.5	0.60	10.39	21.2	20.25	0.00	0.00	1.2	1.00	32.60	27.34	1.63	0.50	15.00
45	5.67	0.29	5.28	4.14	0.00	17.5	14.56	11.96	38.8	10.60	0.00	0.00	3.7	0.00	22.00	22.12	0.95	1.80	8.00
46	12.00	0.00	7.22	9.78	0.00	17.5	12.10	13.33	61.9	8.12	0.00	0.00	2.5	0.00	25.00	16.54	1.98	1.00	16.00
47	9.00	0.00	8.47	11.03	0.00	15.25	14.30	14.23	67.1	4.40	1.00	0.00	3.1	0.00	45.00	9.12	4.47		3.00
48	13.60	0.14	0	4.34	0.00	19	15.10	15.09	58.1	0.00	2.00	0.14	3.6	0.00	32.00	5.23	1.88		0.00
49	4.27	0.00	0	2.12	0.00	20.5	12.2	12.24	41.9	0.00	1.00	0.00	4.3	0.00	17.00	0.00	0		0.00
50	4.60	0.00	0		0.00	16	10.3	11.36	20.3	0.00	0.00	0.00	0	0.00	12.00	3.14	0		0.00
51	2.10	0.00	0		0.00	40	11.43	10.71	21.2	0.00	0.00	0.00	0	0.00	9.00	12.29	0		0.00
52	1.20	0.00	0		0.00	66.5	11.20	9.42	18.6	0.00	0.00	0.00	0	0.00	10.00	2.71	0		0.00
1	0.90	0.00	0		0.00	89.75	10.65	15.45			0.00	0.00	0	0.00	8.00	0.57	0		0.00
2	1.30	0.00				112	9.25					0.00			12.00	0.57			
3	0.60					121.25									11.00				

LG- Lam Guntur, ND - Nnadyal, DW - Dharwad, RC - Raichur, CN - Chamarajanagar, SVPR – Srivilliputtur

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Table 57.4. Ent 2. Seasonal dynamics of key pests of cotton (Abiotic factors - Temperature) under Unprotected condition to develop suitable forecasting model in South Zone during 2019 – 20

Standard weeks	Abiotic factors – Temperature (^{0}C)													
	LG		ND		DW		RC		CN		CBE		SVPR	
	min	max	min	max	min	max	min	max	min	max	min	max	min	max
23					22.1	34.7								
24					21.7	30.9								
25					21.3	30.8			33.10	23.80				
26					20.4	26.8			32.60	24.60				
27					20.3	27.8			31.20	27.90				
28					20.1	26.6			33.60	30.30				
29					20.4	29.4			28.70	20.70				
30					20.4	26			29.20	20.17				
31					19.9	24.8			29.58	20.14				
32					20.1	24.4	31.8	24.0	26.48	20.05				
33					20.8	26.9	34.0	24.3	28.74	20.28				
34	25.24	35.37			20.5	28.2	33.9	23.7	28.55	20.18				
35	26.56	35.64			20.7	27	33.1	23.0	28.90	20.01				
36	25.64	33.76			20.9	25.1	31.1	23.3	29.00	20.64				
37	26.31	37.01			20.9	27.7	33.9	23.6	30.65	20.12				
38	24.93	32.34			20.8	27.9	31.4	23.0	30.80	19.85			25.57	33.96
39	24.89	35.56	32.50	25.00	20.9	28.9	31.0	22.6	30.42	19.40	31.3	23.1	24.54	33.36
40	25.09	33.74	33.80	24.40	20.3	29.5	31.3	22.9	30.84	19.60	32.2	23.3	27.83	33.30
41	25.21	32.86	33.40	24.10	20.3	29.5	31.1	22.7	30.64	20.04	32.7	22.7	28.41	33.33
42	24.66	31.5	32.10	24.50	21	29.4	30.4	23.4	28.91	19.71	30.1	22.6	26.19	31.70
43	24.43	31.07	31.10	23.70	20	26.6	30.0	22.6	28.72	18.78	29.2	22.4	22.84	32.09
44	24.84	31.46	31.60	23.50	19.5	29.1	30.5	22.5	30.70	17.97	28.7	21.8	21.27	30.04
45	22.4	33.09	33.00	23.00	19.1	30.2	32.2	21.3	29.01	18.25	31.2	21.7	26.01	32.53
46	23.29	32.24	31.60	22.90	18.1	29.5	31.3	21.1	30.30	28.28	29.7	22.7	21.84	18.04
47	21.99	31.67	31.60	21.20	16.7	29.6	31.2	19.6	29.20	17.38	29.1	22.5	22.09	27.41
48	20.67	30.96	30.80	21.40	18.1	29.3	29.4	20.3	27.70	17.18	27.9	22.5	21.86	20.50
49	19.9	30.41	29.10	20.40			28.8	18.7	30.01	14.56	27.6	21.4	23.36	31.23
50	18.13	31.14	30.90	18.90			30.4	18.0	29.37	15.67	28.3	20.5	22.03	32.21
51	17.99	31.26	30.90	19.50			30.3	18.4	30.32	16.87	28	21.5	23.36	31.97
52	18.07	30.7	29.80	19.20			30.0	20.2	31.40	16.15	27.6	21	23.21	31.21
1	21.04	29.71									30.4	22.6	19.79	30.44
2	18.44	30.37									29.8	19.4		
3	18	30.07									30.5	20.3		
4											31.4	19.5		

LG- Lam Guntur, ND - Nnadyal, DW - Dharwad, RC - Raichur, CN - Chamarajanagar, SVPR – Srivilliputtur

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Table 57.5. Ent 2. Seasonal dynamics of key pests of cotton (Abiotic factors – Relative Humidity) under Unprotected condition to develop suitable forecasting model in South Zone during 2019 – 20

Standard weeks	Abiotic factors - RH %											
	LG		ND		DW	RC		CN		CBE		SVPR
	morning	evening	morning	evening	morning	morning	evening	morning	evening	morning	evening	morning
23					67.1							
24					75.9							
25					78.6			81.50	47.50			
26					88.5			75.11	44.02			
27					87.8			62.48	50.07			
28					88.9			50.08	42.04			
29					79.3			95.55	60.06			
30					81.2			94.64	57.57			
31					91.7			94.88	55.28			
32					91.8	82.3	52.1	98.13	73.32			
33					87.5	81.3	42.7	99.27	64.21			
34	85.57	70.14			82.8	82.0	44.3	97.22	62.21			
35	86.57	66			87.4	86.4	51.0	97.78	61.62			
36	88.29	65.43			91.8	86.0	56.4	95.82	63.77			
37	86.57	65.29			85.3	83.3	44.4	99.50	55.70			
38	90.57	84.29			87.5	92.4	66.1	99.41	58.22			82.36
39	82.29	52.57	87.60	67.90	79.1	93.9	68.0	99.65	61.64	87	59	85.20
40	90.29	70.43	82.90	72.40	88.2	91.3	63.6	99.64	59.70	86	56	78.89
41	92	72.29	86.90	66.70	84.9	93.3	62.7	99.60	63.52	86	49	74.87
42	94.14	82.86	87.90	74.00	76.3	91.1	64.0	99.61	70.37	88	71	58.57
43	91.43	83.71	91.60	70.60	85.9	91.1	65.1	99.62	66.70	85	62	36.57
44	91.14	74.14	84.70	68.00	79.8	87.6	60.4	99.64	53.48	85	64	67.89
45	92.86	72	87.60	61.40	76.9	88.9	51.1	99.62	62.91	87	57	76.10
46	93.43	74.57	86.90	66.60	67.6	86.6	49.1	99.65	60.58	87	56	56.83
47	93.29	80.86	85.70	64.30	66.4	85.0	49.0	99.65	60.37	85	62	63.23
48	90.29	84.71	87.40	63.40	71.4	81.6	49.1	99.65	67.08	88	69	66.25
49	88.71	88.57	89.70	65.40		85.4	50.1	99.64	52.98	84	62	81.44
50	92.43	79.29	91.90	59.00		82.7	42.4	99.62	55.90	85	57	77.50
51	92.14	80.14	90.40	62.00		83.1	45.3	99.62	55.81	86	61	82.27
52	90.86	79.57	89.40	57.80		81.3	48.5	99.70	47.60	85	59	84.53
1	89	84.71								87	52	66.16
2	90.29	83.86								86	48	
3	87.86	78								86	46	
4										85	41	

LG- Lam Guntur, ND - Nnadyal, DW - Dharwad, RC - Raichur, CN - Chamarajanagar, SVPR – Srivilliputtur

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Table 57.6. Ent 2. Seasonal dynamics of key pests of cotton (Abiotic factors – Rainfall) under Unprotected condition to develop suitable forecasting model in South Zone during

Standard weeks	Abiotic factors						
	Rainfall in mm						
	LG	ND	DW	RC	CN	CBE	SVPR
23			14.80				
24			14.20				
25			9.00		0.00		
26			65.00		5.20		
27			66.20		0.00		
28			81.40		2.10		
29			14.80		6.10		
30			9.40		12.70		
31			115.20		2.20		
32			404.00	27.4	88.60		
33			14.60	0.0	33.20		
34	57.1		17.80	2.4	28.40		
35	20.7		54.20	21.0	0.00		
36	6		46.00	32.0	5.30		
37	73.6		3.20	9.2	8.80		
38	81.8		25.00	5.0	8.20		1.00
39	3	5.60	34.40	113.6	150.10	10.5	23.43
40	5.6	0.00	29.80	153.4	66.70	10	2.26
41	61	18.20	168.60	57.6	100.80	22.7	0.00
42	74.4	20.60	44.80	21.6	51.00	187	7.64
43	40.6	21.80	158.20	11.2	32.40	7.8	2.00
44	41	25.60	4.00	40.0	33.40	42.6	19.09
45	0	6.80	21.00	0.0	19.30	72.2	2.57
46	0	0.00	0.00	0.0	31.80	37.8	7.00
47	0	0.00	0.00	0.0	11.30	5.9	1.50
48	0	0.00	0.00	0.0	4.30	43.6	4.00
49	1.6	6.00		0.0	0.00	4.4	4.00
50	0	0.00		0.0	0.00	10.4	1.61
51	0	0.00		0.0	0.00	1.2	0.00
52	0	0.00		0.0	0.00	5	0.00
1	7.6					-	0.00
2	0					-	
3	0					0.5	
4						-	

2019 – 20

LG- Lam Guntur, ND - Nnadyal, DW - Dharwad, RC - Raichur, CN - Chamarajanagar, SVPR – Srivilliputtur

Table 58: Ent 3. Survey for key and emerging pests in cotton in Farmers Field for weekly advisory at North Zone during 2019 – 20

Zone	Centres	Duration of survey	No. of villages surveyed	Total No. of locations surveyed	No. of locations crossed ETL												
					Whitefly	Leaf hopper	Thrips	Mealybug	Aphids	Mirid Bug	*H. armigera*	*E. vittella*	*P. gossypiella*	*S. litura*	Flower bud maggot	Stem weevil	Red cotton Bug
North Zone	Bathinda	May - Nov	203	973	0	22	33	0	0	0	0	0	1	0	0	0	0
	Faridkot	May - Oct	176	501	19	33	8	0	0	0	0	0	0	0	0	0	0
	Hisar	Jul - Sep	100	203	33	9	19	0	0	0	0	0	0	0	0	0	0
	Sirsa	Jun - Oct	96	185	15	4	6	0	0	0	0	0	0	0	0	0	0
	Sriganganagar	May - Nov	70	263	6	4	61	0	0	0	0	0	0	0	0	0	0
Central Zone	Banswara	Jul-Oct	45	141	0	61	0	0	0	0	0	0	0	0	0	0	0
	Junagadh	Jul-Dec	185	185	2	39	78	0	44	0	0	0	74	0	0	0	0
	Surat	Jul-Dec	134	585	0	55	31	4	55	0	0	0	11	0	0	0	0
	Akola	May - Jan'2020	91	249	28	69	27	0	14	0	0	0	61	0	0	0	12
	Nanded	Jun - Dec	140	700	50	110	38	58	37	0	10	10	154	0	0	0	0
	Rahuri	Jul-Nov	50	146	12	97	40	0	22	0	0	0	57	0	0	0	0
	Bhawanipatna	Jul-Dec	44	214	0	87	32	0	7	0	5	10	0	13	0	0	0
South Zone	Lam, Guntur	Jul-Dec	30	115	11	19	6	0	3	0	0	0	25	2	0	0	0
	Nandyal	Sep-Dec	23	58	21	49	18	2	0	0	0	0	17	0	0	0	0
	Dharwad	Jul- Nov	106	389	3	48	52	2	68	9	0	0	17	0	0	0	0
	Raichur	Aug - Dec	44	680	0	105	174	0	0	0	0	0	244	0	0	0	0
	Chamarajanagar	Jun-Nov	90	476	0	40	0	0	53	0	0	0	49	0	0	0	0
	Coimbatore	Sep - Jan	22	59	0	1	0	0	0	0	0	0	1	0	0	3	0
	Srivilliputtur	Jul-Feb	31	98	0	32	14	0	42	0	0	0	0	17	0	17	0
	Nandyal	Sep-Dec	23	58	21	49	18	2	0	0	0	0	17	0	0	0	0

Table 59: Ent 4a. Determination of nymphal based ETL estimation and yield losses for cotton whitefly *Bemisiatabaci* at Faridkotin North Zone during 2019-20

Treatments	Mean Whitefly Nymph population/ node		Mean Whitefly population-Nymph			Total	Mean Whitefly population-adult			Total	Yield (g/plant)	Interventions
	5th	7th	U	M	L		U	M	L			
30 Red eye nymph	1.5 (0.0-7.5)	2.8 (0.0-14.1)	0.2 (0.0-1.0)	1.1 (0.0-4.0)	2.0 (0.0-5.3)	3.3	0.8 (0.0-2.3)	1.0 (0.0-3.0)	1.6 (0.0-3.0)	3.4	125.9	2 sprays of Pyriproxyfen
60 Red eye nymph	1.7 (0.0-6.1)	3.3 (0.0-10.4)	0.2 (0.0-1.0)	1.7 (0.0-5.7)	2.4 (0.0-7.3)	4.3	0.7 (0.0-2.0)	1.2 (0.0-3.7)	1.3 (0.0-2.3)	3.2	104.7	2 sprays of Pyriproxyfen
120 Red eye nymph	1.9 (0.0-8.8)	3.2 (0.0-10.4)	0.3 (0.0-2.3)	1.1 (0.0-3.3)	1.8 (0.0-5.0)	3.2	0.7 (0.0-2.3)	1.2 (0.0-3.0)	1.7 (0.0-3.7)	3.6	107.4	
180 Red eye nymph	1.7 (0.0-8.5)	3.7 (0.0-10.8)	0.1 (0.0-0.7)	1.3 (0.0-4.3)	1.6 (0.0-5.3)	3.0	0.9 (0.0-2.0)	1.2 (0.0-4.3)	1.6 (0.0-3.7)	3.7	119.8	
Treated Control	1.6 (0.0-6.5)	3.2 (0.0-15.6)	0.1 (0.0-1.0)	1.4 (0.0-4.7)	2.1 (0.0-4.7)	3.0	0.8 (0.0- 2.1)	1.1 (0.0-3.3)	1.6 (0.0-4.1)	3.3	112.6	2 sprays of Pyriproxyfen
Untreated control	2.7 (0.0-9.7)	4.7 (0.0-16.6)	0.5 (0.0-3.1)	2.1 (0.0-3.4)	1.9 (0.0-5.8)	4.5	0.9 (0.0-2.0)	1.0 (0.0-4.4)	1.5 (0.0-3.9)	3.4	102.4	

Mean of 13 observations
ETL level not reached in any of the treatments during the season
U-upper; M-Middle; L- Lower

Contd…

Table 59.1 : Ent 4a. Determination of nymphal based ETL estimation and yield losses for cotton whitefly *Bemisiatabaci* in North Zone during 2019-20 at Sirsa

Name of the centre: CICR SIRSA DOS: 10.06.2019									
No. of Treatments: 10	No. of Replications: 3	Name of the variety: ABCH 2099-BG-II Hybrid							
Treatment	SMW(32-43)								
	cticides applied	No. of Sprays	Cost of sprays/ha	Average Nymphal Count on 5th Main stem Leaf**	Average Nymph/leaf***	Whitefly adults/3 leaves****	Ant/ plant	Average Yield (Q/ha)	Reduction (%)
T1	Pyriproxyfen 10 % EC	2	Rs 2875	4.90(3.37-7.67)	1.2 (0.61-2.51)	6.46 (4.00-11.88)	0.22 (0.00-0.67)	14.96	-24.82
T2	Pyriproxyfen 10 % EC	2	Rs 2875	5.40(2.50-8.80)	1.94 (0.69-2.81)	7.79 (4.11-11.22)	0.32 (0.00-0.89)	14.77	-23.21
T3	Pyriproxyfen 10 % EC	1	Rs 1150	5.48(2.83-10.63)	3.31 (2.13-5.02)	7.77 (4.67-12.00)	0.21 (0.00-0.56)	11.13	7.14
T4	Pyriproxyfen 10 % EC	1	Rs 1150	6.26(4.67-9.66)	4.66 (3.34-6.35)	8.31 (4.89-14.56)	0.33 (0.00-1.00)	10.91	8.93
T5	Pyriproxyfen 10 % EC	1	Rs 1150	7.64(4.34-12.72)	3.17 (3.11-12.67)	7.43 (3.67-12.56)	0.52 (0.00-0.89)	9.91	17.27
T6*	-----	0	--	9.92(5.12-14.41)	2.67 (3.56-12.33)	9.28 (5.33-19.89)	0.52 (0.00-1.00)	8.56	20.23
T7*	-----	0	---	8.25(6.11-14.10)	2.75 (4.00-15.00)	10.38 (6.33-17.67)	0.43 (0.00-1.22)	9.27	22.63
T8*	-----	0	----	9.45(3.74-13.56)	2.82 (2.22-13.33)	11.36 (4.00-18.56)	0.29 (0.00-0.96)	9.13	23.83
T9	Diafenthiuron& Pyriproxyfen 10 % EC	2	Rs 2738	5.04(4.10-9.14)	1.26 (2.11-9.33)	5.34 (3.67-13.11)	0.19 (0.00-0.78)	11.98	-----
T10		0		10.97(6.24-15.14)	2.74 (5.00-14.00)	10.42 (4.67-18.33)	0.31 (0.00-1.22)	9.06	24.38

Treatment details

T1- 30 or more live red eyed nymph/30leaves; T2- 60 or more live red eyed nymph/30leaves; T3 - 120 or more live red eyed nymph/30leaves;
T4- 180 or more live red eyed nymph /30 leaves; T5-Honey dew symptoms on 20% of the plant; T6*-Honey dew symptoms on 30% of the plan;
T7*-Honey dew symptoms on 40% of the plan; T8*-Honey dew symptoms on 50% of the plant; T9-6-8 adult/leaf (Treated control);
T10-Untreated control

* Required Honey Dew Level Does Not Appear

** Data recorded from 3 plants /plot

*** Nymph/ leaf based on data recorded from 30 tagged plant /plot

****Data recorded from 3 plants /plot

Table 60 Ent. 4b Estimation of yield losses and management of cotton pink bollworm in Central Zone during 2019-2020 (Rosette flowers, Green boll damage on boll basis)

Treatments	Insecticide applications at DAS				Rosette flowers (%)- Mean at 45 and 60 DAS							Green boll damage on boll basis (%)- Mean at 90, 120, 150 DAS						
	Neem pesticide (1500 ppm) @ 5 ml/lt	Thiodicarb @ 2g/lt	Chlorpyriphos 20EC@ 2.5ml/lt	Lamda-Cyhalothrin @ 1.0ml/lt	JU	SU		AK	NA	RA	BW	JU	SU		AK	NA	RA	BW (Green and open boll damage)
					OV	OV	TV	**OV**	**OV**	OV	OV	OV	OV	TV	OV	OV	OV	OV
T_1	45	60	-	-	7.21	8.67	16.98	0.00	3.87	9.75	0.00	9.27	12.78	20.65	14.44	12.88	22.47	1.67
T_2	45	60	90	-	2.84	6.33	14.48	0.00	4.17	7.84	0.00	4.00	8.33	16.46	13.33	11.81	15.88	1.00
T_3	45	-	90	120	3.57	11.00	19.16	0.00	4.82	4.27	0.00	4.68	27.22	31.29	7.78	12.94	9.58	0.33
T_4	-	60	90	-	5.80	5.33	13.29	1.28	4.39	6.24	0.00	7.87	7.22	15.37	7.78	10.79	12.55	0.67
T_5	-	60	-	120	4.16	8.00	16.34	3.03	4.14	8.37	0.00	5.57	10.00	18.17	11.11	11.57	18.57	0.33
T_6	-	60	90	120	4.78	3.67	10.84	3.28	4.44	2.76	0.00	6.80	5.00	10.45	3.33	9.63	7.71	0.00
T_7	-	-	90	120	5.96	11.33	19.46	3.34	5.23	6.44	0.00	8.32	28.33	31.85	12.22	13.34	14.83	0.33
T_8	45	60	90	120	5.02	5.00	12.85	0.00	3.67	1.87	0.00	7.47	5.56	12.71	1.11	8.35	5.77	0.00
T_9	-	-	-	-	8.48	12.33	20.37	4.88	5.47	11.49		11.27	37.78	37.79	21.11	15.51	36.03	2.33
F test																		
S. Em. ±						-	0.90						-	1.58				
CD at 5%						-	2.56						-	4.45				
CV %						-	14.48						-	23.37				

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Trial was vitiated at Banswara, Khandwa; OV – Original Value; TV – Transformed Value

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Table 60.1. Ent. 4b Estimation of yield losses and management of cotton pink bollworm in Central Zone during 2019-2020 (Green boll damage on locule basis and Open boll damage)

Treatments	Insecticide applications at DAS				Green boll damage on locule basis (%)					Open boll damage / 20 bolls @ Harvest											
	Neem pesticide (1500 ppm) @ 5 ml/lt	Thiodicarb @ 2g/lt	Chlorpyriphos 20EC @ 2.5ml/lt	Lamda-Cyhalothrin @ 1.0ml/lt	SU		AK	NA	RA	JU		SU		AK		NA		RA		BW	
					OV	TV	OV	OV	OV	OV	TV	OV	TV	OV	TV	OV	TV	OV	TV	OV	TV
T_1	45	60	-	-	5.83	13.76	4.48	7.13	17.09	14.84	22.66	16.67	24.04	73.33	59.33	6.5	14.76	33.27	35.23	2.00	1.58
T_2	45	60	90	-	3.47	10.51	3.87	7.09	13.20	6.93	15.27	13.33	21.14	66.67	54.89	6.03	14.18	28.97	32.56	1.33	1.29
T_3	45	-	90	120	13.75	21.62	2.20	8.57	7.80	8.38	16.83	31.67	34.13	33.33	35.17	7.13	15.47	22.47	28.3	0.67	1.00
T_4	-	60	90	-	3.06	9.91	1.95	7.19	9.84	12.04	20.30	10.00	18.04	43.33	41.12	7.42	15.79	31.46	34.12	1.33	1.29
T_5	-	60	-	120	4.58	12.08	3.03	7.78	14.29	9.22	17.68	15.00	22.78	48.33	44.04	7.27	15.63	29.57	32.94	0.67	1.00
T_6	-	60	90	120	1.53	5.70	0.86	5.23	5.62	10.20	18.63	6.67	12.29	25.00	29.93	3.70	11.08	20.33	26.8	0.67	1.00
T_7	-	-	90	120	14.31	21.92	3.03	8.71	11.48	13.47	21.53	35.00	36.14	46.67	43.06	6.68	14.97	26.49	30.98	1.33	1.29
T_8	45	60	90	120	1.94	7.42	0.28	4.8	4.05	11.62	19.93	8.33	16.59	18.33	25.00	4.63	12.41	19.48	26.19	0.00	0.71
T_9	-	-	-	-	19.03	25.66	7.24	11.4	29.92	16.87	24.25	43.33	41.12	85	68.1	10.8	19.14	56.24	48.58	4.00	2.12
F test															**Sig.**		Sig				
S. Em. ±					-	0.99				1.01		-	2.41		4.12		0.46				**0.35**
CD at 5%					-	2.81				3.03		-	7.23		13.44		1.38				**0.71**
CV %					-	21.73				8.89		-	16.62		16.05		5.38				**33.90**

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Trial was vitiated at Banswara, Khandwa

OV – Original Value; TV – Transformed Value

Contd…

Table 60.2. Ent. 4b Estimation of yield losses and management of cotton pink bollworm in Central Zone during 2019-2020 (Locule damage)

Treatments	Insecticide applications at DAS				Locule damage / 20 bolls @ Harvest									
	Neem pesticide (1500 ppm) @ 5 ml/lt	Thiodicarb @ 2g/lt	Chlorpyriphos 20EC@ 2.5ml/lt	Lamda-Cyhalothrin @ 1.0ml/lt	JU		SU		AK		NA		RA	
					OV	TV	OV	TV	OV	TV	OV	TV	OV	TV
T_1	45	60	-	-	12.55	20.75	8.75	17.17	31.51	34.08	4.73	12.56	27.34	31.53
T_2	45	60	90	-	5.81	13.94	5.42	13.07	29.2	32.63	6.7	14.98	19.89	26.49
T_3	45	-	90	120	7.01	15.35	16.25	23.69	10.37	18.69	4.55	12.31	12.77	20.94
T_4	-	60	90	-	10.30	18.72	4.58	12.16	12.13	20.32	7.05	15.39	14.74	22.58
T_5	-	60	-	120	8.08	16.52	7.50	15.85	17.85	24.94	4.75	12.58	22.27	28.16
T_6	-	60	90	120	8.76	17.22	1.67	5.86	8.69	17.03	5.73	13.84	10.98	19.35
T_7	-	-	90	120	11.95	20.22	17.92	24.99	14.09	21.98	8.63	17.07	17.24	24.53
T_8	45	60	90	120	9.60	18.05	2.08	8.00	6.69	14.9	5.7	13.8	9.89	18.33
T_9	-	-	-	-	15.26	22.99	22.92	28.58	35.53	36.54	12.63	20.77	42.84	40.88
F test										**Sig.**		Sig		
S. Em. ±					0.87		-	1.33		1.774		0.4		
CD at 5%					2.61		-	4.00		5.785		1.21		
CV %					8.27		-	13.92		12.51		4.72		

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Trial was vitiated at Banswara, Khandwa

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Table 60.3. Ent. 4b Estimation of yield losses and management of cotton pink bollworm in Central Zone during 2019-2020 (Yield)

Treatments	Insecticide applications at DAS				Yield (Kg/ha) @ 180 DAS						Yield loss (%) by PBW						Yield loss (Kg/ha) of seed cotton	
	Neem pesticide (1500 ppm) @ 5 ml/lt	Thiodicarb @ 2g/lt	Chlorpyriphos 20EC@ 2.5ml/lt	Lamda-Cyhalothrin @ 1.0ml/lt	JU	SU	AK	NA	RA	BW	JU	SU	AK	NA	RA	BW	SU	RA
T_1	45	60	-	-	2293.00	2592.67	6.78	20.08	9.89	23.02	4.00	1.23		30.51	48.49	1.17	26.21	9.89
T_2	45	60	90	-	2657.00	2675.00	7.15	23.16	10.90	23.06	1.00	0.77		19.86	43.23	0.84	17.10	10.90
T_3	45	-	90	120	2623.00	2109.00	11.94	23.85	15.40	23.10	1.00	4.32		17.47	19.79	0.33	81.15	15.40
T_4	-	60	90	-	2414.00	2798.33	11.16	23.6	14.30	23.28	3.00	0.60		18.33	25.52	0.83	13.54	14.30
T_5	-	60	-	120	2579.00	2674.67	8.16	22.03	10.56	23.06	2.00	0.99	57.48	23.77	45.00	0.67	21.15	10.56
T_6	-	60	90	120	2524.00	3004.00	13.19	28.49	15.44	23.15	2.50	0.37		1.41	19.58	0.33	9.36	15.44
T_7	-	-	90	120	2348.00	1954.67	9.32	23.37	11.50	23.10	3.50	4.67		19.13	40.10	0.67	88.29	11.50
T_8	45	60	90	120	2458.00	2963.00	16.19	28.9	18.10	24.03	3.00	0.51		0	5.73	0.00	12.15	18.10
T_9	-	-	-	-	1929.00	1666.67	5.29	10.22	6.78	22.18	9.00	16.02		64.63	64.69	2.01	267.30	6.78
F test							**Sig.**	Sig										
S. Em. ±					120.69	191.68	0.609	0.25		**3.12**		-				**0.14**	-	
CD at 5%					361.84	574.67	1.827	0.76		**5.25**		-				**0.30**	-	
CV %					8.62	13.32	10.65	7.59		**13.50**		-				**16.17**	-	

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Trial was vitiated at Banswara, Khandwa

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Table 60.4. Ent. 4b Estimation of yield losses and management of cotton pink bollworm in Central Zone during 2019-2020 (Economics of different treatments evaluated against cotton pink bollworm at Surat)

Treat No	Insecticide applications at DAS				No. of spray	Cost of insecticides (Rs/ha)	Total cost of treatments including labour charges (Rs/ha)	Yield (kg/ha)	Net realization (Rs/ha)	Net profit excluding cost of cultiavation (Rs/ha)	Profit over control (Rs/ha)
	Achook 1500 ppm	Thiodicarb 75 WP	Chlorpyriphos 20 EC	Lamda - cyhalothrin 5 EC							
T1	45	60	-	-	2	3785	4497	2592.67	112170	77170	54286
T2	45	60	90	-	3	4200	5268	2675.00	115102	80102	57218
T3	45	-	90	120	3	1650	2718	2109.00	92189	57189	34305
T4	-	60	90	-	2	3275	3987	2798.33	121939	86939	64055
T5	-	60	-	120	2	3170	3882	2674.67	116488	81488	58604
T6	-	60	90	120	3	3585	4653	3004.00	130532	95532	72648
T7	-	-	90	120	2	725	1437	1954.67	86526	51526	28642
T8	45	60	90	120	4	4510	5934	2963.00	127399	92399	69515
T9	-	-	-	-	-	-	-	1666.67	75000	40000	-

Table 61. Ent. 4b : Estimation of yield losses and management of cotton pink bollworm in South Zone during 2019-2020 (Rosette flowers and Green boll damage)

Treatments	Insecticide applications at DAS				Rosette flowers (%)						Mean Green boll damage							
											Boll basis (%)							Locule basis (%)
	Neem pesticide (1500 ppm) @5 ml/lt	Thiodicarb @ 2g/lt	Chlorpyriphos 20EC@ 2.5ml/lt	Lamda-Cyhalothrin @ 1.0ml/lt	ND	DW	RC	CN	CBE	SVPR	LG	ND	DW	RC	CN	CBE	SVPR	LG
T_1	45	60	-	-	0.00	0.65	7.88	2.01	1.57	5.17	34.43	24.89	6.88	32.93	8.63	3.48	10.56	16.95
T_2	45	60	90	-	0.00	0.44	2.25	0.67	1.54	2.50	27.77	20.00	2.56	17.60	4.04	2.87	3.33	14.40
T_3	45	-	90	120	0.00	0.95	4.22	1.25	1.99	2.83	23.90	19.56	6.44	29.38	4.77	3.85	6.67	13.35
T_4	-	60	90	-	0.00	1.13	7.05	1.59	1.73	9.00	29.01	23.11	4.96	23.12	5.31	3.57	10.00	15.20
T_5	-	60	-	120	0.00	1.15	5.65	1.87	2.28	6.67	28.33	15.56	7.64	35.48	6.40	4.03	10.56	15.00
T_6	-	60	90	120	0.00	1.19	6.24	0.55	1.61	3.67	17.77	17.33	4.27	28.16	3.31	3.92	6.11	9.60
T_7	-	-	90	120	0.00	1.72	7.21	1.95	2.33	7.67	23.34	18.67	7.44	38.08	7.49	4.36	8.89	12.22
T_8	45	60	90	120	0.00	0.38	1.25	0.37	1.49	2.00	14.45	21.33	2.61	5.83	2.16	2.79	1.67	7.54
T_9	-	-	-	-	0.00	1.95	8.56	5.15	2.64	13.67	41.67	43.56	8.88	60.60	18.47	5.94	13.89	22.14

LG – Lam, Guntur; ND – Nandyal; DW – Dharwad; RC – Raichur; CN – Chamarajanagara; CBE – Coimbatore; SVPR - Srivilliputtur

Nandyal, Raichur, Chamarajanagar, SVPR - Green boll damage is given combinedly on boll and locule basis (Mean of 90, 120 and 150 DAS)

Coimbatore & SVPR - Rosette flowers mean of 45 and 60 DAS

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Table 61.1. Ent. 4b : Estimation of yield losses and management of cotton pink bollworm in South Zone during 2019-2020 (Open boll and locule damage)

Treatments	Insecticide applications at DAS				Open boll damage / 20 bolls @ Harvest										Locule damage / 20 bolls @ Harvest			
	Neem pesticide (1500 ppm) @ 5 ml/lt	Thiodicarb @ 2g/lt	Chlorpyriphos 20EC@ 2.5ml/lt	Lamda-Cyhalothrin @ 1.0ml/lt	LG		ND		DW		RC	CN	CBE	SVPR	LG		ND	
					OV	TV	OV	TV	OV	TV	OV	OV	OV	OV	OV	TV	OV	TV
T_1	45	60	-	-	30.06	33.27	37.31	37.55	25.62	30.40	25.64	19.4	24.66	5.50	18.46	25.46	38.56	38.34
T_2	45	60	90	-	28.55	32.31	34.53	35.91	9.52	17.90	24.32	9.35	17.87	1.44	16.88	24.27	40.18	39.33
T_3	45	-	90	120	23.32	28.89	27.06	31.23	18.13	25.00	31.65	10.12	27.46	3.29	14.62	22.49	37.87	37.89
T_4	-	60	90	-	27.58	31.7	30.14	33.18	17.71	24.60	36.21	11.27	24.48	3.96	16.98	24.35	32.22	34.55
T_5	-	60	-	120	24.06	29.39	25.34	30.10	15.79	23.1	35.08	14.46	29.54	5.69	15.24	22.99	35.56	36.54
T_6	-	60	90	120	20.33	26.81	22.51	28.16	7.43	15.8	25.12	7.87	17.87	4.31	13.65	21.69	32.13	34.42
T_7	-	-	90	120	21.00	27.29	19.23	25.92	20.92	27.2	33.44	16.2	30.04	2.81	14.19	22.14	25.86	30.53
T_8	45	60	90	120	18.66	25.61	29.02	32.56	5.63	13.7	8.68	5.35	17.35	0.91	12.5	20.72	41.83	40.30
T_9	-	-	-	-	31.8	34.34	47.70	43.70	58.25	49.7	76.84	34.25	36.52	10.63	19.46	26.19	48.73	44.30
SEd							4.02			1.73							3.20	
CD at 5%						5.74	8.52			**5.2**						NS	6.79	
CV %						11.07	14.84			13.96						14.89	10.50	
F test							S										S	

LG – Lam, Guntur; ND – Nandyal; DW – Dharwad; RC – Raichur; CN – Chamarajanagara; CBE – Coimbatore; SVPR - Srivilliputtur

Raichur - Open boll damage is combined for bolls and locules

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Table.61.2. Ent. 4b: Estimation of yield losses and management of cotton pink bollworm in South Zone during 2019-2020 (Yield and Yield loss)

Treatments	Insecticide applications at DAS				Cotton Seed Yield							Yield loss (%) by PBW				Yield loss of seed cotton				
	Neem pesticide (1500 ppm) @ 5 ml/lt	Thiodicarb @ 2g/lt	Chlorpyriphos 20EC @ 2.5ml/lt	Lamda-Cyhalothrin @ 1.0ml/lt	LG (Q/ha)	ND (Kg/ha)	DW (Q/ha)	RC (Q/ha)	CN (Q/ha)	CBE (Kg/ha)	SVPR (Q/ha)	DW OV	DW TV	CN	SVPR	LG (Kg/ha)	ND (Kg/ha)	DW (Q/ha)	RC (Q/ha)	CN (Q/ha)
T_1	45	60	-	-	16.91	1975.47	10.55	20.68	13.2	1700	14.00	36.31	37.00	28.4	20.40	5.27	345	5.7	11.68	3.75
T_2	45	60	90	-	17.13	2137.61	14.96	31.64	17.82	1708	16.50	19.60	26.30	12.06	7.14	4.03	311	3.6	6.55	2.15
T_3	45	-	90	120	17.33	1955.56	11.55	28.34	16.65	1640	15.20	14.83	22.60	14.71	9.83	2.91	256	2.0	8.23	2.45
T_4	-	60	90	-	17.19	2237.37	13.03	26.47	15.53	1689	14.65	15.42	23.10	18.16	25.47	3.7	286	2.4	10.67	2.82
T_5	-	60	-	120	17.23	2457.78	11.54	25.86	15.15	1670	13.25	18.49	25.50	20.46	19.43	3.47	265	2.6	8.64	3.1
T_6	-	60	90	120	17.64	2284.61	15.34	35.75	19.5	1716	13.90	9.26	17.70	8.92	25.00	1.18	245	1.6	4.36	1.74
T_7	-	-	90	120	17.51	2964.61	10.08	26.12	14.85	1586	14.50	18.81	25.60	23.57	22.22	1.9	212	2.3	8.92	3.5
T_8	45	60	90	120	17.85	2234.07	19.86	40.58	20.15	1720	17.52	6.22	14.40	5.56	6.67	0	237	1.3	2.04	1.12
T_9	-	-	-	-	16.73	1528.07	8.67	10.32	11.75	1346	9.40	48.20	43.90	34.47	29.41	6.27	775	8.0	28.11	4.05
SEd						305.45	0.93						1.23					**0.12**		
CD at 5%					NS	641.17	**2.79**						3.70					**0.36**		
CV %					6.06	16.86	14.18						12.72					**12.13**		
F test						S														

LG – Lam, Guntur; ND – Nandyal; DW – Dharwad; RC – Raichur; CN – Chamarajanagara; CBE – Coimbatore; SVPR - Srivilliputtur

Table 62 : Ent 5. Management of thrips through biorational approaches in North zone during 2019 – 2020 (Thrips population)

Treatment Details	Dosage ml/litre	No. of thrips/ 3 leaves																			
		BT				FA				HI				SR				SG			
		BS		7 DAS		BS		7 DAS		BS		7 DAS		BS		7 DAS		BS		7 DAS	
		OV	TV	OV	TV	OV	TV	OV	TV	OV	TV	OV	TV	OV	TV	OV	TV	OV	TV	OV	TV
T1	10	33.53	5.81	8.87	3.13	28.07	5.34	13.67	3.75	60.87	7.86	15.2	4.02	26.33	5.21	10.67	3.39	41.53	6.48	30.47	5.53
T2	10	38.67	6.22	5.93	2.58	31.18	5.62	17.67	4.26	66.8	8.21	14.27	3.9	28.00	5.37	12.33	3.63	37.33	6.14	24.87	5.03
T3	10	23	4.84	14.8	3.87	30.05	5.52	19.33	4.45	70.8	8.47	12.27	3.63	28.33	5.40	11.89	3.58	35.80	6.02	28.27	5.35
T4	5	29.27	5.43	8.2	3.02	34.3	5.81	20.33	4.56	69.2	8.38	14.6	3.95	25.22	5.11	13.78	3.83	36.20	6.04	17.07	4.19
T5	5	24.53	5	10.2	3.33	27.78	5.3	12.00	3.49	70.93	8.46	12.47	3.67	28.56	5.40	12.00	3.58	43.47	6.63	25.60	5.10
T6	5	32	5.56	11.6	3.53	23.82	4.92	11.09	3.40	62.6	7.95	10	3.31	30.89	5.63	14.44	3.93	40.67	6.41	21.40	4.68
T7	5	33.07	5.8	15.8	4.01	29.2	5.45	12.67	3.59	66.8	8.22	14.67	3.95	25.67	5.15	14.00	3.87	34.87	5.95	16.07	4.06
T8	0.8	35.2	5.93	7.73	2.92	26.65	5.21	4.83	2.31	72.33	8.56	16.2	4.15	31.44	5.68	4.11	2.25	38.20	6.22	6.60	2.66
T9	3.3	37.2	6.13	8	2.98	22.97	4.84	6.33	2.61	66.27	8.2	16.6	4.19	27.11	5.30	3.78	2.17	40.13	6.37	17.67	4.26
T10	1.6	37.93	6.19	7.8	2.95	23.25	4.87	6.00	2.55	71.13	8.48	16.67	4.2	24.22	5.02	8.11	3.01	37.80	6.18	14.93	3.92
T11		32.93	5.79	34.4	5.94	27.5	5.28	13.17	3.67	59.27	7.75	19.47	4.52	27.44	5.33	19.33	4.47	40.27	6.36	53.20	7.33
CV (%)			15.97		14.59		8.23		10.03		5.95		5.56		7.09		10.54	11.23	5.63	13.20	6.17
S.Em±			0.24		0.13										0.22		0.21	3.55	0.29	2.51	0.24
CD (p=0.05)			0.66		0.37		NS		0.66		NS		0.38		N/A		0.62	10.48	0.85	7.40	0.70
F test			3.8		49.36						0.94		6.77								
SE (d)											0.4		0.18		0.31		0.30				

BT - Bathinda; FA - Faridkot; HI - Hisar; SR - Sirsa; SG - Sriganganagar
BS - Before spray; DAS - Days after spray

Treatment details

T1- Sesame oil ; T2- Pongamia oil ; T3- Castor oil ; T4- Neem oil ; T5- Neem 300 ppm ;
T6- Neem1500ppm ; T7- Horticultural Mineral oil; T8- Spinosad 2.5EC; T9- Profenophos 50 EC; T10- Diafenthiuron 50EC;
T11- Untreated Control

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Table 62.1 : Ent 5. Management of thrips through biorational approaches in North zone during 2019 – 2020 (% Reduction over control and Natural enemies)

Treatment Details	Dosage ml/litre	% reduction of pest over control						Natural enemies (No./ plant)										
		BT		FA	HI	SR	SG	BT				FA		SR	SG			
								BS		7 DAS		BS	7 DAS		BS		7 DAS	
		OV	TV					OV	TV	OV	TV				OV	TV	OV	TV
T1	10	74.11	59.40	-3.80	21.93	44.82	42.49	0.80	1.31	1.20	1.43	8.04	6.50	1.00	1.67	1.47	1.33	1.35
T2	10	82.88	65.62	-34.18	26.72	36.20	53.14	1.00	1.40	1.80	1.66	9.14	6.00	0.89	2.33	1.68	2.17	1.63
T3	10	55.87	48.77	-46.84	37.00	38.50	46.82	0.80	1.31	0.40	1.17	8.14	6.50	1.00	2.17	1.63	2.00	1.58
T4	5	75.94	60.67	-54.43	25.01	28.72	67.86	1.00	1.38	0.80	1.31	8.67	7.33	0.89	1.76	1.50	1.53	1.42
T5	5	70.25	56.94	8.86	35.97	37.92	51.76	0.80	1.31	0.80	1.31	7.72	9.17	1.00	2.07	1.60	1.83	1.53
T6	5	66.22	54.46	15.77	48.64	25.27	59.76	1.20	1.46	0.80	1.31	8.51	7.67	1.11	1.53	1.42	1.47	1.40
T7	5	53.30	47.21	3.80	24.67	27.57	69.73	2.00	1.72	1.20	1.46	9.14	7.00	0.89	1.67	1.47	1.27	1.33
T8	0.8	77.45	61.72	63.29	16.80	78.73	87.59	1.80	1.66	1.20	1.45	9.14	6.33	0.67	2.00	1.58	1.76	1.50
T9	3.3	76.69	61.12	51.90	14.74	80.46	66.75	1.00	1.38	1.20	1.46	9.45	6.67	0.44	2.67	1.78	1.63	1.46
T10	1.6	77.39	61.59	54.43	14.40	58.04	71.86	0.60	1.25	1.20	1.46	8.04	4.83	0.56	1.87	1.54	1.43	1.39
T11								1.00	1.38	1.00	1.38	8.04	7.67	1.22	2.33	1.68	2.83	1.82
CV (%)			10.30						12.79		11.58				NS	NS	NS	NS
S.Em±			3.43						0.13		0.14				NS	NS	NS	NS
CD (p=0.05)			10.28						NS		NS				NS	NS	NS	NS
F test			4.62						1.27		0.87							

BT - Bathinda; FA - Faridkot; HI - Hisar; SR - Sirsa; SG - Sriganganagar
BS - Before spray; DAS - Days after spray

Treatment details

T1- Sesame oil ; T2- Pongamia oil ; T3- Castor oil ; T4- Neem oil ; T5- Neem 300 ppm ;
T6- Neem1500ppm ; T7- Horticultural Mineral oil; T8- Spinosad 2.5EC; T9- Profenophos 50 EC; T10- Diafenthiuron 50EC;
T11- Untreated Control

Contd…

Table 62.2 : Ent 5. Management of thrips through biorational approaches in North zone during 2019 – 20 (Phytotoxicity and Seed cotton Yield)

Treatment Details	Dosage ml/litre	Phytotoxicity 15 DAS		Seed cotton Yield (q/ha)					
		BT	HI	BT	FA	HI	SR		SG
							OV	TV	
T1	10	NIL	NIL	14.30	22.69	29.33	30.70	5.63	31.32
T2	10	NIL	NIL	21.30	23.05	31.43	31.07	5.65	32.57
T3	10	NIL	NIL	12.50	23.16	30.68	35.20	6.02	30.63
T4	5	NIL	NIL	11.30	23.16	29.33	31.95	5.74	33.68
T5	5	NIL	NIL	19.30	23.63	31.43	31.82	5.73	33.04
T6	5	NIL	NIL	18.70	23.16	31.13	33.95	5.91	33.19
T7	5	NIL	NIL	16.10	22.34	31.28	32.07	5.75	33.82
T8	0.8	NIL	NIL	15.90	23.63	31.43	35.83	6.07	36.17
T9	3.3	NIL	NIL	12.30	25.63	29.18	36.20	6.10	34.68
T10	1.6	NIL	NIL	12.90	24.69	29.03	37.20	6.17	35.07
T11		NIL	NIL	11.02	19.87	25.74	28.82	5.46	29.52
CV (%)					**7.4**	6.39		3.50	6.63
S.Em±						1.56		0.12	1.82
CD (p=0.05)					**NS**	3.29		0.35	5.17
F test						2.46		0.17	
SE (d)								0.17	

BT - Bathinda; FA - Faridkot; HI - Hisar; SR - Sirsa; SG - Sriganganagar
BS - Before spray; DAS - Days after spray

Treatment details

T1- Sesame oil ; T2- Pongamia oil ; T3- Castor oil ; T4- Neem oil ; T5- Neem 300 ppm ;
T6- Neem1500ppm ; T7- Horticultural Mineral oil; T8- Spinosad 2.5EC; T9- Profenophos 50 EC; T10- Diafenthiuron 50EC;
T11- Untreated Control

Table 63. Ent 6: Enhancing the efficacy of yellow sticky trap using essential oils against sucking pests of cotton in North Zone during 2019-20

Treatments	No. of Leafhoppers / square of YST								No. of whitefly / square of YST								Natural enemies (No./square of YST)					
	BT		FA	HI		SR	SG		BT		FA	HI		SR	SG		BT		FA	SR	SG	
	OV	TV	OV	OV	TV	OV	OV	TV	OV	TV	OV	OV	TV	OV	OV	TV	OV	TV	OV	OV	OV	TV
T1	15.30	4.01	5.92	11.28	3.37	2.43	6.72	2.68	27.40	5.29	5.27	22.74	4.73	25.76	24.56	5.00	1.45	1.55	0.58	0.95	3.40	1.97
T2	14.30	3.90	5.70	10.83	3.30	2.96	6.08	2.56	25.95	5.17	5.58	24.03	4.84	27.21	22.32	4.77	1.90	1.65	0.53	1.05	3.28	1.94
T3	13.95	3.83	5.17	10.48	3.26	1.99	5.80	2.51	25.30	5.10	5.90	22.57	4.69	20.75	21.04	4.64	1.35	1.53	0.60	0.95	3.24	1.93
T4	14.35	3.90	5.62	10.68	3.27	1.91	5.36	2.42	24.35	5.00	6.94	21.66	4.60	19.41	19.48	4.47	0.95	1.36	0.48	0.69	2.96	1.86
CD (p=0.05)		NS			0.08	N/A		NS		NS			0.12	N/A		NS		NS		N/A		NS
S.Em±		0.11			0.04	0.25		NS		0.18			0.05	1.43		NS		0.12		0.14		NS
S.E(d)						0.35								2.03						0.20		
CV (%)		5.52			2.05	21.30				8.37			1.97	12.31				18.95		31.58		
F test		0.45			3.47			NS		0.34			6.64			NS		0.48				NS

BT - Bathinda; FA - Faridkot; HI - Hisar; SR - Sirsa; SG - Sriganganagar
Bathinda - 4 Replications; 4 Applications;Faridkot - Mean of weekly observations from July – Sep;Hisar - Mean of 6 observations;Sirsa - 5 replications; 4 Applications
OV – Original Value; TV – Transformed Value

Treatment details
T1 : Yellow StickyTrap + Basil oil
T2 : YST + sandalwood oil
T3 : YST+ cotton seed oil
T4 : YST alone

Table 64 : Ent 7a: Evaluation of new Bt formulation against bollworm complex of cotton in North Zone during 2019-20 (Larval population)

Treatments	Dosage (ml/L)	Larval population/plant (Avg. of 5 plants per rep.)																			
		BT				FA				HI				SR				SG			
		BS		14 DAS		BS		14 DAS		BS		14 DAS		BS		14 DAS		BS		14 DAS	
		OV	TV	OV	TV	OV	TV	OV	TV	OV	TV	OV	TV	OV	TV	OV	TV	OV	TV	OV	TV
T1	2.0	2.75	1.88	2.95	1.96	1.56	1.25	1.38	1.15	2.15	1.77	2.60	1.90	2.00	1.73	1.88	1.70	4.27	2.18	1.47	1.40
T2	3.0	2.70	1.89	2.80	1.92	1.81	1.34	1.31	1.13	2.05	1.74	2.40	1.84	2.13	1.77	2.04	1.74	3.67	2.04	0.93	1.19
T3	4.0	2.95	1.93	3.15	2.02	1.44	1.20	1.19	1.06	1.90	1.70	2.00	1.73	1.67	1.63	1.58	1.61	4.20	2.17	0.90	1.18
T4	0.3	2.70	1.89	2.85	1.94	1.94	1.39	1.00	0.96	1.95	1.71	2.30	1.82	2.13	1.77	1.54	1.59	3.93	2.10	0.40	0.95
T5	2.5													1.42	1.55	1.08	1.44	4.27	2.18	1.53	1.42
T6	2.0													1.13	1.46	1.08	1.44	3.87	2.09	1.20	1.30
T7		2.90	1.95	5.80	2.60	2.06	1.43	1.44	1.20	2.10	1.75	3.00	2.00	1.96	1.72	2.17	1.78	4.27	2.18	3.53	2.01
CD (p=0.05)			NS		0.19	**NS**		**NS**			NS		0.10		0.13		0.13		0.10		0.06
S.Em+-			0.09		0.07						0.03		0.05		0.04		0.04		0.31		0.18
S.E(d)															0.06		0.06		5.73		5.34
CV (%)			16.54		14.53	**8.29**		**22.82**			2.41		3.43		4.28		4.54				
F test			2.14		18.00						2.01		9.81								

BT - Bathinda; FA - Faridkot; HI - Hisar; SR - Sirsa; SG – Sriganganagar
BS - Before spray; DAS - Days after spray

Treatment details
T1 : Bt-127 SC formulation; T2 : Bt-127 SC formulation; T3 : Bt-127 SC formulation; T4 : Chlorantraniliprole 18.5 SC;
T5 : Chlorpyriphos20 EC; T6 : Lambda cyhalothrin 5% EC; T7 : Untreated check

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Table 64.1 : Ent 7a: Evaluation of new Bt formulation against bollworm complex of cotton in North Zone during 2019-20 (Boll damage and % reduction over control)

Treatments	Dosagae (ml/L)	Green boll damage (%)		Open boll damge(%)				Locule damage (%)				Mean Reduction (%) of population over control						Mean Reduction (%) of damage over control				
		SG		SR		SG		SR		SG		BT		FA	HI	SR	SG	Green Boll damage	Open boll damage		Locule damage (%)	
		OV	TV	OV	TV	OV	TV	OV	TV	OV	TV	OV	TV					SG	SR	SG	SR	SG
T1	2.0	13.67	21.67	11.75	20.00	16.67	24.07	5.87	13.85	7.23	15.59	49.14	44.49	4.35	13.33	13.59	63.10	46.75	27.30	41.18	-5.30	52.29
T2	3.0	8.33	16.77	10.57	18.94	9.67	18.10	4.05	11.40	4.26	11.91	51.14	45.64	8.70	20.00	5.91	76.55	67.53	34.61	65.88	27.40	71.87
T3	4.0	7.67	16.06	7.92	16.27	8.33	16.73	5.58	13.24	3.62	10.95	45.47	42.35	17.39	33.33	27.04	77.93	70.13	51.00	70.59	-0.20	76.09
T4	0.3	2.67	9.36	6.39	14.54	3.33	10.49	4.17	11.70	1.84	7.75	50.64	45.36	30.43	23.33	28.96	91.85	89.61	45.09	88.24	27.21	87.88
T5	2.5	5.67	13.75	8.87	17.31	6.67	14.95	4.06	11.59	2.91	9.81					50.08	68.98	77.92	60.43	76.47	25.12	80.82
T6	2.0	6.67	14.95	8.49	15.82	7.67	16.06	3.05	10.04	2.89	9.78					50.08	75.52	74.03	47.48	72.94	45.29	80.93
T7		25.67	30.42	16.16	23.37	28.33	32.13	5.57	13.32	15.15	22.89											
CD (p=0.05)			0.82		N/A		1.01		N/A		0.56		NS									
S.Em+-			2.52		2.15		3.51		1.22		1.71		2.44									
S.E(d)			5.71		3.04		6.51		1.73		5.38											
CV (%)					20.64				17.43				10.96									
F test													0.37									

BT - Bathinda; FA - Faridkot; HI - Hisar; SR - Sirsa; SG - Sriganganagar
BS - Before spray; DAS - Days after spray
OV – Original Value; TV – Transformed Value

Treatment details

T1 : Bt-127 SC formulation; T2 : Bt-127 SC formulation; T3 : Bt-127 SC formulation; T4 : Chlorantraniliprole 18.5 SC;
T5 : Chlorpyriphos20 EC; T6 : Lambda cyhalothrin 5% EC; T7 : Untreated check

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Table 64.2 : Ent 7a: Evaluation of new Bt formulation against bollworm complex of cotton in North Zone during 2019-20 (Natural Enemies)

Treatments	Dosage ml/litre	Natural enemies/ plant (Avg. of 5 plants)																			
		BT				FA				HI				SR				SG			
		BS		14 DAS		BS		14 DAS		BS		14 DAS		BS		14 DAS		BS		14 DAS	
		OV	TV	OV	TV	OV	TV	OV	TV	OV	TV	OV	TV	OV	TV	OV	TV	OV	TV	OV	TV
T1	2	1.20	1.46	1.20	1.46	2.53	1.58	2.25	1.50	1.90	1.70	1.60	1.61	1.08	1.44	1.04	1.43	2.33	1.68	2.47	1.72
T2	3	1.40	1.54	1.00	1.40	2.87	1.69	2.31	1.52	1.60	1.61	1.80	1.67	0.79	1.34	0.83	1.35	1.67	1.47	2.03	1.59
T3	4	1.60	1.58	1.40	1.52	2.73	1.64	1.75	1.32	1.65	1.63	1.55	1.59	0.83	1.36	0.92	1.38	2.17	1.63	2.27	1.66
T4	0.3	1.40	1.49	1.20	1.48	3.00	1.73	2.00	1.40	1.70	1.64	1.60	1.61	1.04	1.43	0.96	1.40	2.67	1.78	2.13	1.62
T5	2.5													0.71	1.31	0.75	1.32	1.83	1.53	1.93	1.56
T6	2.0													0.96	1.40	0.79	1.34	2.00	1.58	1.67	1.47
T7		1.40	1.51	1.40	1.52	2.87	1.69	2.13	1.45	1.70	1.64	1.75	1.65	1.00	1.41	1.17	1.47	1.67	1.47	2.83	1.82
CD (p=0.05)			NS		NS	**NS**		**NS**			NS		NS		N/A		N/A		NS		NS
S.Em+-			0.22		0.19						0.04		0.05		0.04		0.05		NS		NS
S.E(d)															0.06		0.06		NS		NS
CV (%)			22.92		20.51	**9.98**		**8.13**			3.81		4.47		5.36		5.61				
F test			1.08		1.15						1.28		0.88								

BT - Bathinda; FA - Faridkot; HI - Hisar; SR - Sirsa; SG - Sriganganagar
BS - Before spray; DAS - Days after spray
OV – Original Value; TV – Transformed Value

Treatment details
T1 : Bt-127 SC formulation; T2 : Bt-127 SC formulation; T3 : Bt-127 SC formulation; T4 : Chlorantraniliprole 18.5 SC;
T5 : Chlorpyriphos20 EC; T6 : Lambda cyhalothrin 5% EC; T7 : Untreated check

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Table 64.3 : Ent 7a: Evaluation of new Bt formulation against bollworm complex of cotton in North Zone during 2019-20 (Phytotoxicity and seed Cotton Yield)

Treatments	Dosage ml/litre	Phytotoxicity				Seed cotton Yield (q/ha)					
		BT	HI	SR	SG	BT	FA	HI	SR		SG
									OV	TV	
T1	2	Nil	Nil	Nil	Nil	14.33	18.74	26.26	35.13	6.01	33.13
T2	3	Nil	Nil	Nil	Nil	14.00	16.15	27.95	37.12	6.17	33.85
T3	4	Nil	Nil	Nil	Nil	14.47	15.76	28.17	36.54	6.13	35.07
T4	0.3	Nil	Nil	Nil	Nil	17.80	19.68	30.30	38.54	6.29	36.37
T5	2.5	Nil	Nil	Nil	Nil				37.70	6.22	34.82
T6	2.0	Nil	Nil	Nil	Nil				37.45	6.20	34.68
T7		Nil	Nil	Nil	Nil	10.07	18.74	24.47	34.53	5.96	27.99
Range									34.53-38.54		
CD (p=0.05)							NS	3.69		0.19	1.89
S.Em+-								1.68		0.06	5.83
S.E(d)										0.09	6.87
CV (%)							38.65	8.63		1.71	
F test								3.42			

BT - Bathinda; FA - Faridkot; HI - Hisar; SR - Sirsa; SG - Sriganganagar
BS - Before spray; DAS - Days after spray
OV – Original Value; TV – Transformed Value

Treatment details
T1 : Bt-127 SC formulation; T2 : Bt-127 SC formulation; T3 : Bt-127 SC formulation; T4 : Chlorantraniliprole 18.5 SC;
T5 : Chlorpyriphos20 EC; T6 : Lambda cyhalothrin 5% EC; T7 : Untreated check

Table 65. Ent 7b: Evaluation of new microbial formulations against bollworm complex of cotton in Central Zone during 2019-2020 (Larval population of *H. armigera* and *E. vittella*)

Sr. No.	Mean larval population of *H. armigera*/5 plant								% Reduction of pest over control			Mean larval population of *E. vittella*/5 plant							% Reduction of pest over control	
	SU				NA			RA	SU	NA	RA	SU				NA			SU	NA
	Pre		Post		Pre		Post	Post				Pre		Post		Pre		Post		
	OV	TV	OV	TV	OV	TV						OV	TV	OV	TV	OV	TV			
T1	3.44	1.98	2.85	1.83	0.67	1.05	0.60	0.55	24.01	54.95	53.66	2.33	1.68	1.89	1.54	1.67	1.46	0.73	28.12	47.57
T2	3.56	2.01	2.83	1.82	0.67	1.05	0.67	0.52	24.70	49.85	56.58	2.11	1.62	1.72	1.49	1.67	1.46	0.73	34.48	47.71
T3	3.33	1.95	2.44	1.71	0.67	1.05	0.53	0.48	34.87	59.91	59.34	2.22	1.65	1.50	1.40	1.67	1.46	0.67	42.97	52.43
T4	3.56	2.01	2.74	1.80	1	1.22	0.73	0.69	26.97	44.89	41.57	2.00	1.58	1.63	1.45	1.33	1.34	0.73	38.03	47.71
T5	3.44	1.98	2.22	1.64	0.67	1.05	0.53	0.64	40.78	59.91	46.13	1.78	1.51	1.41	1.37	1.67	1.46	0.67	46.46	52.43
T6	3.55	2.01	1.86	1.52	0.67	1.05	0.53	0.58	50.32	59.91	51.25	2.00	1.58	1.26	1.31	1.33	1.34	0.67	52.06	52.43
T7	3.22	1.91	1.59	1.42	0.67	1.05	0.47	0.2	57.54	65.02	82.84	2.22	1.65	1.06	1.23	1.67	1.46	0.73	59.88	47.57
T8	3.33	1.96	3.75	2.06	1.33	1.34	1.33	1.19			0	2.11	1.62	2.63	1.77	2.67	1.77	1.40	-	
S. Em.		0.1	-	0.03		0.16							0.07	-	0.03		0.12		-	
C.D. at 5%		NS	-	0.07	-	0.5							NS	-	0.09		0.37		-	
CV%		8.65	-	7.56	-	25.76							7.14	-	10.05		14.48		-	
S. Em. (TXP)			-	0.08								2.33	1.68	-	0.08				-	
C.D. at 5%			-	NS	-									-	NS				-	

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Treatment details

T1- Bt-127 SC formulation @2.0 ml/litre; T2- Bt-127 SC formulation @3.0 ml/litre; T3- Bt-127 SC formulation @4.0 ml/litre
T4- Brigade-B (WP formulation) @ 3 gm/litre; T5- Brigade-B (WP formulation) @ 5 gm/litre; T6- Brigade-B (WP formulation) @ 7 gm/litre
T7- Chlorantraniliprole 18.5 SC @ 0.3 ml/litre; T8- Untreated check
OV – Original Value; TV – Transformed Value;

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Table 65.1. Ent 7b: Evaluation of new microbial formulations against bollworm complex of cotton in Central Zone during 2019-2020 (Larval population of PBW, SBW - square damage)

Sr. No.	Mean larval population of *P. gossypiella* /20 green bolls												% Reduction of pest over control				SBW - Square damage % at different crop stage			% Reduction of pest over control
	JU				SU				NA			RA	JU	SU	NA	RA	NA			
	Pre		Post		Pre		Post										Pre		Post	
	OV	TV	OV	TV	OV	TV	OV	TV	Pre		Post	Post					OV	TV		
T1	4.33	2.08	4.59	2.14	2.33	1.68	1.37	1.34	1.33	1.34	1.47	4.23	18.90	55.95	47.60	37.09	2.87	9.74	1.35	51.47
T2	3.96	1.99	2.66	1.63	2.67	1.77	1.37	1.35	1.67	1.46	1.53	4.12	53.00	55.95	45.18	38.84	2.73	9.48	1.34	51.83
T3	4.33	2.08	2.77	1.66	2.00	1.58	1.07	1.23	1.67	1.46	1.33	3.85	51.06	65.48	52.32	42.74	2.67	9.38	1.27	54.34
T4	3.96	1.99	2.04	1.43	2.67	1.77	1.19	1.27	1.33	1.34	1.53	4.31	63.95	61.90	45.18	35.97	2.73	9.46	1.31	52.97
T5	4.97	2.23	1.37	1.17	2.33	1.68	1.00	1.20	2.33	1.67	1.47	4.1	75.79	67.86	47.61	39.12	3.4	10.6	1.51	45.88
T6	4.33	2.08	3.39	1.84	2.33	1.66	0.93	1.17	1.33	1.34	1.06	3.89	40.10	70.24	61.97	42.13	1.8	7.64	1.01	63.80
T7	4.67	2.16	3.71	1.93	2.00	1.58	0.70	1.05	1.33	1.34	1.00	2.56	34.45	77.38	64.33	61.89	1.27	6.45	0.92	66.95
T8	4.67	2.16	5.66	2.38	2.67	1.77	3.11	1.88	2.33	1.67	2.80	6.73		-		0	6.67	11.49	2.79	
S. Em.		0.11	0.09		-	0.11	-	0.05		0.12				-				0.39		
C.D. at 5%		NS	0.28		-	NS	-	0.13		0.36								1.2		
CV%		9.43	9.11			11.61	-	20.43		14.34								7.07		
S. Em. (TXP)							-	0.16						-						
C.D. at 5%							-	NS						-						

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Treatment details

T1- Bt-127 SC formulation @2.0 ml/litre; T2- Bt-127 SC formulation @3.0 ml/litre; T3- Bt-127 SC formulation @4.0 ml/litre
T4- Brigade-B (WP formulation) @ 3 gm/litre; T5- Brigade-B (WP formulation) @ 5 gm/litre; T6- Brigade-B (WP formulation) @ 7 gm/litre
T7- Chlorantraniliprole 18.5 SC @ 0.3 ml/litre; T8- Untreated check
OV – Original Value; TV – Transformed Value;

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Table 65.2. Ent 7b: Evaluation of new microbial formulations against bollworm complex of cotton in Central Zone during 2019-2020 (square and flower damage)

Sr. No.	*H. armigera* - Square damage % at different crop stage			% Reduction of pest over control	*P. gossypiella* - Square damage % at different crop stage			% Reduction of pest over control	SBW - Flower damage % at different crop stage			% Reduction of pest over control	*P. gossypiella* - Flower damage % at different crop stage			% Reduction of pest over control
	NA				NA				NA				NA			
	Pre		Post		Pre		Post		Pre		Post		Pre		Post	
	OV	TV			OV	TV			OV	TV			OV	TV		
T1	0.33	1.91	1.88	57.85	3.00	9.87	2.73	47.84	0.03	0.60	0.02	50.00	1.67	7.33	0.81	54.02
T2	0.33	1.91	2.012	54.89	2.33	8.74	2.31	55.93	0.10	1.81	0.03	35.00	1.67	7.33	0.81	53.91
T3	0.67	3.82	1.602	64.08	1.67	7.33	2.09	60.09	0.00	0.00	0.02	50.00	1.67	7.33	0.64	63.53
T4	0.33	1.91	1.7	61.88	2.00	8.12	2.22	57.57	0.03	0.60	0.01	70.00	1.00	5.73	0.95	46.32
T5	0.33	1.91	1.638	63.27	1.33	6.53	1.74	66.77	0.10	1.45	0.03	15.00	1.67	7.33	0.69	60.70
T6	0.67	3.82	1.508	66.19	1.00	5.73	1.59	69.59	0.10	1.81	0.03	35.00	1.67	7.33	0.86	51.42
T7	0.33	1.91	1.318	70.45	1.00	5.73	1.37	73.90	0.03	0.60	0.02	50.00	1.67	7.33	0.84	52.66
T8	1.33	6.53	4.46		6.33	14.50	5.24		0.10	1.45	0.04		3.67	11.01	1.77	
S. Em.		1.88				0.57				0.53				0.75		
C.D. at 5%		5.7				1.72				1.61				2.27		
CV%		109.8								88.63				17.16		
S. Em. (TXP)						11.87										
C.D. at 5%																

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Treatment details

T1- Bt-127 SC formulation @2.0 ml/litre; T2- Bt-127 SC formulation @3.0 ml/litre; T3- Bt-127 SC formulation @4.0 ml/litre
T4- Brigade-B (WP formulation) @ 3 gm/litre; T5- Brigade-B (WP formulation) @ 5 gm/litre; T6- Brigade-B (WP formulation) @ 7 gm/litre
T7- Chlorantraniliprole 18.5 SC @ 0.3 ml/litre; T8- Untreated check
OV – Original Value; TV – Transformed Value;

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Table 65.3. Ent 7b: Evaluation of new microbial formulations against bollworm complex of cotton in Central Zone during 2019-2020 (square and flower damage)

Sr. No.	SBW - Green boll damage % at different crop stage			% Reduction over control	*H. armigera* - Green boll damage % at different crop stage			% Reduction over control	*P. gossypiella* - Green boll damage % at different crop stage		Green boll Damage		% Reduction over control	SBW - Fruiting body damage % at different crop stage			% Reduction over control
	NA				NA				NA		JU			NA			
	Pre		Post		Pre		Post		Pre	Post				Pre		Post	
	OV	TV			OV	TV					**OV**	**TV**	JU	OV	TV		
T1	2.30	8.65	0.49	50.20	5.6	13.67	1.65	65.04	0.00	0.00	28.3	32.14	19.00	2.90	9.79	1.86	51.23
T2	2.00	8.12	0.45	55.04	5.27	13.25	1.54	67.23	0.00	0.00	16.6	24.05	52.49	2.83	9.66	1.82	52.49
T3	2.03	8.09	0.45	55.04	4.13	11.7	1.56	66.95	0.00	0.00	26.63	31.07	23.78	2.67	9.38	1.74	54.47
T4	2.03	8.19	0.45	55.04	3.33	10.5	1.18	75.02	0.00	0.00	13.24	21.34	62.11	2.77	9.53	1.77	53.64
T5	2.07	8.25	0.47	52.82	2.8	9.62	1.10	76.57	0.00	0.00	11.57	19.89	66.89	3.50	10.76	2.01	47.36
T6	2.00	8.11	0.44	55.65	1.93	7.98	0.91	80.68	0.00	0.00	21.62	27.71	38.12	1.90	7.85	1.48	61.33
T7	1.98	8.09	0.43	56.65	1.67	7.37	0.89	81.17	0.00	0.00	29.92	33.16	14.37	1.30	6.54	1.37	64.15
T8	4.33	12.00	0.99		12.27	20.47	4.71		0.00	0.00	34.94	36.24		6.77	15.06	3.82	
S. Em.		0.37				0.43					1.38				0.39		
C.D. at 5%		1.13				1.32					4.18				1.18		
CV%		7.45				64.13					8.46				6.87		

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Treatment details

T1- Bt-127 SC formulation @2.0 ml/litre; T2- Bt-127 SC formulation @3.0 ml/litre; T3- Bt-127 SC formulation @4.0 ml/litre
T4- Brigade-B (WP formulation) @ 3 gm/litre; T5- Brigade-B (WP formulation) @ 5 gm/litre; T6- Brigade-B (WP formulation) @ 7 gm/litre
T7- Chlorantraniliprole 18.5 SC @ 0.3 ml/litre; T8- Untreated check
OV – Original Value; TV – Transformed Value;

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Table 65.4. Ent 7b:Evaluation of new microbial formulations against bollworm complex of cotton in Central Zone during 2019-2020 (Fruiting body damage and Open boll damage)

Sr. No.	*H. armigera* - Fruiting body damage % at different crop stage			% Reduction of pest over control	*P. gossypiella* - Fruiting body damage % at different crop stage			% Reduction of pest over control	Open boll damage (%)						% Reduction of over control		
	NA				NA				JU		SU		NA				
	Pre		Post		Pre		Post		**OV**	**TV**	OV	TV	OV	TV	JU	SU	NA
	OV	TV			OV	TV											
T1	0.33	1.91	3.73	54.72	3.00	9.87	4.62	50.23	30.15	33.31	15.56	23.21	10.43	18.82	19.86	32.99	44.61
T2	0.33	1.91	3.73	54.72	2.33	8.74	4.14	55.38	17.93	25.06	12.95	21.08	9.71	18.14	52.34	44.25	48.43
T3	0.67	3.82	3.03	63.23	1.67	7.33	3.78	59.32	28.09	32	5.20	13.16	9.27	17.71	25.33	77.61	50.77
T4	0.33	1.91	2.90	64.86	2.00	8.12	4.15	55.31	14.87	22.68	8.62	17.06	9.42	17.86	60.47	62.87	49.97
T5	0.33	1.91	2.93	64.44	1.33	6.53	3.75	59.56	12.86	21.02	4.93	12.81	8.72	17.16	65.82	78.77	53.69
T6	0.67	3.82	2.36	71.36	1.00	5.73	3.28	64.62	23.89	29.26	3.91	11.41	8.13	16.54	36.50	83.15	56.82
T7	0.33	1.91	2.05	75.12	1.00	5.73	3.05	67.14	33.19	35.17	2.23	8.58	7.25	15.61	11.78	90.41	61.50
T8	1.33	6.53	8.25		6.33	14.50	9.28		37.62	37.83	23.23	28.77	18.83	25.70			
S. Em.		1.88				0.57			1.69		-	0.62		0.43			
C.D. at 5%		5.70				1.72			5.12		-	1.88		1.30			
CV%									9.90		-	6.32		4.03			
S. Em. (TXP)						11.87											
C.D. at 5%																	

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Treatment details

T1- Bt-127 SC formulation @2.0 ml/litre; T2- Bt-127 SC formulation @3.0 ml/litre; T3- Bt-127 SC formulation @4.0 ml/litre
T4- Brigade-B (WP formulation) @ 3 gm/litre; T5- Brigade-B (WP formulation) @ 5 gm/litre; T6- Brigade-B (WP formulation) @ 7 gm/litre
T7- Chlorantraniliprole 18.5 SC @ 0.3 ml/litre; T8- Untreated check
OV – Original Value; TV – Transformed Value;

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Table.65.5. Ent 7b:Evaluation of new microbial formulations against bollworm complex of cotton in Central Zone during 2019-2020 (Locule damage and Open boll damage)

Sr. No.	Locule damage (%)						% Reduction of over control			Open boll damage by PBW (%)		% Reduction of over control	Locule damage by PBW (%)		% Reduction of over control
	JU		SU		NA		JU	SU	NA	SU		SU	SU		SU
	OV	**TV**	OV	TV	OV	TV				OV	TV*		OV	TV*	
T1	25.15	30.1	6.86	15.16	7.74	16.12	21.21	37.47	32.70	8.88	20.12	33.69	5.98	14.13	36.53
T2	13.31	21.4	5.45	13.50	6.46	14.71	58.30	50.34	43.83	7.37	18.26	44.98	4.75	12.58	49.56
T3	22.33	28.2	2.46	9.02	6.20	14.36	30.04	77.58	46.09	2.04	9.48	84.75	1.41	6.80	84.98
T4	10.73	19.12	3.72	11.08	6.27	14.49	66.38	66.09	45.48	4.37	13.93	67.39	3.12	10.15	66.89
T5	8.58	17.03	2.11	8.33	6.06	14.22	73.12	80.78	47.30	2.40	10.25	82.04	1.63	7.28	82.66
T6	18.19	25.25	1.63	7.31	5.79	13.86	43.01	85.17	49.65	1.65	8.45	87.71	1.14	6.07	87.86
T7	27.91	31.89	0.72	4.87	4.83	12.69	12.56	93.43	58	1.11	6.99	91.68	0.54	4.21	94.26
T8	31.92	34.4	10.97	19.31	11.50	19.71	-	-	-	13.39	24.95	-	9.42	17.85	-
S. Em.	-	1.56	-	0.44	-	0.82	-	-	-	-	0.63	-	-	0.49	-
C.D. at 5%	-	4.74	-	1.32	-	2.49	-	-	-	-	1.92	-	-	1.50	-
CV%	-	10.45	-	6.82	-	9.50	-	-	-	-	7.81	-	-	8.64	-

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Treatment details

T1- Bt-127 SC formulation @2.0 ml/litre; T2- Bt-127 SC formulation @3.0 ml/litre; T3- Bt-127 SC formulation @4.0 ml/litre
T4- Brigade-B (WP formulation) @ 3 gm/litre; T5- Brigade-B (WP formulation) @ 5 gm/litre; T6- Brigade-B (WP formulation) @ 7 gm/litre
T7- Chlorantraniliprole 18.5 SC @ 0.3 ml/litre; T8- Untreated check
OV – Original Value; TV – Transformed Value;

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Table.65.6. Ent 7b:Evaluation of new microbial formulations against bollworm complex of cotton in Central Zone during 2019-2020 (Seed Cotton Yield and Natural enemies)

Sr. No.	Seed Cotton Yield (Kg/ha)				Natural enemies -LBB (No./Plant)						Natural enemies (No./Plant) -*Chrysopa*			Natural enemies			
	JU	SU	NA	RA	SU			NA			NA			JU			
								Pre		Post	Pre		Post	Pre		Post	
					LBB	*Chrysopa*	Spider	OV	TV		OV	TV		OV	TV	**OV**	**TV***
T1	2238	504	12.63	14.08	1.48	1.41	1.19	1.23	1.3	0.36	0.3	0.89	0.38	4.65	2.16	1.58	1.26
T2	2491	648	13.04	14.65	1.37	1.32	1.17	1.33	1.35	0.40	0.2	0.83	0.54	4.45	2.11	2.90	1.70
T3	2425	885	13.75	15.50	1.48	1.37	1.16	1.33	1.35	0.40	0.3	0.89	0.46	4.72	2.17	2.17	1.47
T4	2579	617	13.31	13.25	1.49	1.38	1.30	1.3	1.34	0.36	0.27	0.87	0.55	4.78	2.19	3.05	1.75
T5	2789	916	14.21	14.10	1.41	1.26	1.12	1.47	1.4	0.43	0.23	0.85	0.53	4.58	2.14	3.32	1.82
T6	2392	1224	14.56	14.72	1.48	1.36	1.29	1.37	1.36	0.37	0.27	0.87	0.66	5.99	2.45	2.38	1.54
T7	2348	1502	16.8	17.65	1.22	1.18	1.01	1.43	1.38	0.31	0.2	0.83	0.35	5.44	2.33	1.78	1.33
T8	1797	442.67	11.19	10.82	1.67	1.59	1.39	1.47	1.4	0.49	0.3	0.89	0.91	5.17	2.27	6.47	2.54
S. Em.	118.40	106.76	0.14	0.12					0.04			0.01			0.11	0.09	
C.D. at 5%	359.17	323.85	0.43	0.37					0.12			0.05			NS	0.28	
CV%	8.61	21.95	5.63	5.53					5.43			3.57			8.68	9.62	

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Treatment details

T1- Bt-127 SC formulation @2.0 ml/litre; T2- Bt-127 SC formulation @3.0 ml/litre; T3- Bt-127 SC formulation @4.0 ml/litre
T4- Brigade-B (WP formulation) @ 3 gm/litre; T5- Brigade-B (WP formulation) @ 5 gm/litre; T6- Brigade-B (WP formulation) @ 7 gm/litre
T7- Chlorantraniliprole 18.5 SC @ 0.3 ml/litre; T8- Untreated check
OV – Original Value; TV – Transformed Value;

Table 65.7. Ent 7b.: Evaluation of new microbial formulations against bollworm complex of cotton in South Zone during 2019-2020 (Population of Boll worms)

Treatments	Mean larval population of *H. armigera*/5 plant									% Reduction of pest over control		Mean larval population of *P. gossypiella*			% Reduction of pest over control			Mean larval population of *Spodopteralitura* (No./10 bolls)			% Reduction of pest over control
	ND			WG			DW			ND	DW	WG (No./10 bolls)			WG	DW	RC	WG			
	Pre		Post	Pre	Post		Pre		Post			Pre	Post					Pre	Post		
	OV	TV			OV	TV	OV	TV					OV	TV					OV	TV	
T1	3.67	2.04	3.11	0.20	0.0	0.0	3.70	2.05	4.14	28.15	38.75	2.33	25.83	5.17	35.42	34.59	33.81	0.67	0.28	1.14	94.37
T2	2.67	1.77	3.67	0.30	0.0	0.0	3.73	2.05	4.04	15.32	40.23	4.67	26.17	5.17	34.58	36.61	39.42	9.23	5.33	2.51	-8.11
T3	3.00	1.86	3.33	0.23	0.0	0.0	3.81	2.07	3.88	23.02	42.69	2.67	23.50	4.94	41.25	46.57	43.27	3.07	1.59	1.61	67.79
T4	3.00	1.86	3.89	0.10	0.0	0.0	3.64	2.03	4.17	10.19	38.42	6.33	21.50	4.74	46.25	33.65	30.61	2.37	1.61	1.61	67.34
T5	2.33	1.68	4.22	0.23	0.0	0.0	3.97	2.11	4.06	2.54	40.07	2.67	19.33	4.50	51.67	41.05	44.95	9.83	0.83	1.35	83.11
T6	3.67	2.04	3.89	0.20	0.0	0.0	3.71	2.05	3.89	10.19	42.53	3.33	24.33	5.02	39.17	47.38	46.71	5.00	0.39	1.18	92.12
T7	3.67	2.04	2.56	0.30	0.0	0.0	3.65	2.04	2.13	40.98	68.47	3.67	17.17	4.25	57.08	72.27	78.77	1.23	0.18	1.10	96.40
T8	3.00	1.86	4.33	0.30	0.0	0.0	3.96	2.11	6.77		0.00	5.33	40.00	6.39			0.00	0.80	4.93	2.43	
S. Em.	0.12							0.06					0.21						0.07		
C.D. at 5%	NS							NS					0.63						0.21		
CV%	11.43							11.82					7.08						7.50		

ND - Nanded; WG – Warangal; DW - Dharwad; RC – Raichur;

T1 : Bt-127 SC formulation @2.0 ml/litre;
T2 : Bt-127 SC formulation @3.0 ml/litre
T3 : Bt-127 SC formulation @4.0 ml/litre
T4 : Brigade-B (WP formulation) @ 3 gm/litre
T5 : Brigade-B (WP formulation) @ 5 gm/litre
T6 : Brigade-B (WP formulation) @ 7 gm/litre
T7 : Chlorantraniliprole 18.5 SC @ 0.3 ml/litre
T8 : Untreated check

Note : Nandyal, Dharwad - Mean post spray population of third spray is given
Raichur - Mean post spray population of fourth spray is given

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Table 65.8. Ent 7b : Evaluation of new microbial formulations against bollworm complex of cotton in South Zone during 2019-2020 (Open boll damage, Natural enemies and yield)

Treatments	Open boll damage		% Reduction of pest over control	Natural Enemeies (No./ plant)					Seed Cotton Yield			
	WG			ND			WG		ND (Kg/ha)	WG (Kg/ha)	DW (Q/ha)	RC (Q/ha)
	OV	TV		Pre		Post	OV	TV				
				OV	TV							
T1	54.84	47.77	-5.29	0.33	0.88	1.56	1.26	1.49	1249.38	1621.49	19.66	24.15
T2	37.52	37.74	27.98	1.33	1.34	2.67	1.36	1.54	1272.43	1569.23	20.03	25.22
T3	41.32	39.98	20.67	1.00	1.22	2.44	1.20	1.47	1150.62	1646.90	20.25	27.12
T4	41.20	39.89	20.90	1.67	1.46	2.56	1.28	1.51	1074.90	1959.20	16.57	23.46
T5	50.29	45.15	3.46	0.67	1.05	2.56	1.38	1.54	1134.16	1727.34	17.90	24.32
T6	42.40	40.57	18.60	1.00	1.22	2.33	1.72	1.63	1277.37	1842.65	18.73	25.15
T7	40.67	39.57	21.93	1.00	1.17	2.67	1.24	1.50	1758.02	1977.30	29.10	38.26
T8	52.09	46.18		1.33	1.34	3.33	1.36	1.54	834.57	1771.57	13.55	16.35
S. Em.	1.57			0.15			0.06		85.71	66.24	0.26	1.24
C.D. at 5%	4.80			NS			NA		259.00	202.86	0.79	3.51
CV%	6.44			20.93			7.25		12.18	6.50	2.32	18.72
F Test				NS					S			

ND - Nanded; WG – Warangal; DW - Dharwad; RC – Raichur;

T1 : Bt-127 SC formulation @2.0 ml/litre;
T2 : Bt-127 SC formulation @3.0 ml/litre
T3 : Bt-127 SC formulation @4.0 ml/litre
T4 : Brigade-B (WP formulation) @ 3 gm/litre
T5 : Brigade-B (WP formulation) @ 5 gm/litre
T6 : Brigade-B (WP formulation) @ 7 gm/litre
T7 : Chlorantraniliprole 18.5 SC @ 0.3 ml/litre
T8 : Untreated check

Table 66. Ent. 8b. Validation of IPM module for cotton insect pests in Central Zone during 2019-2020

S. No.	Particulars	Modue-I (IPM)						Module-II (Farmers practice)					
		JU	SU	AK	NA	BW	RA	JU	SU	AK	NA	RA	BW
A.	**Sucking pests**												
	Aphids/3 leaves	-	8.82	-	3.86	14.60	12.34	-	3.58	-	6.63	33.52	25.36
	Jassids/3 leaves	-	2.35	5.67	1.68	3.72	4.82	-	3.47	8.17	3.18	7.78	6.08
	Whitefly/3 leaves	-	12.26	2.00	2.86	2.50	6.28	-	4.75	2.83	6.71	10.22	5.46
	Thrips/3 leaves	-	13.38	9.00	1.47	5.48	17.14	-	24.00	17.83	6.74	48.32	8.64
B.	**Bollworm**												
	Helicoverpa eggs/ 5 plant	-	-	-	0.21	1.15	-	-	-	-	0.24	-	3.05
	Helicoverpa larvae/ 5 plant	-	-	-	0.33	1.03	-	-	-	-	0.50	-	3.90
	SBW larvae / 5 plant	-	-	-	0.30	2.04	-	-	-	-	0.53	-	5.66
	Flower damage / 50 Flowers (%)	1.32	5.84	0.00	4.50	-	3.97	5.75	12.58	3.33	9.60	10.36	-
	Pink boll worm/ 20 green bolls	1.83	0.75	2.67	1.86	0.00	5.21	15.77	2.83	6.89	3.93	11.71	0.00
	Fruiting bodies damage %	2.14	5.97	17.22	11.66	5.10	-	13.16	17.22	50.56	18	-	16.86
	Green Boll Damage %	-	-	-	-	-	8	-	-	-	-	15.22	-
	Green boll damage on locule basis (%)	-	-	5.56	-	-	5.85	-	-	16.39	-	12.35	-
	Open boll damage	2.99	4.58	38.33	8.3	-	-	18.32	15.42	86.67	14.3	-	-
	Open boll locule damge	2.61	1.56	12.39	7.8	-	9.82	15.75	5.94	30.97	14.4	33.52	-
	% Parasitism on bollworms	-	-		4.45	-	-	-	-	-	1.49	-	-
C.	**Other pests**												
	Anomis flava larvae/ 5 plant	-	-	-	-	1.16	-	-	-	-	-	-	3.15
	Syleptaderogata larvae/ 5 plant	-	-	-	-	9.40	-	-	-	-	-	-	16.00
	Spodopteralitura larvae/ 5 plant	-	-	-	0.26	2.04	-	-	-	-	0.46	-	6.08
	Mean Trap catches / week	6.95	26.34	43.37	8.15		-	50.84	10.28	52.62	9.89	-	-
D.	**Natural enemies/plant**	-	-	-	3.56	1.04	-	-	-	-	0.7	-	0.08
E.	**Seed cotton yield and economics**	-	-	-	-	-	-	-	-	-	-	-	-
	1. Seed cotton yield (q/ha)	34.55	25.45	20.4	15.52	25.72	16.92	18.7	19.34	15.57	14.2	7.78	21.50
	2. Gross income (Rs./ha)	-	-	-	-	138888.00	-		-	-	-	-	116100.00
	3. Cost of crop protection measures (Rs./ha)	-	-	-	-	8150.00	-	-	-	-	-	-	10000.00
	4. Cost of other expenditure (Rs./ha)	-	-	-	-	50000.00	-	-	-	-	-	-	50000.00
	Total (3+4)					**58150.00**							**60000.00**
	Net profit (Rs./ha)					**80738.00**							**56100.00**
	Cost Benefit ratio					**2.39**							**1.94**

Hybrid: Denim (PRCH 709), Date of sowing: 13.07.2019

JU – Junagadh; SU – Surat; AK – Akola; NA – Nanded; RA – Rahuri; BW – Bhawanipatna;

Table 66.1. Ent 8b: Validation of IPM module for pink boll worm at Khandwa in Central Zone during 2019-2020

	Farmers Practice							IPM Practices						
S. No.	Rosette flower		Green boll damage %		Open boll damage		Yield	Rosette flower		Green boll damage %		Open boll damage		Yield
	Total Flower	Rossete flower	Total bolls	Green boll damage	Total bolls	Open boll damage	5500 Kg./ha.	Total Flower	Rossete flower	Total bolls	Green boll damage	Total bolls	Open boll damage	7250 Kg./ha.
1	11	4	7	3	7	4		11	1	7	0	7	0	
2	16	4	8	3	8	3		16	0	8	0	8	0	
3	10	3	5	2	5	2		10	3	5	2	5	0	
4	12	4	9	5	9	3		12	4	9	1	9	1	
5	10	4	8	4	8	4		10	1	8	0	8	1	
6	13	2	8	4	8	4		13	2	8	0	8	0	
7	15	2	10	6	10	6		15	0	10	2	10	2	
8	10	5	6	1	6	2		10	0	6	1	6	0	
9	11	3	5	2	5	2		11	3	5	0	5	0	
10	13	2	6	2	6	2		13	0	6	1	6	0	
11	14	4	7	4	7	4		14	2	7	2	7	1	
12	16	5	8	4	8	4		16	1	8	0	8	0	
13	16	4	9	4	9	4		16	0	9	0	9	0	
14	12	4	10	6	10	6		12	1	10	1	10	1	
15	11	3	9	6	9	4		11	1	9	0	9	0	
16	10	2	11	5	11	5		10	2	11	2	11	1	
17	14	3	8	3	8	3		14	3	8	1	8	3	
18	14	4	9	5	9	5		14	2	9	1	9	1	
19	13	2	7	3	7	3		13	2	7	1	7	3	
20	15	6	12	8	12	7		15	1	12	0	12	1	

Table 67. Ent 8b: Validation of IPM module for pink boll worm in South Zone during 2019-2020

Sl. No.	Particulars	Modue-I (IPM)							Module-II (Farmers practice)						
		LG	ND	DW	RC	CN	CBE	SVPR	LG	ND	DW	RC	CN	CBE	SVPR
A.	**Sucking pests**														
	Aphids/3 leaves	3.19	-	8.33	-	-	-	1.57	3.98	-	28.62	-	-	-	9.33
	Jassids/3 leaves	1.72	-	3.22	-	-	-	3.40	1.32	-	4.66	-	-	-	11.07
	Thrips/3 leaves	3.61	-	7.25	-	-	-	3.87	4.96	-	26.43	-	-	-	10.37
	Whitefly/3 leaves	3.00	-		-	-	-	1.03	5.24	-	-	-	-	-	4.93
	Percent Shoot weevil infestation	-	-	9.5	-	-	-	-	-	-	18.33	-	-	-	-
	Mirids/ 10 squares	-	-	3.49	-	-	-	-	-	-	14.62	-	-	-	-
	Stem weevil infestation	-	-		-	-	18.57	-	-	-	-	-	-	33.33	-
	Midge infested flower buds in (% twisted flower buds)	-	-	0.59	-	-	-	-	-	-	5.78	-	-	-	-
B.	**Bollworm**														
	Helicoverpa eggs/ 5 plant	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Helicoverpa larvae/ 5 plant	-	-	-	-	-	-	0.20	-	-	-	-	-	-	0.50
	SBW larvae / 5 plant	-	-	-	-	-	-	0.30	-	-	-	-	-	-	0.30
	Flower damage / 50 Flowers (%)	0.00	0.00		1.07	6.06	2.23	7.67	0.00	2.00	-	5.13	13.50	3.17	17.30
	Pink boll worm/ 20 green bolls	12.5	1.30	1.79	5.61	9.31		3.33	13.00	3.30	17.48	10.55	26.12	-	13.30
	Spodopteralitura / 5 plants							1.00	-	-	-	-	-	-	2.90
	Fruiting bodies damage %	35.53	6.60	7.23	7.13	11.1	3.8	-	37.77	25.00	22.44	20.59	28.09	4.22	-
	Green boll damage on locule basis (%)	26.5	5.00	8.2	9.23	12.81	-	-	28.13	8.47	27.41	27.01	29.68	-	-
	Open boll damage	20.9	10.00	8.75	7.38	12.65	-	-	26.28	25.00	24.57	40.12	13.62		
	Open boll locule damge	11.6	8.75	9.55	10.38	15.47	21.23	2.5	14.00	30.00	29.77	28.32	32.25	21.91	3.50
	PBW - No. of Trap catches	-	9.00	-	22.56	-	7.33	-	-	14.00	-	26.22	-	7.12	-
	% Parasitism on bollworms	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C.	**Other pests**														
	Anomis flava larvae/ 5 plant	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Syleptaderogata larvae/ 5 plant	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Spodopteralitura larvae/ 5 plant	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mean Trap catches / week	-	-	-	-	12.35	-	-	-	-	-	-	0.00	-	-
D.	**Natural enemies/plant**	-	-	2.16	-	-	-	0.93	-	-	1.85	-	-	-	0.44
E.	**Seed cotton yield and economics**														
	1. Seed cotton yield (q/ha)	17.56	23.75	19.35	35.25	17.9	17.64	21.65	18.74	18.75	14.38	32.38	12.3	16.85	17.34
	2. Gross income (Rs./ha)	-	-	96750	-	-	-	-	-	-	71900	-	-	-	-
	cost of cultivation/ ha (Rs)	-	-	60042	-	-	-	-	-	-	57042	-	-	-	-
	Net profit (Rs./ha)	-	-	36708	-	-	-	-	-	-	14858	-	-	-	-
	Cost Benefit ratio	-	-	1.61	-	-	-	-	-	-	1.26	-	-	-	-

LG – Lam Guntur; ND – Nandyal; DW – Dharwad; RC – Raichur; CN – Chamarajanagara; CBE – Coimbatore; SVPR – Srivilliputtur;

Table 68. Ent 9. Evaluation of an BVG Agro Safe (a product from Plant extracts) on cotton pest complex (Aphids) - Paid up trial by BVG Life Sciences Ltd., at Central Zone during 2019- 20

Treatments	Mean Population of Aphid (No./ 3 leaves)														% reduction of Aphids over control				
	JU		RA			SU				AK		NA			JU	RA	SU	AK	NA
	Post		Pre		Post	Pre		Post		Pre	Post	Pre		Post					
	OV	TV	OV	TV	OV	OV	TV	OV	TV	OV	OV	OV	TV	OV					
T1	10.30	3.21	3.54	2.2	7.87	3.47	1.99	28.99	5.05	0.88	0.3	11.13	3.41	1.11	22.26	52.81	9.14	18.18	61.06
T2	8.08	2.84	4.65	2.57	7.9	3.60	2.02	25.11	4.72	0.79	0.3	10.47	3.29	1.15	39.02	52.62	21.31	18.18	59.65
T3	8.74	2.96	4.34	2.39	7.2	3.40	1.97	21.08	4.35	0.74	0.29	10.5	3.31	1.07	34.04	56.85	33.95	21.21	62.46
T4	9.36	3.06	4.62	2.19	6.83	4.13	2.15	29.66	5.13	0.86	0.34	8.73	3.04	1.14	23.28	61.43	13.65	43.64	58.25
T5	7.71	2.78	4.45	2.57	5.72	3.53	2.01	25.33	4.76	0.92	0.49	8.27	2.96	1.06	36.80	67.71	26.24	20	61.18
T6	8.29	2.88	4.12	2.48	5.03	3.33	1.96	18.70	4.08	0.78	0.28	9.1	3.09	1.05	32.05	71.61	45.55	54.55	61.54
T7	13.25	3.64	6.69	2.72	16.68	4.00	2.12	31.91	5.35	0.98	0.37	10.03	3.24	2.85	-		-		-
T8	12.20	3.49	6.94	2.81	17.72	3.13	1.91	34.34	5.55	0.97	0.61	9.27	3.12	2.73	-		-		-
F Test													N.S.						
S.Em.±		0.15		0.09		-	0.07	-	0.08				0.11				-		
C.D. at 5 %		0.45		0.29		-	NS	-	0.24				0.35				-		
C.V. %		8.24		7.16		-	6.19	-	7.18				6.41				-		

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Treatment details

T1- NBt (DCH 32) - BVG Agrosafe @3.00 ml Per litre of spray fluid
T2- NBt (DCH 32) - BVG Agrosafe@ 4.50 ml Per litre of spray fluid
T3- NBt (DCH 32) - BVG Agrosafe@6.00 ml Per litre of spray fluid
T4- Bt (RCH 2 BG II) – BVG Agrosafe@3.00 ml Per litre of spray fluid
T5- Bt (RCH 2 BG II) – BVG Agrosafe@4.50 ml Per litre of spray fluid
T6- Bt (RCH 2 BG II) – BVG Agrosafe@6.00 ml Per litre of spray fluid
T7- NBt Control (Unsprayed) -
T8- Bt control (Unsprayed) -
Central Zone : Irrigated : Junagadh, Rahuri, Khandwa
Rainfed : Akola, Nanded, Surat
OV – Original Value; TV – Transformed Value;

Contd…

Table 68.1. Ent 9. Evaluation of an BVG Agro Safe (a product from Plant extracts) on cotton pest complex (Leafhopper) - Paid up trial by BVG Life Sciences Ltd., at Central Zone during 2019- 20

Treatments	Mean Population of Leafhopper (No./ 3 leaves)														% Reduction of Leafhopper over control				
	JU		RA			SU				AK		NA			JU	RA	SU	AK	NA
			Pre		Post	Pre		Post		Pre	Post	Pre		Post					
	OV	TV	OV	TV	OV	OV	TV	OV	TV	OV	OV	OV	TV						
T1	10.45	3.23	2.27	1.67	4.24	5.87	2.52	11.21	3.34	4.93	3.49	3.67	2.04	1.26	21.72	26.29	23.68	16.93	31.15
T2	8.96	2.99	2.21	1.65	3.93	6.60	2.66	9.91	3.14	4.63	3.44	3.73	2.06	1.16	32.88	31.67	32.53	17.99	36.62
T3	9.55	3.09	2.34	1.69	3.77	5.80	2.51	7.12	2.67	4.76	3.12	3.97	2.11	1.18	28.46	34.39	51.51	25.66	35.52
T4	7.86	2.80	2.3	1.67	3.96	5.27	2.40	9.72	3.10	4.5	3.71	4.1	2.14	1.29	25.71	26.56	26.72	10.7	29.51
T5	6.15	2.48	1.87	1.54	3.68	6.07	2.56	8.18	2.86	4.28	3.44	3.93	2.1	1.25	41.87	31.85	38.36	17.11	31.7
T6	7.09	2.66	2.05	1.6	3.54	5.33	2.41	6.11	2.48	4.02	2.98	4.3	2.19	1.12	32.99	34.4	53.94	28.34	38.8
T7	13.35	3.65	2.6	1.76	5.75	5.67	2.48	14.69	3.82	4.21	4.2	4.73	2.29	1.83	-		-		-
T8	10.58	3.25	1.87	1.54	5.4	4.40	2.21	13.27	3.61	4.67	4.16	4.87	2.32	1.83	-		-		-
F Test													Sig.						
S.Em.±		0.13		N/A		-	0.09	-	0.06				0.05				-		
C.D. at 5 %		0.41		0.11		-	NS	-	0.16				0.18				-		
C.V. %		7.66		11.8		-	6.23	-	8.14				4.79				-		

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Treatment details

T1- NBt (DCH 32) - BVG Agrosafe @3.00 ml Per litre of spray fluid
T2- NBt (DCH 32) - BVG Agrosafe@ 4.50 ml Per litre of spray fluid
T3- NBt (DCH 32) - BVG Agrosafe@6.00 ml Per litre of spray fluid
T4- Bt (RCH 2 BG II) – BVG Agrosafe@3.00 ml Per litre of spray fluid
T5- Bt (RCH 2 BG II) – BVG Agrosafe@4.50 ml Per litre of spray fluid
T6- Bt (RCH 2 BG II) – BVG Agrosafe@6.00 ml Per litre of spray fluid
T7- NBt Control (Unsprayed) -
T8- Bt control (Unsprayed) -

OV – Original Value; TV – Transformed Value;

Central Zone : Irrigated : Junagadh, Rahuri, Khandwa
Rainfed : Akola, Nanded, Surat

Contd…

Table 68.2. Ent 9. Evaluation of an BVG Agro Safe (a product from Plant extracts) on cotton pest complex (Thrips) - Paid up trial by BVG Life Sciences Ltd., at Central Zone during 2019- 20

Treatments	Mean Population of Thrips (No./ 3 leaves)														% Reduction of Thrips over control				
	JU		RA			SU				AK		NA			JU	RA	SU	AK	NA
	Post spraying		Pre		Post	Pre		Post		Pre	Post	Pre		Post					
	OV	TV	OV	TV	OV	OV	TV	OV	TV	OV	OV	OV	TV						
T1	11.20	3.35	6.59	2.19	4.07	17.20	4.21	22.17	4.54	1.31	0.93	6.2	2.59	4.13	22.44	39.99	18.90	6.67	30.06
T2	9.12	3.02	5.1	2.02	4.15	17.53	4.24	17.17	4.04	1.07	0.82	5.43	2.43	3.86	36.84	47.55	37.20	17.78	34.91
T3	10.96	3.31	5.33	2.28	4.01	16.40	4.11	13.10	3.51	1.1	0.79	5.47	2.44	3.46	24.10	40.82	52.07	21.11	41.66
T4	10.89	3.30	6.28	2.45	4.68	17.80	4.28	19.73	4.29	1.42	0.98	6.3	2.61	4.17	16.62	40.81	25.95	16.19	34.23
T5	8.26	2.87	4.83	2.45	3.71	18.80	4.39	15.25	3.82	1.23	0.82	5.47	2.44	3.7	36.75	53.08	42.78	29.52	41.65
T6	9.53	3.09	4.68	2.03	3.58	17.00	4.16	10.80	3.22	1.46	0.78	4.73	2.29	3.5	27.03	54.74	59.47	33.33	44.8
T7	14.44	3.80	6.97	2.34	6.78	16.47	4.11	27.33	5.13	1.3	1	7.83	2.89	5.93	-		-		-
T8	13.06	3.61	8.62	2.77	7.91	16.07	4.04	26.65	5.07	1.5	1.17	7.87	2.89	6.34	-		-		-
F Test													Sig.		-		-		
S.Em.±		0.14		0.14		-	0.20	-	0.11				0.07		-		-		
C.D. at 5 %		0.42		0.42		-	NS	-	0.31				0.2		-		-		
C.V. %		7.30		9.55		-	8.39	-	8.89				5.06		-		-		

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Treatment details

T1- NBt (DCH 32) - BVG Agrosafe @3.00 ml Per litre of spray fluid

T2- NBt (DCH 32) - BVG Agrosafe@ 4.50 ml Per litre of spray fluid

T3- NBt (DCH 32) - BVG Agrosafe@6.00 ml Per litre of spray fluid

T4- Bt (RCH 2 BG II) – BVG Agrosafe@3.00 ml Per litre of spray fluid

T5- Bt (RCH 2 BG II) – BVG Agrosafe@4.50 ml Per litre of spray fluid

T6- Bt (RCH 2 BG II) – BVG Agrosafe@6.00 ml Per litre of spray fluid

T7- NBt Control (Unsprayed) -

T8- Bt control (Unsprayed) -

OV – Original Value; TV – Transformed Value;

Central Zone : Irrigated : Junagadh, Rahuri, Khandwa

Rainfed : Akola, Nanded, Surat

Contd…

Table 68.3. Ent 9. Evaluation of an BVG Agro Safe (a product from Plant extracts) on cotton pest complex (Whitefly) - Paid up trial by BVG Life Sciences Ltd., at Central Zone during 2019- 20

Treatments	Mean Population of Whitefly (No./ 3 leaves)														% Reduction of Whitefly population over control				
	JU		RA			SU				AK		NA			JU	RA	SU	AK	NA
			Pre		Post	Pre		Post		Pre	Post	Pre		Post					
	OV	TV	OV	TV	OV	OV	TV	OV	TV										
T1	6.67	2.58	1.18	1.3	2	2.93	1.85	7.21	2.69	1.68	1.42	2.63	1.77	1.36	23.16	42.02	20.56	7.79	47.7
T2	5.48	2.34	1.06	1.25	1.82	2.73	1.79	5.90	2.46	1.48	1.36	2.1	1.61	1.46	36.87	47.39	35.01	11.18	43.85
T3	6.35	2.52	0.94	1.2	1.75	3.93	2.10	3.51	1.96	1.46	1.13	2.15	1.62	1.47	26.84	49.45	61.32	26.62	43.47
T4	7.15	2.67	1.08	1.26	1.36	3.33	1.95	7.03	2.69	1.58	1.4	2.03	1.59	1.31	23.77	33.84	29.59	10.82	49.23
T5	5.78	2.40	1.12	1.27	1.21	3.07	1.88	5.34	2.36	1.66	1.21	1.82	1.52	1.36	38.38	40.94	46.50	22.92	47.29
T6	6.42	2.53	1.04	1.24	1.07	3.87	2.08	3.31	1.90	1.63	1.13	2.15	1.62	1.37	31.56	48.06	66.85	28.02	46.9
T7	8.68	2.95	1.2	1.3	3.45	3.00	1.87	9.08	3.04	1.62	1.54	3.95	2.11	2.6	-		-		-
T8	9.38	3.06	0.98	1.22	2.05	3.53	2.00	9.99	3.18	1.42	1.57	3.62	2.03	2.58	-		-		-
F Test													Sig.						
S.Em.±		0.13		N/A		-	0.12	-	0.09				0.06				-		
C.D. at 5 %		0.40		0.16		-	NS	-	0.25				0.19				-		
C.V. %		8.72		22.62		-	10.35	-	8.17				6.52				-		

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Treatment details

T1- NBt (DCH 32) - BVG Agrosafe @3.00 ml Per litre of spray fluid
T2- NBt (DCH 32) - BVG Agrosafe@ 4.50 ml Per litre of spray fluid
T3- NBt (DCH 32) - BVG Agrosafe@6.00 ml Per litre of spray fluid
T4- Bt (RCH 2 BG II) – BVG Agrosafe@3.00 ml Per litre of spray fluid
T5- Bt (RCH 2 BG II) – BVG Agrosafe@4.50 ml Per litre of spray fluid
T6- Bt (RCH 2 BG II) – BVG Agrosafe@6.00 ml Per litre of spray fluid
T7- NBt Control (Unsprayed) -
T8- Bt control (Unsprayed) -

OV – Original Value; TV – Transformed Value;

Central Zone : Irrigated : Junagadh, Rahuri, Khandwa
Rainfed : Akola, Nanded, Surat

Contd…

Table 68.4. Ent 9. Evaluation of an BVG Agro Safe (a product from Plant extracts) on cotton pest complex (Green boll damage) - Paid up trial by BVG Life Sciences Ltd., at Central Zone during 2019- 20

Treatments	Mean Green boll damage (%)														% Reduction of green boll damage				
	JU		RA(PBW)			NA (H. armigera)			NA (SBW)			NA (PBW)			JU	NA			RA
			Pre		Post	Pre		Post	Pre		Post	Pre		Post		H. a	SBW	PBW	
	OV	TV	OV	TV	OV	OV	TV		OV	TV		OV	TV						
T1	28.3	32.14	5	13.3	4.23	4.37	12.06	2.23	5.1	12.97	3.58	7.37	15.65	5.39	10.56	42.23	28.12	23.66	26.13
T2	23.18	28.78	6.2	13.79	3.6	4	11.45	2.13	4.5	12.18	2.65	5.07	12.96	4.13	26.74	44.82	46.79	41.61	37.11
T3	26.63	31.07	3.42	11.21	2.76	3.07	9.98	1.81	1.8	7.65	0.98	3.9	11.38	3.24	15.83	53.11	88.33	54.11	51.76
T4	21.62	27.71	2	7.9	1.7	0	0	0	0	0	0	3.27	10.27	2.44	27.74	-	-	42.73	44.34
T5	14.76	22.60	2.09	8.27	1.63	0	0	0	0	0	0	2.2	8.52	2.02	50.67	-	-	52.59	46.46
T6	18.27	25.31	3.1	10.21	2.22	0	0	0	0	0	0	2.17	8.45	2.26	38.94	-	-	46.95	27.29
T7	31.64	34.23	8.97	15.93		5.8	13.92	3.86	8.7	17.08	4.98	9.13	17.53	7.06		-	-	-	
T8	29.92	33.16	4.2	13.1		0	0	0	0	0	0	3.73	11.11	4.26		-	-	-	
F Test							Sig			Sig.			Sig.						
S.Em.±		1.61		0.64			0.54			0.67			0.78						
C.D. at 5 %		4.88		1.98			1.65			2.05			2.38						
C.V. %		9.49		9.42			15.97			18.82			11.37						

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Treatment details

T1- NBt (DCH 32) - BVG Agrosafe @3.00 ml Per litre of spray fluid
T2- NBt (DCH 32) - BVG Agrosafe@ 4.50 ml Per litre of spray fluid
T3- NBt (DCH 32) - BVG Agrosafe@6.00 ml Per litre of spray fluid
T4- Bt (RCH 2 BG II) – BVG Agrosafe@3.00 ml Per litre of spray fluid
T5- Bt (RCH 2 BG II) – BVG Agrosafe@4.50 ml Per litre of spray fluid
T6- Bt (RCH 2 BG II) – BVG Agrosafe@6.00 ml Per litre of spray fluid
T7- NBt Control (Unsprayed) -
T8- Bt control (Unsprayed) -

OV – Original Value; TV – Transformed Value;

Central Zone : Irrigated : Junagadh, Rahuri, Khandwa
Rainfed : Akola, Nanded, Surat

Contd…

Table 68.5. Ent 9. Evaluation of an BVG Agro Safe (a product from Plant extracts) on cotton pest complex (Open boll damage) - Paid up trial by BVG Life Sciences Ltd., at Central Zone during 2019- 20

Treatments	Mean Open boll damage (%)										% Reduction of Open boll damage over control					Open boll damage (%) by PBW		% Reduction of open boll damage by PBW
	JU		RA		SU		AK		NA		JU	RA	SU	AK	NA	SU		SU
																OV	TV	
	OV	TV	**OV**	**TV**	OV	TV	OV	TV	OV	TV								
T1	25.99	30.65	42.5	40.69	26.32	30.85	58.17	50.19	22.87	28.55	20.50	45.67	26.37	-8.81	14.12	14.16	22.10	28.23
T2	23.33	28.88	39.34	38.84	22.97	28.59	52.23	46.28	21.25	27.43	28.63	49.71	35.73	2.30	20.20	12.12	20.35	38.60
T3	25.31	30.20	36.95	37.43	16.78	24.16	56.82	49.13	10.48	18.84	22.58	52.77	53.06	-6.29	60.65	7.46	15.79	62.21
T4	21.34	27.51	38.4	38.29	12.89	21.02	62.6	52.37	9.55	17.98	30.15	42.94	25.55	8.16	36.58	12.89	21.02	25.55
T5	13.17	21.28	36.5	37.17	11.79	20.03	74.28	60.9	7.94	16.31	56.89	45.77	31.90	-8.98	42.47	11.79	20.03	31.90
T6	17.36	24.62	31.29	34.01	6.70	14.90	80.78	64.16	7.04	15.37	43.18	53.51	61.30	-18.52	45.78	6.70	14.90	61.30
T7	32.69	34.87	78.23	62.19	35.75	36.69	53.46	47.02	26.63	31.05			-	-	-	19.73	26.35	-
T8	30.55	33.55	67.3	55.12	17.31	24.54	68.16	56.08	22.65	28.35			-	-	-	17.31	24.54	-
F Test								**NS**		Sig.								
S.Em.±		1.36			-	0.67		5.358		0.83			-			-	0.71	-
C.D. at 5 %		4.13			-	2.03		--		2.54			-			-	2.16	-
C.V. %		8.14			-	8.20		17.42		6.31			-			-	5.98	-

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Treatment details

T1- NBt (DCH 32) - BVG Agrosafe @3.00 ml Per litre of spray fluid
T2- NBt (DCH 32) - BVG Agrosafe@ 4.50 ml Per litre of spray fluid
T3- NBt (DCH 32) - BVG Agrosafe@6.00 ml Per litre of spray fluid
T4- Bt (RCH 2 BG II) – BVG Agrosafe@3.00 ml Per litre of spray fluid
T5- Bt (RCH 2 BG II) – BVG Agrosafe@4.50 ml Per litre of spray fluid
T6- Bt (RCH 2 BG II) – BVG Agrosafe@6.00 ml Per litre of spray fluid
T7- NBt Control (Unsprayed) -
T8- Bt control (Unsprayed) -
Central Zone : Irrigated : Junagadh, Rahuri, Khandwa
Rainfed : Akola, Nanded, Surat
OV – Original Value; TV – Transformed Value;

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Table 68.6. Ent 9. Evaluation of an BVG Agro Safe (a product from Plant extracts) on cotton pest complex (Locule damage) - Paid up trial by BVG Life Sciences Ltd., at Central Zone during 2019- 20

Treatments	Mean locule damage (%)								% Reduction of locule damage over control				Locule damage by PBW		% Reduction of locule damage by PBW
	JU		SU		AK		NA		JU	SU	AK	NA	SU		SU
	OV	TV	OV	TV	OV	TV	OV	TV							
T1	25.09	30.06	13.10	21.20	32.74	34.35	7.76	16.14	18.93	22.95	-29.82	44.05	7.24	15.61	24.40
T2	21.53	27.65	11.26	19.58	27.03	31.25	7.72	16.07	30.44	33.77	-7.18	44.34	6.31	14.53	34.16
T3	23.59	29.06	8.23	16.65	29.52	32.88	7.02	15.32	23.78	51.61	-17.05	49.39	3.84	11.27	59.89
T4	19.33	26.08	6.07	14.25	37.09	37.36	6.65	14.92	32.77	31.53	-10.92	54.70	6.07	14.25	31.53
T5	12.45	20.66	5.45	13.47	41.36	39.91	4.9	12.78	56.70	38.47	-23.68	66.62	5.45	13.47	38.47
T6	16.81	24.2	3.41	10.55	45.49	42.41	4.21	11.82	41.53	61.58	-36.03	71.32	3.41	10.55	61.58
T7	30.95	33.8	17.00	24.33	25.22	30.05	13.87	21.81		-			9.58	18.02	-
T8	28.75	32.42	8.86	17.29	33.44	35.21	14.68	22.42		-			8.86	17.29	-
F Test						**NS**		Sig							
S.Em.±		1.34	-	0.45		3.92		0.93		-			-	0.44	-
C.D. at 5 %		4.07	-	1.36		--		2.83		-			-	1.32	-
C.V. %		8.31	-	9.21		19.17		9.88		-			-	5.26	-

Treatment details

T1- NBt (DCH 32) - BVG Agrosafe @3.00 ml Per litre of spray fluid
T2- NBt (DCH 32) - BVG Agrosafe@ 4.50 ml Per litre of spray fluid
T3- NBt (DCH 32) - BVG Agrosafe@6.00 ml Per litre of spray fluid
T4- Bt (RCH 2 BG II) – BVG Agrosafe@3.00 ml Per litre of spray fluid
T5- Bt (RCH 2 BG II) – BVG Agrosafe@4.50 ml Per litre of spray fluid
T6- Bt (RCH 2 BG II) – BVG Agrosafe@6.00 ml Per litre of spray fluid
T7- NBt Control (Unsprayed) -
T8- Bt control (Unsprayed) -
OV – Original Value; TV – Transformed Value;
Central Zone : Irrigated : Junagadh, Rahuri, Khandwa
Rainfed : Akola, Nanded, Surat

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Table 68.7. Ent 9. Evaluation of an BVG Agro Safe (a product from Plant extracts) on cotton pest complex (Natural enemies) - Paid up trial by BVG Life Sciences Ltd., at Central Zone during 2019- 20

Treatments	Mean Population of Natural enemies (No./Plant)																	
	JU		SU (Spiders)				AK		SU (LBB)				AK		NA (LBB)			RA (LBB)
			Pre		Post		Pre	Post	Pre		Post				Pre		Post	**Post**
	OV	TV	OV	TV	OV	TV			OV	TV	OV	TV	Pre	Post	OV	TV		OV
T1	1.39	1.18	1.13	1.28	1.93	1.55	0.1	0.1	2.20	1.62	1.20	1.30	0.03	0.06	1.43	1.39	0.47	0.91
T2	1.52	1.23	1.73	1.49	2.00	1.56	0.1	0.11	2.40	1.70	1.60	1.44	0.06	0.07	1.6	1.44	0.5	0.98
T3	1.31	1.15	1.27	1.32	1.87	1.52	0.04	0.09	2.87	1.83	1.87	1.52	0.08	0.07	1.63	1.45	0.54	0.96
T4	1.65	1.28	1.40	1.37	2.00	1.58	0.07	0.06	2.40	1.70	1.80	1.51	0.07	0.08	1.3	1.34	0.63	0.82
T5	1.91	1.38	1.13	1.28	1.80	1.51	0.08	0.07	1.87	1.53	1.73	1.49	0.08	0.06	1.23	1.31	0.57	0.79
T6	1.25	1.12	1.20	1.30	1.73	1.49	0.1	0.08	1.73	1.49	1.53	1.42	0.07	0.06	1.47	1.4	0.64	0.92
T7	1.52	1.23	1.67	1.46	2.13	1.62	0.1	0.14	2.20	1.64	1.60	1.45	0.14	0.17	2.3	1.67	0.76	1.37
T8	2.32	1.52	1.73	1.49	1.67	1.47	0.09	0.13	2.67	1.77	1.47	1.40	0.12	0.14	1.93	1.56	0.82	1.06
F Test																N.S.		
S.Em.±		0.07	-	0.09	-	0.12			-	0.12	-	0.11				0.07		
C.D. at 5 %		0.21	-	NS	-	NS			-	NS	-	NS				0.21		
C.V. %		9.71	-	11.22	-	13.84			-	12.54	-	13.41				8.63		

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Treatment details

T1- NBt (DCH 32) - BVG Agrosafe @3.00 ml Per litre of spray fluid
T2- NBt (DCH 32) - BVG Agrosafe@ 4.50 ml Per litre of spray fluid
T3- NBt (DCH 32) - BVG Agrosafe@6.00 ml Per litre of spray fluid
T4- Bt (RCH 2 BG II) – BVG Agrosafe@3.00 ml Per litre of spray fluid
T5- Bt (RCH 2 BG II) – BVG Agrosafe@4.50 ml Per litre of spray fluid
T6- Bt (RCH 2 BG II) – BVG Agrosafe@6.00 ml Per litre of spray fluid
T7- NBt Control (Unsprayed) -
T8- Bt control (Unsprayed) -

OV – Original Value; TV – Transformed Value;

Central Zone : Irrigated : Junagadh, Rahuri, Khandwa
Rainfed : Akola, Nanded, Surat

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Table 68.8. Ent 9. Evaluation of an BVG Agro Safe (a product from Plant extracts) on cotton pest complex (Natural enemies and Yield) - Paid up trial by BVG Life Sciences Ltd., at Central Zone during 2019- 20

Treatments	Mean Population of Natural enemies (No./Plant)										Seed Cotton Yield (Q/ha)				
	SU (Chrysoperla)				AK		NA (Chrysopa)			RA(Chrysopa)	JU	RA	SU (Kg/ha)	AK	NA
	Pre		Post		Pre	Post	Pre		Post	**Post**					
	OV	TV	OV	TV						OV					
T1	1.00	1.22	1.53	1.42	0.08	0.02	0.43	0.96	0.19	3.23	21.94	5.92	679.00	2.14	6.54
T2	0.87	1.16	1.67	1.47	0.03	0.08	0.4	0.94	0.22	2.71	22.93	6.26	740.67	2.22	7.36
T3	1.13	1.27	1.60	1.45	0.07	0.02	0.4	0.94	0.23	3.01	22.82	7.6	1028.67	2.58	7.46
T4	1.20	1.29	1.93	1.55	0.07	0.06	0.53	1.01	0.24	3.67	24.91	11.08	925.67	3.21	10.5
T5	1.13	1.27	1.67	1.46	0.06	0.07	0.33	0.91	0.23	3.11	27.56	12.1	1204.00	3.59	10.63
T6	1.13	1.27	2.00	1.58	0.09	0.03	0.37	0.93	0.25	3.07	26.23	14.26	1471.33	3.88	13.82
T7	0.93	1.19	2.07	1.60	0.1	0.07	0.63	1.06	0.34	5.38	17.97	4.85	432.00	2.05	5.87
T8	1.07	1.25	2.47	1.72	0.14	0.08	0.57	1.03	0.43	5.62	18.74	9.89	689.33	2.99	10.09
F Test								N.S.						**SIG**	Sig
S.Em.±	-	0.10	-	0.10				0.04			1.15	0.18	118.82	0.196	0.19
C.D. at 5 %	-	NS	-	NS				0.12			3.48	0.54	360.45	0.596	0.58
C.V. %	-	14.38	-	11.20				7.56			8.67	13.25	22.96	12.02	14.37

BA - Banswara, JU - Junagadh, SU - Surat, BH - Bharuch, AK -Akola, NA - Nanded, RA - Rahuri, KH - Khandwa, BW - Bhawanipatna

Treatment details

T1- NBt (DCH 32) - BVG Agrosafe @3.00 ml Per litre of spray fluid

T2- NBt (DCH 32) - BVG Agrosafe@ 4.50 ml Per litre of spray fluid

T3- NBt (DCH 32) - BVG Agrosafe@6.00 ml Per litre of spray fluid

T4- Bt (RCH 2 BG II) – BVG Agrosafe@3.00 ml Per litre of spray fluid

T5- Bt (RCH 2 BG II) – BVG Agrosafe@4.50 ml Per litre of spray fluid

T6- Bt (RCH 2 BG II) – BVG Agrosafe@6.00 ml Per litre of spray fluid

T7- NBt Control (Unsprayed) -

T8- Bt control (Unsprayed) -

OV – Original Value; TV – Transformed Value;

Central Zone : Irrigated : Junagadh, Rahuri, Khandwa

Rainfed : Akola, Nanded, Surat

AICRP on COTTON

ANNUAL REPORT:2019-20

Results of

Plant Pathology Trials

Photo: M. Sabesh

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CROP PROTECTION
PATHOLOGY

Path.1 Epidemiological studies on cotton diseases

NORTH ZONE

Path.1 (a): Observations on the occurrence of various diseases (in the farmer's field and research farms)

Regular surveys were conducted by PAU Regional station Faridkot at regular intervals in farmers field and research farms in three cotton-growing districts of Punjab. Cotton leaf curl disease (CLCuD), bacterial blight (BB) and fungal foliar spots (FFS) were the diseases observed in different districts. The PDI of CLCuD ranged from 1.24 to 35.72%on varieties RS 921, RST-9, F 186, F 846, F 505, F 1861, F 1378, F 2164, F 2381, F 2228, F 2383, F 1054. While CLCuD PDI on different hybrids was ranged between 6.33 to 14.83%, 5.0 to 35.33%, 4.0 to 12.2% in different villages, research farms of Faridkot, Fazilka and Muktsar districts, respectively (Table 1). Among the genotypes, the variety RCH 776 BG II occupying the major area in the cotton-growing region was found susceptible to CLCuD. Bacterial blight was found in traces to 2 Grade in Faridkot and traces to 1.0 Grade in Fazilka on hybrids like Bioseed 6588 BG II, RCH 773 BG II, RCH 776 BG II, US 51 and various entries of coordinated trials in different cotton-growing areas. The fungal foliar leaf spots caused by *Alternaria*, Myrothecium and *Cercospora*, ranged between traces to 3.0 Grade at Faridkot and betweentraces to 2.0 Grade at Fazilka and Muktsar district **(Table 1).**

The sixmajor blocks were covered in the district Bathinda i.e. Nathana, Talwandi, Sangat, Bathinda, Rampura, and Maur.During*Kharif* 2019, the severity of the CLCuD was found to be less (0-14.67%) in the cotton fields of the Bathinda district as compared to the previous year(0-49.17%).The initial incidence of the CLCuD was noticed on July 10 in Research trial(adjoining CLCuD sick plots) andon Aug 14, 2019, in RCH 776 BG II (Disease Severity Grade 1) at farmer's field of district Bathinda. Incidence of root rot ranging from 0-10% was found in the isolated pockets at 5-6 locations of the cotton field of Bathinda district at the time of the first irrigation at the farmer's field. An incidence of fungal foliar spots was noticed in September. An Incidence of Bacterial Blight particularly vein blight was noticed in traces at the farmer's field at the later stages(120-130 DAS) of the cropping season.The most popular *Bt*cotton hybrid sown in Bathinda District was found to be RCH 773 BG II followed by RCH 776 BG II and US 51 BG II**(Table 2).**

The data on disease intensity of leaf curl virus during *Kharif* 2019 in the cotton-growing areas of Sriganganagar and adjoining areas of Hanumangarh districts of Rajasthan state was recorded. Out of four tehsils surveyed in Sriganganagar district, average disease intensity of leaf curl virus was found to be the highest in Sriganganagar tehsil (21.98%) followed by Sadulshahar, Srikaranpur and Padampur tehsils in which the average disease intensity was 19.37, 13.65 and 6.22%, respectively. In adjoining cotton areas of Hanumangarh district, the average disease intensity was recorded to be 11.05%**(Table 3)**

The survey was conducted to record the occurrence of different diseases in major cotton-growing districts (Hisar, Bhiwani, Fatehabad, Sirsa, and Jind) as well as in the non-traditional cotton-growing areas of Haryana (Palwal and Rohtak) from June to September 2019. At HAU research farm cotton leaf curl virus disease ranged from 33.3 to 66.67% in September. Whereas at farmer's field the PDI was low as compared to the HAU research farm (8.0-18.0%). The highest percent disease index (PDI) was recorded 35.0% at Nidaniin district Jind followed by 31.0% at village Nidana and Ikkasof district Jind and 21% in Pilimandhori village of district Fatehabad. CLCuD PDI at Hansi in district Hisar 18.0%, Mehamin district Rohtak 18.0% and Kharkari in district Bhiwani 13.4% was recorded. Whereas, in Palwal district, PDI was less than 13.0%. Among the fungal diseases, PDI of Myrothecium leaf spot

(MLS) ranged from 0 to 8.0%. Other diseases *viz.* Bacterial leaf blight ranged from 0 to 4.0%, Root rot ranged from 0 to 5.0%**(Table 4).**

CENTRAL ZONE

Path.1 (a): Observations on the occurrence of various diseases (in the farmer's field and research farms)

The *Alternaria*was found widespread disease followed by grey mildew, bacterial blight and *Anthracnose*on*G. hirsutum* and *G. arboreum* cotton at the research station and at farmers field in **Nanded** district. The incidence of *Alternaria*, Bacterial blight and grey mildew was recorded at 30, 60 and 90 DAS. The percent disease intensity of *Alternaria*at 120 DAS was ranged from 7.01 to 12.40%, while the intensity of bacterial blight and grey mildew was ranged from 4.00 to 7.23% and from 6.85 to 13.20%. The *Anthracnose* was found in varieties of central zone screening trials namely line9191 (0.50%) and 9192 (1.20%), however, no incidence of parawilt was observed during years 2019-2020 **(Table 5).**

The survey was conducted on the farmer's field of **Akola** area as well as at the Research farm.During the seedling, stage crop was free from diseases at farmers' fields. The bacterial blight was observed at boll development stage and ranged between 8.75 to 26.25% in varieties/hybrids Bt and Non-Bt.The grey mildew intensity was observed after boll development to picking stage in few locations and it rangedfrom 4.00 to 18.50% only under irrigated crop. The Myrothecium leaf spot was observed in traces **(Table 6).**

The survey was conducted on the farmer's field of the Surat area as well as at Research farm, **Surat**. Bacterial leaf blight incidence (PDI)ranged from 0.0 to 36.5% (LRA5166) and *Alternaria* leaf spot disease from 0.0 to 5.5% in different cultivars/ hybrids at Research farm. Whereas at farmer's fields, a roving survey was carried out on BG II hybrids, the PDI of Bacterial leaf blight disease was ranged from 0.0 to 12.0%, 0.0 to 8.0% and 2.0 to 7.0% in Surat, Bharuch and Narmada districts, respectively.PDI of *Alternaria* leaf spot disease was observed in the range of 0.0 to 5.0%, 0.0 to 20.0% and 0.0 to 2.0% in Surat, Bharuch and Narmada district, respectively (**Table7**).

The occurrence of various diseases of cotton was surveyed on farmer's field of Saurashtra area and at Cotton Research Station, JAU, **Junagadh**. In Junagadh district the PDI of *Alternaria* leaf spot (ALS), bacterial leaf blight (BLB), and grey mildew was ranged from 15.0 to 23.5%, 0.0 to 1.6% and 8 to 21.10% respectively. In the Rajkot district, the intensity of ALS, BLB and grey mildew disease was ranged from 14.2 to 21.6, 0.2 to 1.5% and 0 to 22 %, respectively. In Amreli district, the intensity of ALS, BLB and grey mildew disease was ranged from 16.0 to 19.7%, 0.5 to 1.0% and 15.0 to 24.0%. Parawilt incidence was recorded from 0 to 5%% in **Junagadh** district only (**Table 8**). At the Cotton Research Station, Junagadh, ALS on G. Cot.hy-8BG-II and G. Cot hy-105.0, 45.0% and BLB from 3.0, 47.0%, respectively. During the season grey mildew was recorded only G. Cot-10 *Bt* Male parent ranging from 5 to 22%. Parawilt was not observed at the farmers field.

SOUTH ZONE

Path.1 (a): Observations on the occurrence of various diseases (in the farmer's field and research farms)

Survey conducted at farmers' fields in five districts in Karnataka and the results indicated the predominance of *Alternaria* blight (05-45%) in the early stages of the crop growth followed by Grey mildew (04-25%) and Bacterial blight (03-25%) **(Table 9).**

Alternaria leaf spot, *Cercospora* leaf spot, *Corynespora* leaf spot, bacterial blight, grey mildew, and rust were recorded during the surveys conducted from August 2019 to January 2020, in cotton-growing mandals of Guntur (1.81 lakh ha), Krishna (0.48 lakh ha), Prakasam (0.45 lakh ha) and Kurnool (2.69 lakh ha) districts in Andhra Pradesh**.** The percent disease intensity (PDI) of bacterial blight, *Alternaria* leaf spot, *Corynespora* leaf spot, grey mildew and rust diseases in various hybrids and varieties of cotton trials conducted at RARS, Lam was also recorded. During August 2019 crop was healthy. Root rot (2%) and wilt (5%) were observed in a few isolated fields during September while leaf spots were in traces. During the October *Alternaria* leaf spot (0.0 to 28.0% PDI) and *Corynespora* leaf spot (0.0 to 9.0%) was observed in 55 to 90 days old crops. *Corynespora* leaf spot (3.0 to 28.75%), *Alternaria* leaf spot (2.0 to 20.0% PDI) and bacterial blight (0.0 to 10.0% PDI) were recorded during November while *Alternaria* (0.0 to 18.0%), *Corynespora* leaf spot (0.0 to 5.67), bacterial blight (0.0 to 1.0) grey mildew (1.0 to 28.0%) and rust (0.0 to 2.75%) were observed during December 2019. Rust progressed from 13.86 to 20.0%during January 2020 while grey mildew from 10.42 to 18.75% and *Corynespora*from11.67 to 13.67%were also recorded **(Table 10)**.

Corynespora leaf spot was the major disease (0.0 to 48.25%) followed by *Alternaria* leaf spot (0.0 to 30.0%), Grey mildew (0.0 to 35.5%) and rust (0.0 to 44.0%), bacterial blight (0.0 to 25.0%), anthracnose (0.0 to 14.0%) and *Cercospora* leaf spot (0.0 to traces) were observed at Regional Agricultural Research Station, Lam**, Guntur** during *Kharif* 2019**(Table 11).**

Survey was conducted to assess the severity of cotton diseases from regions *viz.,* Virudhunagar, Tirunelveli, Dindigul, Tiruppur, Madurai, Perambalur and Coimbatore of Tamil Nadu. The incidence of diseases *viz.,* root rot, *Alternaria*leaf blight, Grey mildew*,* bacterial blight, and Tobacco streak virus (TSV) were ascertained in the above-mentioned cotton-growing regions**.** In the villages namely Solasari, Perumalpatti, Karivalam, Sankarankovil, Kuvalakkanni, and Kurukalpatti, of **Tirunelveli District,** the cotton fields were found to be sown with RCH659 cotton hybrid. The incidence of*Alternaria* leaf blight was observed to be approximately five percent. Root rot with stem weevil incidence was also observed in the surveyed cotton fields in the range between 10 to 15%.The villagesof Virudhunagar district, namely, Ramalingapuram, Desigapuram, Rajapalayam, Muthukudi and Solapuram were surveyed and the data revealed that farmers have been growing cotton hybrid RCH 659. The plants are fairly devoid of diseases except for the incidence of root rot which was observed in some of the fields in the range between 5-10% (**Table 12).**

The disease surveillance survey conducted in the Coimbatore district including villages namely Mungiltholuvu, Pethppampatti, Thondamuthur, Kenathukadavu, PutturandSinkaiyanpudur. The symptom of *Tobacco streak virus* disease was observed in MCU5, Co14 cotton and RCH 659 fields which ranged from 5-10%. Bacterialleaf blight was observed in the range of 5-10 percent whereas 5 percent of *Myrothecium* and *Alternaria* leaf blight was also observed in the cotton fields. The survey in Perambalur district including cotton-growing areas of Perambulur, Veppanthattai and Paluvurindicated that the RCH 659 was the predominant hybrid cotton grown by farmers. The incidence of *Alternaria* Leaf Blight was found to be high with 3.0 PDI followed by the medium incidence of Grey mildew (2.0% PDI) and Bacterial Leaf Blight (2.0 % PDI)

Kundadam and Dharapuram blocks surveyed in Tiruppur District where a higher incidence of ALB and Grey mildew as the PDI was 3.0% in the hybrid cotton fields. Dindigul District is another

predominant cotton-growing district in which the villages namely Palam Rajakkapatti, Chinnagoundanvalasu and Amplikkai were surveyed and it was found that the symptoms of ALB and Grey mildew was predominant and the incidence was rated to be high with PDI of 3.0. In Erode district farmers were found to grow RCH 659. Grey mildew appeared and the level of incidence was high (3.0% PDI) in surveyed areas of Chittode and Erode. In Madurai District, the Non-Bt cotton areas were surveyed for the incidence of cotton diseases. The survey in Alampatti and S.Ammapatti villages revealed that the incidence of ALB was minimal.

Path.1 (b): Disease progress in relation to weather factors.

NORTH ZONE

Observations on the appearance and progress of Cotton leaf curl viral disease (CLCuD) were taken at weekly intervals starting from 25th to 44th meteorological week at **Faridkot, Punjab**. CLCuD was first observed on RST-9 in the 25thSMW. It was found that CLCuD % increased up to 40th SMW in all the varieties. Max PDI was 36.8 followed by 36.0, 33.0 and 34.4 in RST 9, HS 6, RS 921 and F 846(Table-5). In F846 the correlation between weather parameters showed a strong negative correlation with temperatures, afternoon and mean relative humidity and also with rainfall. PDI was negatively correlated with maximum temperature (r = -0.66), minimum temperature (r = -0.82) and mean temperature (r = -0.81). Conversely, morning time relative humidity (r = 0.59) and extended duration of bright sunshine (r = 0.17) was beneficial for the PDI of CLCuD**(Table 13).**

Susceptible variety RST-9 of cotton was sown on 26.5.2019 in 545 square meter area following the recommended package of practices to record weekly progress of leaf curl disease at **Sriganganagar**, Rajasthan. Leaf curl disease first appeared on 02nd July after 36 days of sowing during 27thSMW and the incidence at the end of this week was 2.54%. However, in subsequent standard week's leaf curl incidence in crop showed fast progressive increase reaching the maximum level of 100%on 13th August during 33rd Standard week. The disease incidence was increased gradually up to 29thSMW (16 July-22 July) with disease severity of 32.57%. In subsequent 30th to 33rd SMW disease progression was found very fast reaching the level of 100%.The overall precipitation from June to August (vegetative phase) during this year was 128.4 mm. The average weekly temperature during this period of June to August remained between 26.7 to 46.8 ^{o}C and relative humidity ranged between 16.1 to 83.7% **(Table 14).**

CLCuD susceptible cultivar HS-6 was sown on 4.5.2019 with a spacing of 67.5 x 30 cm at **Hisar, Haryana**. All the recommended agronomical practices were followed for raising the crop. The observations on disease progress were recorded at an interval of 7 days till the first week of November 2019 under field conditions. CLCuD appeared on 12th June 2019 in the 24thSMW after 37 days of sowing and disease incidence was 5.66% which increases upto 97.00% on 39th week. The percent disease index was increased from 0.93%to up to 55.48% on 43rd week, during this period the average maximum and minimum temperature recorded were 31.9 and 14.9^{o}C, whereas, morning and evening relative humidity was from 79 to 31.00% with 6.50 sunshine hours having maximum whitefly population 42.30 per three leaves on 35th standard meteorological week **(Table 15).**

The leaf curl virus disease initiated in 26th SMW (25 June-1 July) and the incidence reached 100% by 32nd week (6-12 Aug) at **Sirsa, Haryana.** An increasing trend of whitefly incidence from 2.5 per 3 leaves up to 12.7 whiteflies per 3 leaves was observed during the season. The maximum temperature ranged from 33.3 to 42.2^{0}C whereas the minimum temperature was between 21.1 to 29.6^{0}C. Relative humidity morning and evening ranged between 53.9 – 83.6 and 30.7-71.6%, respectively. The total rainfall received during this period was 202.5 mm(**Table 16**).

CENTRAL ZONE

The first incidence of Bacterial blight was noticed during 36 thSMW at **Nanded** and PDI was found in the range of 0.13 to 8.20%, while the incidence of *Alternaria* was observed during 33rdSMW and PDI was ranged from0.2 to 12.4%. The Grey mildew PDI was observed during 45rdDMW, and the PDI ranged from0.6 to 13.2%.Anthracnose was observed during 50thSMW and ranged from 0.50 to 1.20%. Apart from this, no othermajor diseases were found at the research station as well as on farmers' fieldin Nanded district **(Table 17).**

The study was undertaken on cultivated susceptible *G hirsutum* variety LRA-5166, hybrid Bhakti Bt and deshi variety AKA-8 at **Akola**. The weekly observations on major foliar diseases viz. Bacterial blight, MLS and grey mildew were recorded on randomly selected 10 plants by using 0-4 point prescribed grade scale.Observations were recorded on Major diseases (BLB, MLS & GM) from 38thSMW (17-23 Sept. 2019) and maximum Bacterial blight incidence was noticed on LRA 5166 from 22-28th October 2019 (43thSMW), when the maximum and minimum temperature was 26.8 and 17.6^{0}C along with relative humidity between the range of 95 and 79 percent. MLS incidence was noticed on LRA 5166 from 24-30th September 2019 (39 MW) and maximum (4.55) was recorded during 22-28th October 2019 (43dr SMW). However, Grey Mildew incidence was noticed on LRA 5166 from 5-11 November 2019 (45th SMW) and maximum (4.66) was recorded during 26 Nov -2nd December 2019 (48th SMW). A similar trend was also observed in the case of Bhakti Bt **(Table 18a).** The maximum temperature has shown positive and significant correlation with bacterial blight at 5% level of significance on LRA-5166 and Bhakti Bt cotton. The correlation between rainfall, minimum temperature, relative humidity, and BSH had positive and non-significant whereas rainfall exhibited positive and non-significant against both LRA-5166 and Bhakti Bt (**Table 18b**).

During the season, only Bacterial leaf blight disease was found on G. Cot. Hy. 12 Non-Bt at **Surat (Gujarat)**. The incidence of Bacterial leaf blight disease was noticed from 32nd to 51stSMW with the maximum disease intensity in the third week of October (34.0 % PDI) *i.e.* in 42thSMW. Incidence of Bacterial leaf blighthada positive correlation with the maximum temperature, evening humidity and sunshine hours for disease development **(Table 19)**

The incidence of Bacterial leaf blight disease (BLB) was noticed from 31^{stSMW} with the maximum disease intensity in the 37th SMW (22.0 % PDI) at **Junagadh** (Gujarat). *Alternaria*leaf spot disease incidence was observed in the 40th SMW with the maximum PDI in 42nd SMW (27.0%) while grey mildew was first noticed in 40th SMW and reached its maximum PDI in 48th SMW (15.0%) (**Table 20a**).

Alternaria leaf spot disease found significant positive correlation at 1% level for maximum temperature and remaining factors *viz.,* minimum temperature, relative humidity and rainy days were no significant at 5% level and 1% level but correlated positively.Bacterial leaf blight disease correlation coefficient studies recorded positive correlation with minimum temperature (0.679), morning relatively humidity (0.624), evening relatively humidity (0.509) and rainy days (0.588) at 5% and 1% level of significance, respectively. Maximum temperature (-0.518), rainfall days (-0.728) were negatively correlated at 1% and 5% level of significance.Grey mildew disease correlation coefficient studies recorded a positive correlation with rainfall (0.123) and rainy day(0.398). Maximum temperature (-0.576) minimum temperature(-0.607) and evening relatively humidity (-0.540) were negatively correlated at 1% and 5% level of significance. Morning relatively humidity (-0.400) was negatively correlated non-significant at 1% and 5% level **(Table 20b)**

SOUTH ZONE

Dharwad: *Alternaria* leaf blight was recorded from 31st SMW whereas bacterial blight and grey mildew diseases appeared in 37th SMW on different varieties/hybrids at Dharwad. The maximum incidence for all diseases was noticed between 42nd to 46th SMW (**Table21a**).

Maximum and minimum temperature.

1. *Alternaria* leaf blight: With respect to *Alternaria* blight, a significant positive correlation was observed between the maximum temperature and the genotypes. A significant negative correlation was observed between minimum temperature and genotypes like Abhadita, Jayadhar, Bunny Bt and Dr. Brent Bt.

2. Bacterial blight: With respect to Bacterial blight, a significantly positive correlation was observed between the maximum temperature and the genotypes and a significantly negative correlation was observed with respect to minimum temperature and the genotypes.

3. Grey Mildew: With respect to Grey mildew, a significantly positive correlation was observed between the maximum temperature and genotypes like Abhadita, Jayadhar, Bunny Bt and Dr. Brent Bt whereas a significantly negative correlation was observed between the minimum temperature and the genotypes Abhadita and Jayadhar. **(Table 21a)**

Relative Humidity No correlation was observed between RH Morning and RH Evening in four genotypes with respect to diseases

Rainfall and Rainy days: Significant positive correlation was noticed between total rainfall and GM with respect to Jayadhar other genotypes correlated negatively. And no correlation was noticed between rainy days and the genotypes with respect to all the diseases.**(Table21b).**

Guntur(AP): Jaadoo BG II cotton hybrid was sown on 23.07.19 in an area of 150 sq. m. Weekly observations were recorded on the percent disease intensity of *Alternaria* leaf spot, grey mildew and rust diseases after the appearance of the disease. During *Kharif* 2019, *Corynespora* leaf spot also developed as a major leaf spot disease. *Alternaria* leaf spot appeared in 35th SMW during August 2019 when the mean maximum temperature was 35.6^{0}C; mean minimum temperature was 26.6^{0}C; mean morning relative humidity of 86.57% (RH I); mean evening relative humidity of 66.0% (RH II); rainfall was 20.7 in two rainy days; sunshine hours were 6.4; wind speed 8.5km/h and evaporation was 6.5. *Alternaria* leaf spot attained a maximum PDI of 30.0 on Jaadoo BG II during 43rd standard week i.e., last week of October, during which the mean maximum temperature was 31.07^{0}C; mean minimum temperature was 24.4^{0}C; mean RH I of 91.4%; mean RH II of 83.7%; rainfall was 40.6 in 4 rainy days; sunshine hours were 2.6; wind speed 4.7km/h and evaporation was 3.2 (**Table22**).

A significant positive correlation with rainfall and no. of rainy days was recorded, while evaporation expressed a significant negative correlation with PDI. Multiple linear regression analysis revealed that rainfall, no. of rainy days and evaporation significantly influenced the progress and disease intensity (R^2=0.877) whereas no. of sunshine hours showed partial influence (R^2=0.245) during *Kharif*2019.

Y= 39.201 - 0.389 Rf + 10.659 Rd - 7.336 Evap. (R^2=87.71)

Corynespora leaf spot in 41st SMW during 2nd week of October 2019 when the mean maximum temperature was 32.9^{0}C; mean minimum temperature was 25.2^{0}C; mean morning relative humidity of 92.0% (RH I); mean evening relative humidity of 72.3% (RH II); rainfall was 61.0mm in three rainy days; sunshine hours were 3.3; wind speed 2.1 km/h and evaporation was 3.7. *Corynespora* leaf spot attained a maximum PDI of 48.3 on Jaadoo BG II during 50th standard week i.e., 2nd week of December 2019, during which the mean maximum temperature was 31.1^{0}C; mean minimum temperature was 18.1^{0}C; mean RH I of 92.4%; mean RH II of 79.3%; rainfall was nil; sunshine hours were 4.9; wind speed 3.3 km/h and evaporation was 4.1. A significant negative correlation of PDI with maximum and minimum temperatures, rainfall and rainy days and significant positive correlation with RH II was recorded.Multiple linear regression analysis revealed that minimum temperature, RH I, RH II and rainfall significantly influenced the progress of *Corynespora* leaf spot

(R^2=0.985) whereas no. of maximum temperature (R^2=0.622) and the number of rainy days ((R^2=0.684) showed partial influence during *Kharif*2019.

Y = -114.89 - 2.405 min T + 1.452 RH I + 0.829 - 0.323 Rf (R^2=0.985)

Grey mildew disease appeared in 44th SMW during 1st week of November 2019 on Jaadoo BG II when average maximum temperature was 31.5^{0}C; mean minimum temperature was 24.8^{0}C; mean RH I was 91.1%; mean RH II was 74.1%, rainfall was 41.0mm in two rainy days; sunshine hours were 4.5; wind speed was 3.5 km/h and evaporation was 3.5. The disease progressed and reached PDI of 35.5 during 3rd week of December 2019 during which the mean maximum temperature was 31.3^{0}C; mean minimum temperature was 18.0^{0}C; mean RH I was 92.1%; mean RH II was 80.1%; rainfall was nil, sunshine hours were 4.9, wind speed 4.2 km/h and evaporation was 4.1. The significant negative correlation of disease intensity with maximum and minimum temperatures, rainfall and rainy days was recorded while RH II showed a significant positive correlation. Multiple linear regression analysis revealed that minimum temperature, RH I, rainfall and sunshine hours significantly influenced the progress of grey mildew during *Kharif* 2019 (R^2=0.956). Maximum temperature (R^2=0.367) showed a partial influence on the development of grey mildew.

Y= -254.092 - 3.275 min T + 4.043 RHI-0.371 Rf - 5.314 SSH (0.956)

Rust disease appeared in 49th SMW during 1st week of December 2019 on Jaadoo BG II when average maximum temperature was 30.4^{0}C; mean minimum temperature was 19.9^{0}C; mean RH I was 88.7%; mean RH II was 88.6%, rainfall was 1.6mm; sunshine hours were 2.0; wind speed 3.6 km/h and evaporation was 3.5. The disease progressed and reached PDI of 44.0% on Jaadoo BG II during 4th week of January 2020 during which the mean maximum temperature was 32.4^{0}C; mean minimum temperature was 19.1^{0}C, mean RH I was 88.9% mean RH II of 71.6%, rainfall was nil, sunshine hours were 6.8, wind speed 3.9 km/h and evaporation was 4.7. Disease intensity was negatively correlated with minimum temperature; RH I and RH II which were significant while sunshine hours and evaporation showed a significant positive correlation.

Multiple linear regression analysis revealed that rainfall and no. of rainy days (R^2 = 0.839); minimum temperature and RH I significantly influenced the disease intensity (R^2 = 0.812). Evaporation expressed partial influence (R^2=0.389) on the progress of rust during *Kharif* 2019.

Coimbatore (Tamil Nadu): The incidence of cotton diseases in relation to the weather parameters was analyzed and the results indicated that the diseases started appearing from 39th SMW. From 39th to 41st SWM, the incidence of only bacterial leaf blight was observed in both varieties and hybrids. During these weeks, Coimbatore received significant rainfall coupled with higher solar radiation as shown in the table depicting weather parameters in the preceding pages which might have been the reason for the incidence. The same trend continued in the SMWs of 42-45 which had witnessed the incidence of foliar diseases namely BLB, TSV and ALB in all the varieties and Hybrids and the incidence was recorded to be PDI 5.0%.

Bacterial Leaf Blight incidence was rated as 'Very High' during the 45th to 48th SMW in both the varieties and hybrids with the rainfall during these weeks were on the rise. The incidence level ranged from PDI of 8.0 to 10.0%. During this same period of 42nd to 48th SMW, the incidence of TSV was observed with the incidence level of PDI 5.0 in all the varieties and hybrids. The ALB incidence of 5.0% PDI also appeared during these periods. Comparatively among the three foliar diseases, the BLB was found to be more pronounced during the rainy period and the weeks experienced higher solar radiation. Another important observation is that the soil-borne disease of root rot was on the higher side during 43rd to 49th SMW with the PDI of 7.0%. It is conspicuous from the table that in RCHIIBGII and MCU5 the incidence of root rot was observed whereas in CO14 the incidence was nil

Further, it was observed from the table that 48th SMW to 5th SMW coinciding the colder months of December, January and February, the incidence of *Alternaria* leaf blight and root rot were at their peak as the PDI crosses 10.0. It could be interpreted that the incidence of BLB and root rot were fuelled by the cool climatic conditions prevailing during these months **(Table23)**

Path.1 (c) Studies on the variability in *Alternaria* causing leaf spot in cotton.

Junagadh: The variability test of cotton pathogen *Alternaria* was carried out during *Kharif*-2019 for confirming of variability in *Alternaria* species of cotton. The disease sample was collected from eight different locations of this cotton-growing region. The samples were processed for isolation of *Alternaria* from blighted leaves of cotton using the standard method. The fungus culture was purified and morphological characters were recorded using a compound microscope. The mycelium was septet. The conidia were also septet and produced 2-8 septa. The shape of conidia was oblong, tapering at one end and round on another end. Based on morphological and characters the fungi identified as *Alternaria macrospora*.

Guntur: During the survey for cotton diseases *Alternaria* leaf spot samples were collected from farmers' fields and experimental plots at RARS, Lam and observed for the presence of *Alternaria*. Based on the spore structure the species was identified as *Alternaria macrospora* (**Table 24**). The fungus was cultured and the isolate was sent to TNAU, Coimbatore for molecular analysis.

Coimbatore: As discussed in the previous AICRP meet, *Alternaria* cultures from Coimbatore, Guntur, Bathinda and Junagadh were obtained to carry out morphological study at this centre. The results of the morphological study are presented in the**Table25**. Morphological studies for the cultures of *Alternaria* collected from the Coimbatore region revealed that the colony was characterized by the black mycelia growth, with concentric rings on the dorsal side of the plate. The cultures from Guntur produced colonies with whitish mycelia growth with black centre on the dorsal side of the plate. The culture brought from Bathinda produced mycelium which was blackish in colour with concentric circles of growth. Junagarh culture has produced mycelia with full whitish growth and raised centre of colony. The mean mycelial diameter was analysed for the cultures brought from four centres. The results given in the above table revealed that on 3rd day the mycelial diameter was high in Junagarh culture (3.95 cm) followed by Bathinda (2.90 cm) and Guntur (2.35 cm). The lowest mycelial diameter on 3rd day was recorded in the Coimbatore culture (2.15 cm). The same trend continued in subsequent days also. The mycelia diameter was the highest in Junagarh culture followed by Bathinda, Guntur and Coimbatore during 5th, 7th and 9th day after culturing. On 9th day, the mycelial diameter for Junagardh culture was 8.50 cm followed by Bathinda (7.25 cm), Guntur (7.00 cm) and Coimbatore (6.7 cm).

Path 1 (d): Survey and Epidemiology of TSV

CENTRAL ZONE

During 2019-20, a survey was undertaken in different locations of Marathwada (Aurangabad, Parbhani, Nanded, Hingoli, Latur, Jalna, Osmanabad, CRS, Nanded) region/VNMKV Jurisdiction for TSV incidence. No incidence of TSVwas observed.

During 2019-20, survey was undertaken in different locations of Vidarbha region (Akola, Amravati, Buldhana, Washim, Yeotmal, Wardha, Nagpur, CRS, Dr. PDKV, Akola, CDF WaniRambhapur) / Dr. PDKV, Akola Jurisdiction for TSV incidence. No incidence of TSV was observed during the survey.

SOUTH ZONE

Guntur:During the surveys conducted in Cotton growing districts, Tobacco Streak Virus disease was recorded from August 2019 to January 2020. The incidence ofTSV in different hybrids varied from 0% to 4.0% (**Table-26a & 26b**).

Progress of TSV disease incidence (%) was in the range of 7.69 % to 23.44% in RCH 2 BG II, however, grade 1 symptoms (restricted to few leaves and/or branches, mostly one or two spots) were observed in the majority of infected plants while few plants showed stunting. Percent disease index was between 1.92 and 7.88. Jaadoo BG II (5.56 to 23.40% and 1.34 to 7.41 PDI) and L 1060 (4.13 to 22.94% and 1.03 to 5.85 PDI) showed grade 1 symptoms on few leaves (**Table-27**). Thrips counts were in the range of 0.0 to 5.0 per three leaves.

Coimbatore: Survey for the occurrence of viral diseases revealed that *Tobacco streak virus* disease incidence was observed in all cotton-growing tracts surveyed in Tamil Nadu. The incidence of TSV varied from 5.0 to 10.0%. The incidence was maximum (10.0%) in the Coimbatore region. The minimum incidence of 5.0% of TSV was noticed in the Dindigul district. The symptom of *Tobacco streak virus* disease was observed in MCU5 and Co14 cotton fields which ranged from 5-10% (**Table 28**).

Path.2(a). Screening of AICRP breeding lines for disease reaction

The breeding lines in various national and zonal trials were screened against important diseases in the area. In each screening trial susceptible checks for the diseases were maintained and their reaction is presented at the end of each table where data from different locations of a trial is pooled. The reaction of a particular entry is considered valid provided there is either susceptible or moderately susceptible reaction in the susceptible check.

The results of National trials are given in Tables -29 to 14.

The results of zonal trials (NorthZone) are given in Tables -43 to46.

The results of zonal trials (Central Zone) are given in Tables - 47 to 57

The results of zonal trials (South Zone) are given in Tables- 58 to 71

Path.2 (b): Confirmation and maintenance of disease resistant lines.

CENTRAL ZONE

Junagarh: Different 17 breeding lines were evaluated against *Alternaria* leaf spot, bacterial leaf blight and grey mildew diseases under field condition during *Kharif*-2019. One entry resistance (RAH-0603), nine entries moderately resistant, six entries moderately susceptible and one entry susceptible reactions were recorded against *Alternaria* leaf spot disease. In the case of bacterial leaf blight disease, One entry was resistant, nine entries were moderately resistant, and seven entries were moderately susceptible. All entries showed resistant reaction against grey mildew during the *Kharif*-2019 (**Table 72).**

Akola: Out of twelve genotypes, all the entries showed resistant reaction to bacterial blight except GSV-173 was categorized under moderately resistant. 1 genotype was moderately susceptible (Khandwa 2) and 1 genotype was susceptible viz. DCH 32(**Table**73)

SOUTH ZONE

Dharwad The genotypes SVA-1118 and DB-14 exhibited a high degree of resistance to *Alternaria* blight (Resistant), Bacterial blight (disease-free) and Grey mildew (disease-free)**(Table74).**

Guntur: Thirteen entries from 2018-19 *viz*., BS 4-18, SHS 113, CPD 1802, Suraj, LHCC 3, LHCC 4, CSH 3158, SHC 374, CPD 1702, RHC 1217, GISH 298, Suvin, NDLH 1938 selected for grey mildew (Grade 1) and *Alternaria* leaf spot (Grade 2); Suvin (Grade 1) for rust were sown on 24.07.2019. Two checks, RCH 2 BG II (for bacterial blight and rust) and Jaadoo BG II (for *Alternaria* leaf spot and grey mildew)

were sown after every four rows of randomized entries and evaluated for a second consecutive year. Jaadoo BG II also served as a border.

RHC 1217 selected for grey mildew showed moderately resistant reaction whereas all the entries continued their resistant reaction to grey mildew during 2019-20. Suvin selected for rust showed moderately resistant reaction during 2nd year of evaluation. All the entries remained moderately resistant against *Alternaria* leaf spot **(Table75).**

Path.2 (c) Monitoring of breakdown of resistance against CLCuD in cotton.

In this experiment, three each of tolerant and susceptible varieties against CLCuD and one each of tolerant and susceptible Bt cotton hybrid were selected and sown at three locations to see how their reaction against CLCuD changes over the years. The PDI in case of tolerant varieties/hybrid was much less compared to susceptible varieties/hybrid atSriganganagar whereas it was almost similar at Bhatinda and Hisar. The cumulative reaction results revealed that all the susceptible verities showed HS reaction whereas the tolerant varieties showed S to MS reaction. The susceptible and tolerant Bt hybrid showed susceptible and moderately resistant reaction (**Table 76**).

Path. 3 (f): Management of sooty mold (*Capnodium*spp.) in cotton

Two experiments were planned during 2019, one experiment was conducted last year where 9 treatments including control were imposed once the sooty mold had developed under field conditions to see how much is controlled. whereas another set with the same treatments was planned and the interventions were applied at the initiation of sooty mold and were compared with check without intervention. The second experiment was conducted in polyhouse where 7 treatments including control were evaluated for their effect on the sooty mold and whitefly population at Sirsa.

In the polyhouse experiment at Sirsa, The prophylactic sprays of mancozeb followed by propiconazole and flonicamid were showed the lowest sooty mold 15 days after the first spray. However, Propiconazole followed by flonicamid and mancozeb showed the lowest sooty mold 15 days after the second spray. Flonicamid followed by neem oil and mancozeb showed the lowest sooty mold 15 days after the third spray (**Table 77**).

Prophylactic sprays of flonicamid followed by neem oil and propiconazole were showed the lowest whitefly population/ 3 leaves 15 days after the first spray. However, flonicamid followed by mancozeb and neem oil showed the lowest whitefly population/ 3 leaves 15 days after second spray (**Table 78**).

In the field trial,pooled means of Hisar and Faridkot showed three sprays of Copper oxychloride 50 WP @2.25g/L followed by Mancozeb 50WP @2.0 g/L and Propiconazole @1ml/L water showed a maximum reduction ofthe sooty mold 15 days after 3rd spray(**Table 79**).

Infield trial conducted at Coimbatore, the maximum reduction was observed by Copper oxychloride 50 WP @2.5g/L followed by Propiconazole 25EC @1ml/L, Copper oxychloride 50 WP @1.75g/L., while at Junagarh (Aphid) among six treatmentsFlonicamid 50 WG was significantly superior to suppressed disease intensity as well as aphid infestation over control at 7 and 15 day after the first and second spray with the reduction of sooty mold by 43.5% and 95.3%, respectively (**Table 80**).

Path 3 g: Management of parawilt of cotton (New experiment)

At Bhatinda, foliar spray of 10 ppm Cobalt chloride immediately after the occurrence of disease followed by drenching of plants with a mixture of Copper oxycloride (COC) 50 WP@ 25g and 200 Urea in 10 litre of water found best however at Hisar, foliar spray of 10 ppm Cobalt chloride immediately after the occurrence of disease followed by foliar spray 50ppm of Sodium Benzoate

immediately after the occurrence of disease showed maximum recovery of plants from parawilt (**Table 81**).

Akola: During 2019-20, the experiment was conducted on the management of parawilt of cotton with seven treatments including control. The treatments were not imposed since parawilt incidence was not observed during this year at Akola Station.

Junagarh: During 2019-20, experiment was conducted but parawilt was not observed.

Path. 3 (h): Evaluation of efficacy of bioagents against cotton diseases

The different bioagent treatments evaluated against root rot, wilt, bacterial fungal foliar spot disease at Nanded, Akola, Nagpur and Surat.

Among all the treatment, the lowest overall mean PDI of Alternarial leaf spot and bacterial blight was recorded in treatment T3 (seed and soil application of *Bacillus aryabhatti* + *Bacillustequeilencis*) followed by treatment 5 (Seed and soil application of*Pf CICR.*) (**Table 82**). However, the lowest pooled mean PDI of grey mildew was recorded in treatment 7 (Foliar application of Pyraclostrobin (0.1%) followed by treatment 6 (Chemical seed treatment (vitavax powder @ 0.2%).

At Nagpur, the treatment -3 (Combined application of *Bacillus tequeilencis* and *Bacillus aryabhattai*: Seed application: 10^8cfu/g @10g per kg of seed at the time of sowing Soil application: 2.5 kg/ha (30 & 60 DAS) with FYM/compost) was found to be superior interms of lowest percent incidence of *Myrothecium* leaf spot, *Corynespora* leaf spot (PDI), wilt and root rot incidence in cv Suraj (Table 83).

Among these eight treatments the highest seed germination percent was recorded win treatment 1 (Seed and soil application of *Bacillus aryabhattai,*) followed bt treatment 3. The overall mean seed cotton yield was highest in the treatment T3(25.4 Q/ha), followed by treatment treatment 1, 5, 6 (22.7Q/ha) **(Table 84).**

Path.4. : Crop loss estimation

Path.4.(e) Expt.1: Crop loss estimation due to CLCuD and distribution pattern of CLCuD in the north zone

Pooled data of Hisar, Faridkot and Rajasthan seed cotton yield reduction (Grade wise from 2-6) due to CLCuD in different Bt hybrids varied from 20.3 to 85.2, 16.4 to 73.5, 20.2 to 69.4 and 18.0 to69.0% in Bt hybrids US-51, RCH 773 BG II, NCS 9013 BGII and Bioseed 6688 BG II respectively. Based on mixed grades it was 37.0, 34.1, 37.6 and 30.9%, respectively in US-51, RCH 773 BG II, NCS 9013 BGII and Bioseed 6688 BG II (**Table 85**).

Path.4 (e) Expt.2: Distribution pattern of CLCuD on local popular BT hybrid at farmer's field.

NORTH ZONE

The maximum leaf curl disease was noted in Haryana followed by Rajasthan and Punjab during the 2019 season. In Haryana, the maximum CLCuD was recorded in Sirsa &Jind followed by Hisar, Fatehabad, Rohtak, Palwal, Bhiwani. In Rajasthan, Sriganganagar district showed maximum CLCuD followed by Hanumangarh.In Punjab, maximum CLCuD was noted in Faridkot district followed by Fazilka, Muktsar and Bhatinda district (**Table86**).

Agron. V: Technology for organic cotton production

Junagarh (G. Cot. 38): Percent disease intensity of bacterial leaf blight and Alterneria leaf spot for 1 to 11 treatment results were statisticallynon-significant. For the bacterial blight minimum disease intensity 0.5 was recorded in treatment- 6 and maximum recorded in treatment T9 while *Alternaria* leaf spot minimum disease intensity 23.2 percent was recorded in treatment-7 and maximum recorded treatment-4 27.0 percent. Medium reading was recorded for all treatments. Root rot and grey mildew were not observed **(Table. 87)**

Surat(G. Cot. 20): Among eleven different treatment combinations including control, the highest bacterial blight was recorded inT-1[Absolute control (No organic and Inorganic)] and T-6[Raising of sun hemp/fodder cowpea between rows incorporated before flowering] , however in the rest of other treatment combinations PDI of Bacterial leaf blight disease was ranged between 2.0 to 8.5% (Resistant type symptoms). Whereas, in the case of *Alternaria* leaf spot disease, all the treatment combinations were disease-free from the infection. (**Table.88**).

Dharwad *(G. arboreum)*: The results indicate that the treatment - 2 Control (RDN through inorganic) has the least incidence of *Alternaria* blight, Bacterial blight and Grey mildew with a higher yield. But in the case of yield treatment no.11 and 12 were at par with no.2.if we consider the cotton equivalent yield as it was a combination of treatment no.4, 5 and 7 with least incidence of diseases **(Table. 89)**

Guntur (AP): (Cotton variety, NA 1938). The intensity of *Corynespora* leaf spot was observed to be the lowest (7.0 PDI) in T6 (Sunnhemp/fodder cowpea, incorporated) followed by T10 (ST and ST of biofertilizers and FA of PPFM+ Neem cake @ 250kg/ha+ Sunnhemp/fodder cowpea, incorporated) with 7.17 PDI. T9 (ST and ST of biofertilizers and FA of PPFM+ Sunnhemp/fodder cowpea, incorporated) with 8.67 PDI, T11 (ST and ST of biofertilizers and FA of PPFM+ Neem cake @ 250kg/ha+ Intercrop GG/BG/Gnut/soy) with 10.0 PDI, T7 (Intercrop GG/BG/Gnut/soy) and T2 (RDN through inorganic) with 10.33 PDI were statistically on par with T6 (**Table 90**).

Agron. Vb: Standardization of geometry for Bt varieties: Junagarh

Results of the trial revealed that Alternaria leaf spot disease incidence was started after 80DAS and maximum intensity was recorded at 100 DAS. A total of seventeen treatments was screened with different spacing and varieties, out of these treatments a significant difference was recorded between treatments. The minimum disease intensity was recorded in Rajat Bt with 90 x 15 cm spacing. It was statistically at par with T11 (Rajat Bt with 90x30cm), T9 (Rajat Bt with 60x15cm), T12 (Rajat Bt with 90x30cm) and T17 (G.Cot-8 BG II with recommended spacing). All our data analyzed and concluded that *Alternaria* leaf spot intensity was not dependent on spacing. Varieties reaction were significant, Rajat Bt was resistant, GJHV374 Bt and G.COT.HY. 8 BGII were moderately resistant, Suraj Bt and PKV 081 Bt were susceptible (**Table 91)**

Agron. V: Enhancing Nitrogen use efficiency in Bt Cotton. (GTHH 49 BG II): Junagarh

Percent disease intensity of bacterial leaf blight and *Alternaria* leaf spot for 1 to 7 treatment results were statistically non-significant. For the bacterial blight minimum disease intensity 0.5 was recorded in treatment-7 and maximum recorded in treatment T1 and T4 while *Alternaria* leaf spot minimum disease intensity 26.0 percent was recorded in treatment-2 and maximum recorded treatment-6, 27.1 percent (**Table 92**).

Concluded Experiment:

Path.3 (f) ; Management of sooty mold (*Capnodium*spp.) in cotton

Based on pooled results (2017-18-2018-19, 2019-20), All the treatments showed a numerical reduction of sooty mold over control. Based on pooled data the highest reduction of sooty mold caused by whitefly/hid was recorded by Copper oxychloride (COC) 50 WP @ 2.25 g/litre of water followed by Propiconazole 25EC @ 1ml / litre of water. Among these treatments, the highest yield was recorded with Copper oxychloride (COC) 50 WP @ 2.25 g/litre of water followed by Propiconazole 25EC @ 1ml / litre of water and Mancozeb 50 WP @ 2.0g /L of water(**Tables 93,94**).

Path.1 Epidemiological studies on cotton diseases

NORTH ZONE

Path1(a): Observations on the occurrence of various diseases (in farmer's field and research farms)

Table 1: Occurrence of Cotton Disease-Faridkot center (Punjab)

District	Locations	CLCuD (PDI)	BB (Grade)	FFS (Grade)	Variety/Hybrid	Acreage
Faridkot	R.R.S. Faridkot	10.71	0	Traces	F 1861	
		11.81	0	1	F 846	
		14.29	0	1	F 1378	
		11.9	0	Traces	F 2228	
		10.82	0	2	F 2383	
		13.15	0	1	F 2164	
		11.22	0	Traces	F 1054	
		15.84	0	1	F 505	
		12.2	0	2	F 2381	
		1.24 - 35.72	1-2	1-2	Different entries of Co-ordinated and State trials	
	WaraDharaka	11.67	Trace	1-2	RCH 773	1.5 acre
	Mehmuana	12.2	0	1-3	RCH 776	5 acre
		9.17	0	1-2	RCH 776	3 acre
	Dhab Sher singh	8.0	0	Traces	RCH 773	2 acre
		12.5	Traces	Traces	RCH 773	2 acre
	Sukhan Wala	11.33	0	2	RCH 773	4 acre
	NwanKilla	6.33	0	1	RCH 773	7 acre
	Faridkot Local	9.83	Traces	1-2	RCH 773	2 acre
	Machaki Mal Singh	14.83	0	1	RCH 773	2.5 acre
	Sadik	12.0	0	1-2	RCH 773	3 acre
	Sher Singh Wala	6.7	0	1-2	RCH 776	2.5 acre
	Chahal	9.17	0	2-3	RCH 773	2 acre
		8.7	0	1-2	RCH 776	4 acre
Fazilka	Sito	5.0	0	1-2	RCH 773	10 acre
		4.17	0	1-2	RCH 776	6 acre
	ChakRadhey Wala	5.0	0	1-2	RCH 773	12 acre
	Kular	11.0	0	Traces	RCH 773	3 acre
	Rajpura	13.25	0	1-2	RCH 776	5 acre
	Amarpura	9.67	0	Traces	RCH 773	10 acre
		7.14	0	1-2	RCH 776	8 acre
	Khuian Sarwar	35.33	0	1-2	RCH 776	10 acre
		33.67	0	1-2	RCH 773	8 acre
	Telupura	31.17	0	1	RCH 773	4 acre
	Daulatpura	22.15	Traces	1	RCH 773	3 acre
	Nihal Khera	19.35	Traces	1-2	RCH 773	7 acre
	KhippanWali	17.83	0	1	RCH 773	3 acre

	KhuiKhera	13.33	0	1-2	RCH 773	4 acre
	HiranWali	12.17	0	1	RCH 773	6 acre
	Ina Khera	9.76	0	1	RCH 773	10 acre
	Malout	8.33	0	1-2	RCH 773	5 acre
	Kabar Wala	11.67	0	1	RCH 773	3 acre
Muktsar	Kotli	7.4	0	1-2	RCH 773	8 acre
	Khara	6.83	0	1	RCH 773	7 acre
		5.67	0	1-2	RCH 776	2 acre
	MarhMallu	9.33	0	1-2	RCH 773	4 acre
	LubaniaWali	4.0	0	Traces	RCH 773	5 acre
	Dohak	4.83	0	Traces	RCH 773	2 acre
	Seer Wali	7.33	0	Traces	RCH 773	1.5 acre
	Aulakh	10.67	0	1-2	RCH 773	5 acre
	Muktsar local	11.81	0	1	RCH 773	5 acre
		12.2	0	1-2	RCH 776	3 acre
	Barkandi	9.85		Traces	RCH 773	3 acre

*CLCuD pressure was very low this year

Table 2.Observations on Occurrence of Cotton Diseases – Bhatinda center(Punjab)

Block	District	Village	Hybrid	CLCuD (PDI)	Bacterial Blight (Grade)	FFS (Grade)	Root rot (%)
Bathinda	Bathinda	Jodhpur Romana	RCH 773 BG II	7.33	0	0	0
			RCH 776 BG II	8.57	0	0	0
		Bangikalan	RCH 773 BG II	0	0	0	0
		BangiRuldu	RCH 773 BG II	0	0	0	0
			RCH 776 BG II	0	0-1	0-1	0
			US 51 BG II	0	0	0	0
		Burjkahn Singh wala	RCH 776 BG II	0	0	0	0
			RCH 773 BG II	0	0	0	0
		GehriBaghi	RCH 773 BG II	0	0-1	0-1	0
		Jeewan Singh Wala	RCH 776 BG II	10.67	0	0	0
		Bhagi Bander	RCH 773 BG II	0	0	0	0
		Deon	RCH 773 BG II	0	0	0	0
		Naruana	RCH 773 BG II	0	0	0	0
		Kotsamir	RCH 773 BG II	0	0	0	0
		Kartar Singh Wala	RCH 773 BG II	0	0	0	0
		Bathinda	RCH 773 BG II	13.33	0	0-1	0-5%
			US 51 BG II	11.33	0	0-1	0-5%
		Virk kalan	SP 7172 BG II	0	0	0	0-5%
Nathana	Bathinda	Nathana	RCH 776 BG II	0	0	0	0-5%
		Joganand	US 51 BG II	0	0	0	0
				0	0	0	0
		Bibiwala	RCH 773 BG II	0	0-1	0-1	0-5%
		Govindpura	RCH 773 BG II	0	0	0	0-5%
		Bath	US 71 BG II	0	0	0	0-5%
		Poohla	RCH 773 BG II	0	0	0	0
		Poohli	RCH 773 BG II	0	0	0	0
		Sema	RCH 773 BG II	0	0	0	0

		ChakBhaktu	RCH 773 BG II	0	0	0	0
		Gill Khurd	RCH 773 BG II	0	0	0	0
		Selbrah	RCH 773 BG II	0	0	0	0
		Kesar Singh Wala	RCH 776 BG II	0	0	0	0-5%
Sangat	Bathinda	ChaakKharak Singh Wala	RCH 776 BG II	0	0	0	0
		ChakRuldu Singh Wala	RCH 773 BG II	0	0	0	0
		GursarSainewala	SP 7172 BG II	0	0	0	0
		Gehri Buttar	RCH 773 BG II	0	0	0-1	0-5%
		Sangat Mandi	US 51 BG II	0	0	0	0
		Kotguru	RCH 773 BG II	0	0	0	0
		Ghudda	RCH 773 BG II	0	0	0	0
		Jai Singh Wala	US 51 BG II	0	0	0	0
		Sangat Kalan	RCH 773 BG II	0	0	0	0
		Kotli Sabo	RCH 773 BG II	0	0	0	0
		Gursar Sainewala	RCH 776 BG II	0	0	0	5
Talwandi Sabo	Bathinda	Kotbhara	RCH 773 BG II	0	0	0	0
		Talwandi Sabo	RCH 773 BG II	0	0-1	0-1	0
		Jagga Ram Tirth	US 51 BG II	0	0	0	0
		BehmanJassa Singh	SP 7172 BG II	0	0	0	0
		Behman Kaur Singh	US 51 BG II	0	0	0	0
		Kotbaktu	RCH 773 BG II	0	0	0	0
		BangiRulda Singh	RCH 773 BG II	0	0	0	0
		Mal kana	RCH 773 BG II	0	0	0	0
		NasibpuraKailebander	RCH 773 BG II	0	0	0-1	0-5%
		GurusarJagga	RCH 773 BG II	0	0	0	0
		Kele Bander	US 51 BG II	0	0	0	0
		Sekhpura	RCH 773 BG II	0	0	0	0-10%
		Laleana	RCH 773 BG II	0	0	0	0
		FattaBalu	RCH 773 BG II	0	0	0-1	0-10%
Maur	Bathinda	Bhai Bakhtaur	RCH 773 BG II	0	0	0	0
		Ramgarh Bhunder	RCH 776 BG II	0	0	0	0
		Rai Khanna	RCH 602 BG II	0	0	0	0
		Ram Nagar	RCH 773 BG II	14.67	0	0	0
		Chanarthal	RCH 773 BG II	0	0	0	0
		Maur Khurd	RCH 773 BG II	0	0	0	0
		Natt	RCH 773 BG II	0	0	0	0
		Kuttiwalan Kalan	RCH 773 BG II	0	0	0	0
		Kuttiwala Khurd	RCH 773 BG II	0	0	0	0
		BhainiChuhaar	RCH 773 BG II	0	0	0	0
		Bagher Charat Singh	RCH 773 BG II	0	0	0	0
		Thambargarh	RCH 773 BG II	0	0	0	0
		Burj Sema	RCH 773 BG II	0	0	0	0
Rampura		Balianwali	RCH 776 BG II	0	0	0	0
		Bhagibander	RCH 773 BG II	0	0	0-1	0
		Dhadhe	RCH 773 BG II	0	0	0	0
		BheniChuhar	RCH 773 BG II	0	0	0	0
		Nandgarh	RCH 773 BG II	0	0	0	0
		Gill Khurd	RCH 773 BG II	0	0	0	0
		Mandi Kalan	RCH 773 BG II	0	0	0	0

		Mandi Khurd	RCH 773 BG II	0	0	0	0
		Gill Khurd	RCH 773 BG II	0	0	0	0
		Ramgarh Bhunder	RCH 773 BG II	0	0	0-1	0

- For the disease reaction of Bacterial Blight and Fungal Foliar Leaf Spot, 0-4 grade was considered.
- Incidence of Root rot was calculated in per cent (%).

Table 3: Observations on Occurrence of Cotton Diseases –ShriganganagarCenter (Rajasthan)

Tehsil	Area surveyed	Bt hybrids/varieties	PDI	Disease range
Sriganganagar district				
Sriganganagar	3Y, Kaliyan, Khatlabana, Hindumalkot, Kotha, Khakha, Shivpur Head, 2C Badi, 3C Badi, Koni, Mohanpura, Mirzewala, 23ML, 22ML	RCH773	21.98	6.66-34.16
		RCH 776		
		RCH 653		
		RCH 650		
		US 51		
		US71		
Srikaranpur	Kaminpura, Guabewala, 39GG, 37GG, 21H, 22H, 11O, 15FF, 24H, 24F, 6W, Jagtewala, Lakhian	SP7172	13.65	5.83-23.33
Sadulshahar	16LNP, 10LNP, Budhsinghwala, Lalgarh,	SP7272	19.37	13.33-26.66
Padampur	Rattewala, 18 BB, 21BB, 4EEA, 1CC, Sawantsar	Super Seed Katha	6.22	6.66-14.16
District average			**15.3**	**5.83-34.16**
Hanumangarh district				
	Malkoka, DhankawaliDhani, Jandwali, Hirnawali, Dholipal, Nawan, Masani, Gurunagar, Munda, Mohanmagaria, Makkasar	RCH773	11.05	4.16-15.83
		RCH 776		
		US 51		
		US71		
		SP7172		
		SP7272		
		RCH 650		
		NCS 9013		
District average			**11.05**	**4.16-15.83**

Table 4: Observations on Occurrence of Cotton Diseases -Hisar Center (Haryana)

	Village	Cotton Hybrids	June				July				August				September
			CLCuD	BB	MLS	RR	CLCuD	BB	MLS	RR	CLCuD	BB	MLS	RR	CLCuD
Hisar	Khairampur	RCH 773, BIO 6317	1	0	0	0	4.2	0	0	1	7	1	1	5	8.2
	BodiaKhera	RCH 773,776	2	0	0	0	4.2	0	0	1	8.2	1	4	1	8.0
	Kabrel	BIO 6488, RCH 776	1	0	0	0	2	0	0	1	9.2	2	4	1	9.0
	Shahpur	US 51, RCH 773	1	0	0	0	2.9	0	0	0	7.2	0	3.2	2	10.0
	Fransi	RCH 773,776, US 51	0	0	0	0	7.3	0	0	0	15	1	7	1	18.0
	Sadalpur	BIO 6588, RCH 773	1	0	0	0	4.2	0	0	1	9.2	0	5	2	10.2
	Kalirawana	RCH 773, 776, US 51	5.1	0	0	0	10.6	0	0	0	16	1	8	1	16.0
HAU	Research Farm CCS HAU	HS 6	3.6	0	0	0	22.2	0	0	2	33.3	4	3	2	55.5
		H 1098(i)	1	0	0	0	20	0	0	0	33.3	2.2	4.2	2	50.0
		F 2228	0	0	0	0	23.9	0	0	0	33.3	2	4	1.2	50.0
		CSH 3075	0	0	0	0	16.7	0	0	0	33.3	4	5	0	57.2
		RCH 773	0	0	0	0	0	0	0	0	9.4	2.2	5.2	0	33.3
		F 846	0	0	0	0	22.2	0	0	0	33.3	3	4.2	1	**66.7**
		RST 9	1.6	0	0	0	24.4	0	0	0	33.3	2	4.2	4	55.9
		Bio 6317	0	0	0	0	16.7	0	0	0	21.7	3	5.2	0	50.0
Fatehabad	Banmandhori	US 51, RCH 773, 776	0	0	0	0	6	0	0	2	7.2	0	2	4	10.0
	Bhattu Kalan	US 51, RCH 776, 773	1	0	0	0	6.2	0	0	0	14	0	3	2	16.0
	KharaKheri	RCH 773, 776	0	0	0	0	4.2	0	0	2	10.7	0	4	4	11.0
	Dingsara	RCH 773, US 51	0	0	0	0	6	0	0	2	11.1	0	4	5	12.3
	Pili Mandori	RCH 773, 776	1	0	0	0	12	0	0	1	20	0	4	2	21.1
	Dhabi	RCH 650, 773, 776	0	0	0	0	3.7	0	0	0	6.9	0	5	1	10.3
	Jandli Kalan	US 51, BIO 6317	0	0	0	0	3.9	0	0	1	10	0	5	2	11.4
	Jhalania	RCH 650, 773, 776	0	0	0	0	3.5	0	0	1	11	0	5	3	12.5
Sirsa	NejiaKhera	US 51,	0	0	0	0	4	0	0	1	8.5	2	2	4	10.0
	Haripura	RCH 650, 776	0	0	0	0	5	0	0	2	10.1	0	3	5	11.9
	Dabra Kala	RCH 776, US 51	0	0	0	0	8	0	0	2	12.1	1	3	2	14.2
	Nahrena	RCH 776, BIO 6317	0	0	0	0	7.3	0	0	2	8.2	0	3	3	10.8
	Kherka	BIO 6488, RCH 650	0	0	0	0	10.1	0	0	0	12	1	6	4	14.0
	NathusariChopta	RCH 650, 773	1	0	0	0	18.4	0	0	2	25.3	0	5	2	27.2

Jind	Ikkas	RCH 650, 776	0	0	0	0	8	0	0	2	16.2	0	4	2	31.0
	Intak Kalan	RCH 602, 773	0	0	0	0	10.2	0	0	0	14	2	1	1	20.0
	KheriSheoran	RCH 650, 776	0	0	0	0	6	0	0	0	12	0	4	1	22.0
	Uchana	US 51, RCH 773	0	0	0	0	4.2	0	0	1	14.2	0	4	1	21.0
	Milakpur	RCH 776, 773	1	0	0	0	8.2	0	0	1	16.6	2	3.2	2	28.0
	Hebatpur	RCH 650, BIO 6588	0	0	0	0	9.1	0	0	0	14	0	7	1	28.0
	Rakhi Ghari	RCH 650, BIO 6588	0	0	0	0	10	0	0	3	15	0	5	3.2	26.0
	Nidana	BIO 6317, US 51	0	0	0	0	8.2	0	0	1	16	0	4	1.4	31.2
	Nidani	RCH 776	0	0	0	0	6	0	0	2	16.2	0	5	2	35.0
Rohtak	Mundhal	RCH 602, 773	0	0	0	0	4.2	0	0	2	10	0	5	4	12.0
	Sishar	US 51, RCH 773	0	0	0	0	6	0	0	0	8	0	1	1	14.0
	Meham	US 51, RCH 776	1	0	0	0	4.2	0	0	0	10.2	0	4	0	18.0
	Kalanur	RCH 602, 776	0	0	0	0	3	0	0	2	9.5	0	4	4	10.0
Bhiwani	Sungapur	RCH 650, 773	0	0	0	0	3.7	0	0	4	7	2	4	4	12.0
	Kharkari	RCH 602, 650	0	0	0	0	4.5	0	0	4	7	1	5	4	13.4
	Chandwash	RCH 776, 773	2	0	0	0	5.3	0	0	5	8	1	5	5	9.5
	Kagdoli	RCH 602, 776	0	0	0	0	2.8	0	0	5	9	0	5	5	12.5
	Bilawal	RCH 650	0	0	0	0	4.1	0	0	4	6.2	0	4	4	13.0
Palwal	Mandkola	RCH 773, BIO 6588	0	0	0	0	8	0	0	1	8	0	5	5	10.0
	Aluka	US 51, BIO 6317	1	0	0	0	4.2	0	0	2	6.2	2	1	0	8.0
	Dhateer	RCH 773, 776	0	0	0	0	6	0	0	1.2	10	0	4	2	13.0
	Bhurja	Ankur 3028, RCH 776	0	0	0	0	6.2	0	0	2	10	0	4	1	12.0
	Ghugera	RCH 776, US 51	1	0	0	0	4.2	0	0	2.2	8	1.2	3.2	0	12.2

CENTRAL ZONE

Path.1 (a): Observations on the occurrence of various diseases

Table 5: Observations on occurrence of cotton diseases on farmer's field – Nanded center (Maharashtra)

Sr.No.	Varieties / hybrids	Alternaria (PDI)	Bacterial blight (PDI)	Grey-mildew (PDI)
1	Ankur (Bt)	7.23	4.85	8.66
2	Superb (Bt)	8.20	4.23	10.26
3	Bramha (Bt)	7.10	5.33	11.56
4	First Class (Bt)	8.96	4.23	8.63
5	Vitthal (Bt)	8.11	4.66	9.30
6	Gabbar (Bt)	7.12	5.00	8.63
7	Rasi (Bt)	12.40	5.23	13.20
8	Ajeet 155 (Bt)	7.45	5.23	9.56
9	Dr. Brent (Bt)	8.95	4.85	10.23
10	PA 255 *(G.arboreum)*	7.01	5.63	7.23
11	NHH 250 (Non Bt)	7.45	4.20	6.85
12	NH 615(Non Bt)	9.63	5.33	9.12
13	LRA 5166 (Non Bt)	10.23	7.23	7.10
14	NHH 44 (Bt)	7.56	4.00	7.69

* PDI – Per cent disease intensity for Bacterial blight, *Alternaria* and Grey mildew.

Table 6: Occurrence of cotton diseases in farmer's field and research farm (Survey): Akola (Maharashtra)

Sr. No.	District/ Place	Variety/ Hybrid	Stage of sampling								
			Percent Disease Intensity (PDI)								
			Seedling (20-30 DAS)			Flowering (60-80 DAS)			Boll development (120-150 DAS)		
			BLB	GM	MLS	BLB	GM	MLS	BLB	GM	MLS
A	**Akola district**										
1	Nimkarda	Ajeet 155 Bt	-	-	-	-	-	-	8.75	-	-
		BindastBt	-	-	-	-	-	-	11.25	-	20.00
2	Adosi	Ankur 3028	-	-	-	-	-	-	12.33	4.50	-
		Ajeet 155 Bt	-	-	-	-	-	-	11.25	10.00	-
		Jadoo BG II	-	-	-	-	-	-	14.33	-	-
		Ajeet 5 BG II	-	-	-	-	-	-	9.33	-	-
3	Jogalkhed	First class BG II							17.50	13.33	-
		Neo Bt BG II	-	-	-	-	-	-	15.83	-	5.33
		RCH 659 Bt	-	-	-	-	-	-	26.25	18.5	13.33
		Ajeet 155 Bt	-	-	-	-	-	-	9.33	-	-
4	Kasura	First class BG II	-	-	-	-	-	-	15.67	-	-
		Neo Bt BG II							12.92		
B	**Buldhana district**										
5	Nagzari	Ajeet 155 Bt	-	-	-	-	-	-	13.33	-	-
		First class BG II							17.08		
6	Takali	Neo Bt BG II	-	-	-	-	-	-	13.5	14.58	-
		Jadoo Bt	-	-	-	-	-	-	10.00	-	-
7	Warkhed	Ajeet 155 Bt	-	-	-	-	-	-	13.33	-	-
		First class BG II	-	-	-	-	-	-	15.83	19.00	-
8	Jawla	Jadoo Bt	-	-	-	-	-	-	17.50	-	17.78
C	**Akola research station**										
		Bhakti Bt	-	-	-	-	-	-	21.11	4.00	-
		Ajeet 155 Bt	-	-	-	-	-	-	12.33	-	-
		Mallika Bt	-	-	-	-	-	-	14.58	4.50	-
		Rasi 2 Bt	-	-	-	-	-	-	21.00	-	-
		JKAL 116 Bt	-	-	-	-	-	-	11.00	-	-
		PKV Hy 2 Bt	-	-	-	-	-	-	14.33	-	-
		AKH 081 Bt							12.33		
		Rajat Bt	-	-	-	-	-	-	15.83	-	-

BLB- Bacterial leaf blight, GM- Grey Mildew, MLS-*Myrothecium* leaf spot

Table 7: Observations on occurrence of cotton diseases- Surat Center (Gujrat)

Sr. No.	District	Taluka	Month	Variety/ Hybrids/cultivars	Disease (PDI)	
					BLB	ALS
1	Surat	Surat	September to November	G.Cot.Hy. 8 BGII	8.5	0.0
				G.Cot.Hy. 10 BGII	18.5	0.0
				G.Cot.Hy. 12 BGII	5.5	0.0
				G.Cot.Hy. 12 NBt	34.0	2.5
				G.Cot.Hy. 14	2.5	0.0
				G.Cot.Hy. 18	18.5	0.0
				G.N. Cot. 22	4.5	0.0
				G.N. Cot. 29	0.0	0.0
				G.Cot. 15	0.0	0.0
				GTHH 49	2.5	0.0
				G. Cot. Hy. 4	12.5	0.0
				CSHH 15035	8.0	0.0
				GSHH 15008	10.0	0.0
				G. Cot. 100	4.5	5.5
				G. Cot. 34	5.5	1.5
				G. Cot. 16	5.0	0.0
				G. Cot. 23	0.0	0.0
				LRA 5166	36.5	2.0
		Mandvi	October	BG II	10.0-12.0	0.0-2.0
				BG II	8.5-10.0	0.0-0.0
				BG II	0.0-1.0	0.0-2.0
		Umarpada		BG II	2.0-3.0	0.0- 2.0
				BG II	1.0-3.0	4.0-5.0
				BG II	1.0-2.0	3.0-4.0
				BG II	1.0-3.0	2.0-3.0
2	Bharuch	Valia	October	BG II	2.0-6.0	0.0-3.0
				BG II	4.0-8.0	15.0-20.0
				BG II	1.0-2.0	3.0-4.0
				BG II	1.0-2.0	1.0-2.0
		Netrag	October	BG II	0.0-1.5	2.0-3.0
				BG II	3.0-5.0	2.0-4.0
				BG II	1.0-2.0	0.0-2.0
				BG II	2.0-3.0	2.0-4.0
				BG II	1.0-2.0	2.0-4.0
3	Narmada	Rajpipla	October	BG II	2.0-7.0	0.0-2.0

Table 8: Observations on the occurrence of cotton diseases- Junagarh (Gujrat)

Village	Taluka	District	Variety/hybrids/Bt	Per cent disease intensity (%)				
				ALB	BLB	GM	RR	Parawilt
Majevadi	Junagadh	Junagadh	Manimaker	23.5	1.0	12.0	0	0.0
			ATM	21.2	1.5	10.4	0	0.0
			RCH-659	19.2	1.0	18.0	0	0.0
			Navab	20.5	1.5	11.5	0	0.0
			RCH-Neo	18.20	1.0	8.0	0	0.0
Motimonpari	Visavadar		Pas-Pas	15.0	0.0	12.5	0	2.0
			Kohinur	16.0	1.6	18.0	0	0.0
			Ankur 3028	18.0	0.5	19.5	0	0.0
			Rasi-Neo	15.5	1.0	20.1	0	0.0
			ATM	20.0	0.6	18.2	0	0.0
Chuda	Bhesan		Navab	19.6	0.5	15.5	0	5.0
			Navab	17.0	1.0	16.0	0	2.0
			Pas-Pas	19.0	1.0	15.0	0	0.0
			RCH-659	20.1	1.0	21.0	0	0.0
			Ajit-155	16.0	0.5	15.5	0	0.0
Torniya	Dhoraji	Rajkot	ATM	19.3	0.2	16.9	0	0.0
			Gajab	14.2	1.0	13.5	0	0.0
			Goldy	21.0	0.2	13.0	0	0.0
			RCH-Neo	14.6	0.2	12.5	0	0.0
			ATM	18.0	1.5	18.0	0	0.0
Boriya	Jamkandorana	Rajkot	Navab	19.3	1.5	13.6	0	0.0
			Vikram-303	21.0	0.6	0.0	0	0.0
			Mg cot-65	21.6	1.0	12.4	0	0.0

Boriya	Jamkandorana	Rajkot	Navab	20.0	1.5	16.3	0	0.0
			Navab	21.6	0.5	18.3	0	0.0
Vimalnagar	Jamkandorana		Sampurna	15.5	1.5	19.6	0	0.0
			Mg cot-65	19.5	0.5	21.2	0	0.0
			Mg cot-65	20.6	1.0	22.0	0	0.0
			Mg cot-65	19.4	1.0	20.0	0	0.0
			ATM	17.0	1.5	18.0	0	0.0
Bagasara	Bagasara	Amerli	ATM	16.6	0.5	19.2	0	0.0
			Gopal-155	19.7	0.4	23.5	0	0.0
			Navab	16.7	0.6	24.0	0	0.0
			ATM	16.0	0.5	15.5	0	0.0
			Gopal-155	17.0	0.5	15.0	0	0.0
			Turbo	19.2	1.0	18.6	0	0.0

ALS= Alternaria leaf spot, BLB=Bacterial leaf blight, GM=Grey mildew, RR=Root rot

SOUTH ZONE

Table 9: Observations on the occurrence of cotton diseases –Dharwad Center (Karnataka) (In farmer's field and in research farms) 2019-20

Locations	Genotype	Rainfed/ irrigated	Crop Stage	PDI		
				AB	BB	GM
Dharwad District						
Hebballi	MRC-7383 Bt	I	Seedling stage	10	5	-
			Boll initiation	20	15	10
			Boll Maturity	35	20	20
Shivalli	Bhaskar Bt	R	Seedling stage	5	5	-
			Boll initiation	10	10	8
			Boll Maturity	25	20	25
Dhummawad	Mahadev Bt	R	Seedling stage	10	-	-
			Boll initiation	10	10	8
			Boll Maturity	30	25	20
Govankoppa	RCH-659 Bt	I	Seedling stage	5	5	-
			Boll initiation	10	15	10
			Boll Maturity	25	20	20
Maradagi	MRC-7383 Bt	R	Seedling stage	10	5	-
			Boll initiation	20	10	10
			Boll Maturity	25	20	25
Morab	Soumya Bt	R	Seedling stage	10	-	-
			Boll initiation	20	10	10
			Boll Maturity	30	20	20
Yamanur	ChaitannyaBt	I	Seedling stage	10	5	-
			Boll initiation	15	12	8
			Boll Maturity	25	20	25
Byahatti	CRC-659 Bt	I	Seedling stage	10	5	-
			Boll initiation	12	15	10
			Boll Maturity	35	20	20

Yarikoppa	Kanaka Bt	I	Seedling stage	10	5	-
			Boll initiation	20	10	15
			Boll Maturity	30	20	25
Jodahalli	ACH-155 Bt	I	Seedling stage	5	5	-
			Boll initiation	15	10	10
			Boll Maturity	30	20	25
Bavihal	Money Bt	I	Seedling stage	7	5	-
			Boll initiation	15	15	10
			Boll Maturity	30	20	25
Dastikoppa	Kanaka Bt	R	Seedling stage	10	2	-
			Boll initiation	15	10	10
			Boll Maturity	35	20	15
Kalaghatagi	MRC-7385 Bt	R	Seedling stage	10	5	-
			Boll initiation	25	10	10
			Boll Maturity	30	25	25
Noolvi	MRC-7385 Bt	I	Seedling stage	10	4	-
			Boll initiation	20	10	10
			Boll Maturity	38	25	25
Sharewad	Ajeet-155 Bt	I	Seedling stage	10	4	-
			Boll initiation	25	10	10
			Boll Maturity	35	20	15
Kundagol	Mahadev Bt	I	Seedling stage	8	5	-
			Boll initiation	22	15	12
			Boll Maturity	32	20	25
Shirur	MRC-7351 Bt	I	Seedling stage	8	5	-
			Boll initiation	10	10	10
			Boll Maturity	30	15	25
Navalgund	Ajeet-155 Bt	I	Seedling stage	10	5	-
			Boll initiation	15	15	10
			Boll Maturity	35	20	25
Mulamuttal	Soumya Bt	I	Seedling stage	5	4	-
			Boll initiation	20	12	10

			Boll Maturity	28	25	20
Konnur	Miracle Bt	I	Seedling stage	10	5	-
			Boll initiation	15	10	8
			Boll Maturity	30	25	20
Lakamapur	DiamandBt	I	Seedling stage	12	4	-
			Boll initiation	18	10	5
			Boll Maturity	35	25	20
Uppinabetageri	Soumya Bt	R	Seedling stage	10	4	-
			Boll initiation	15	12	10
			Boll Maturity	40	25	20
Marewad	Miracle Bt	R	Seedling stage	10	5	-
			Boll initiation	15	10	8
			Boll Maturity	35	25	20
Timmapur	Ajeet-155 Bt	R	Seedling stage	10	5	-
			Boll initiation	20	15	10
			Boll Maturity	30	20	25
Karadigudda	MRC-7385 Bt	R	Seedling stage	10	4	-
			Boll initiation	20	12	10
			Boll Maturity	35	20	25
Lokur	Soumya Bt	R	Seedling stage	10	-	-
			Boll initiation	15	10	15
			Boll Maturity	38	12	20
Somapur	Ajeet-155 Bt	I	Seedling stage	10	5	-
			Boll initiation	12	10	8
			Boll Maturity	30	25	15
Hebasur	MRC-7351 Bt	I	Seedling stage	10	4	-
			Boll initiation	15	12	10
			Boll Maturity	45	20	25
Gopanakoppa	Everest Bt	R	Seedling stage	5	-	-
			Boll initiation	20	15	10
			Boll Maturity	40	18	15

Belgaum District						
Anigol	First Class	I	Seedling stage	10	-	-
			Boll initiation	20	12	10
			Boll Maturity	35	25	20
Bevinkoppa	YuvaBt	I	Seedling stage	8	-	-
			Boll initiation	20	10	10
			Boll Maturity	30	25	20
Neginhal	First Class	I	Seedling stage	5	-	-
			Boll initiation	15	10	15
			Boll Maturity	30	20	25
Sampagova	YuvaBt	I	Seedling stage	5	-	-
			Boll initiation	15	8	15
			Boll Maturity	35	20	25
Vakkunda	MRC-7383 Bt	I	Seedling stage	10	-	-
			Boll initiation	15	10	10
			Boll Maturity	30	15	25
Murgod	Puli Bt	I	Seedling stage	5	-	-
			Boll initiation	10	10	5
			Boll Maturity	25	20	25
Hosur	Money Maker Bt	I	Seedling stage	10	-	-
			Boll initiation	15	8	5
			Boll Maturity	28	16	20
Koravinkoppa	MRC-7352 Bt	I	Seedling stage	10	5	-
			Boll initiation	25	10	8
			Boll Maturity	35	20	20
Yaradala	Everest Bt	I	Seedling stage	10	-	-
			Boll initiation	20	8	10
			Boll Maturity	35	20	25
M.K. Hubballi	Mahadev Bt	I	Seedling stage	5	5	-
			Boll initiation	15	10	5
			Boll Maturity	35	25	10
Udikeri	Everest Bt		Seedling stage	10	5	-

			Boll initiation	15	12	10
			Boll Maturity	30	25	15
Hosur	MRC-7351 Bt	I	Seedling stage	5	-	-
			Boll initiation	12	15	10
			Boll Maturity	25	20	15
Doopadal	JaaduBt	I	Seedling stage	5	3	-
			Boll initiation	20	15	10
			Boll Maturity	30	25	20
Belawadi	Chiranjeevi Bt	I	Seedling stage	10	-	-
			Boll initiation	12	10	8
			Boll Maturity	30	15	20
Mallur	Everest Bt	I	Seedling stage	10	4	-
			Boll initiation	15	12	10
			Boll Maturity	28	18	15
Asundi	Chiranjeevi Bt	I	Seedling stage	5	3	-
			Boll initiation	20	15	10
			Boll Maturity	30	18	15
Ghataprabha	Money maker	I	Seedling stage	5	3	-
			Boll initiation	10	12	10
			Boll Maturity	25	20	20
Murukumbi	Everest Bt	I	Seedling stage	10	4	-
			Boll initiation	15	12	10
			Boll Maturity	30	20	25
Akkatangirahal	Chiranjeevi Bt	I	Seedling stage	5	-	-
			Boll initiation	20	15	10
			Boll Maturity	30	18	25
Haveri District						
Varadahalli	Chiranjeevi Bt	R	Seedling stage	5	-	-
			Boll initiation	18	12	8
			Boll Maturity	20	15	25
Yalavigi	JaaduBt	I	Seedling stage	5	3	-
			Boll initiation	10	15	10
			Boll Maturity	30	18	20

Savanur	MRC-7351 Bt	I	Seedling stage	10	5	-
			Boll initiation	18	12	10
			Boll Maturity	30	20	15
Kurubagonda	Chiranjeevi Bt	I	Seedling stage	5	-	-
			Boll initiation	12	15	10
			Boll Maturity	25	18	25
Mattur	MRC-7351 Bt	I	Seedling stage	5	-	-
			Boll initiation	20	15	10
			Boll Maturity	30	25	15
Bisanahalli	MRC-7351 Bt	R	Seedling stage	10	-	-
			Boll initiation	20	10	15
			Boll Maturity	35	15	20
Bankapur	Everest Bt	R	Seedling stage	10	5	-
			Boll initiation	12	10	8
			Boll Maturity	30	20	22
Motebennur	MRC-7351 Bt	R	Seedling stage	10	-	-
			Boll initiation	15	12	10
			Boll Maturity	30	20	25
Hmsabhavi	JaaduBt	R	Seedling stage	10	-	-
			Boll initiation	12	10	8
			Boll Maturity	30	20	18
Sriramankoppa	MRC-7351 Bt	R	Seedling stage	5	3	-
			Boll initiation	20	15	10
			Boll Maturity	30	20	15
Haradahalli	Everest Bt	I	Seedling stage	10	5	-
			Boll initiation	12	10	8
			Boll Maturity	30	18	25
Tavaragi	MRC-7351 Bt	I	Seedling stage	10	-	-
			Boll initiation	15	12	10
			Boll Maturity	28	22	22
Akkialur	Puli Bt	I	Seedling stage	5	5	-
			Boll initiation	12	15	10
			Boll Maturity	35	25	15
Adur	Everest Bt	R	Seedling stage	5	5	-

			Boll initiation	12	15	10
			Boll Maturity	30	25	15
Hosalli	MRC-7351 Bt	I	Seedling stage	10	-	-
			Boll initiation	15	12	10
			Boll Maturity	30	18	25
Gadag District						
Laxmeshwar	RashiBt	I	Seedling stage	10	5	-
			Boll initiation	20	15	10
			Boll Maturity	35	18	20
Shirahatti	TridevBt	I	Seedling stage	5	4	-
			Boll initiation	18	10	10
			Boll Maturity	30	20	15
Gulgajikoppa	First Class	I	Seedling stage	5	-	-
			Boll initiation	20	15	8
			Boll Maturity	35	20	15
Govinhala	Super fiber	I	Seedling stage	4	2	-
			Boll initiation	18	12	8
			Boll Maturity	25	18	20
Timmapur	JaihoBt	R	Seedling stage	5	4	-
			Boll initiation	10	12	10
			Boll Maturity	25	18	25
Allipur	Bunny Bt	I	Seedling stage	10	5	-
			Boll initiation	15	15	10
			Boll Maturity	38	25	20
Kadakol	JaaduBt	I	Seedling stage	5	5	-
			Boll initiation	12	15	10
			Boll Maturity	32	20	18
Veerapur	Chiranjeevi Bt	I	Seedling stage	10	5	-
			Boll initiation	12	10	8
			Boll Maturity	35	20	25
Hulakoti	MRC-7351 Bt	I	Seedling stage	5	-	-

			Boll initiation	10	10	10
			Boll Maturity	30	20	25
Mevundi	Puli Bt	I	Seedling stage	10	8	-
			Boll initiation	15	12	10
			Boll Maturity	35	25	15
Uttar Kannada District						
Koppa	MRC-7351 Bt	R	Seedling stage	5	3	-
			Boll initiation	20	15	10
			Boll Maturity	25	18	25
Mundagod	Chiranjeevi Bt	R	Seedling stage	8	-	-
			Boll initiation	12	8	10
			Boll Maturity	25	15	20
Bachunaki	Everest Bt	R	Seedling stage	10	4	-
			Boll initiation	15	10	10
			Boll Maturity	30	20	25
Malagi	MRC-7351 Bt	R	Seedling stage	5	3	-
			Boll initiation	10	5	12
			Boll Maturity	20	10	20

Table 10: Observations on the occurrence of cotton diseases- Guntur Center (Andhra Pradesh) (in farmers' fields)

Month	Location (Village/ District)	Hybrid (BG II)	Stage of the crop (days)	Per cent disease Intensity (PDI)				
				ALS	CoLS	BLB	GM	Rust
Aug'19	Gorantla	MH 5370	21	0	0	0	0	0
		Crystal 999	21	0	0	0	0	0
	Jonnalagadaa	Crystal 999	21	0	0	0	0	0
		Magna	21	0	0	0	0	0
		Atish	21	0	0	0	0	0
	Tatireddypalem	Crystal 999	10-20	0	0	0	0	0
	Nidumukkala	Sadananda	10-30	0	0	0	0	0
	Gudipudi	Shakthi	28	0	0	0	0	0
		Magna	30	0	0	0	0	0
		Nava Mallika	30	0	0	0	0	0
		Magic	30	0	0	0	0	0
	Bejathpuram	RCH 659	30	0	0	0	0	0
		Magna	30	0	0	0	0	0
		Crystal 999	30	0	0	0	0	0
	Damarapalli	Nava Mallika	30	0	0	0	0	0
		Super Shine	30	0	0	0	0	0
		RCH 659	30	0	0	0	0	0
		Money Maker	30	0	0	0	0	0
		Raja	30	0	0	0	0	0
	Lam	RCH 659	7.0	0	0	0	0	0
Sept.'19	Ramapuram	Vennela	90	Traces	0	0	0	0
		Police	90	Traces	0	0	0	0
		Super Shine	90	Traces	0	0	0	0
	Damarapalli	Sidda	50	Traces	0	0	0	0
		Super Shine	50	Traces	0	0	0	0
		Jaadoo	50	Traces	0	0	0	0
		Raja	50	Traces	0	0	0	0
	Kurnoothala	Bhakthi	55	0	0	0	0	0
		Money Maker	55	0	0	0	0	0
		Moksha	55	0	0	0	0	0
		Dheeraj	55	0	0	0	0	0
		RCH 659	55	0	0	0	0	0
	Abbineniguntapalem	Big Boss	55	0	0	0	0	0
	Palaparru	Super Shine	55	0	0	0	0	0

	Pedanandipadu	Jaadoo	55	0	0	0	0	0
	Chilakaluripet	Jaadoo	55	0	0	0	0	0
Oct'19	Kakani	Bhakthi	55	0	0	0	0	0
	Repudi	Akira	55	10.0	0	0	0	0
	Satuluru	Mahyco	55	9.0	0	0	0	0
	Narasingapadu	RCH 659	60	2.0	0	0	0	0
	Gundlapalli	Raja	60	13.5	9.0	0	0	0
	Zulakallu	Jaadoo	60	8.0	0	0	0	0
	Karempudi	RCH 659	60	28.0	0	0	0	0
	Oppicharla	RCH 659	60	15.0	0	0	0	0
	Narmalapadu	Money Maker	90	5.0	5.0	5.0	0	0
		Big Boss	90	5.0	0	10.0	0	0
	Adigoppula	Sadananda	90	5.0	0	0	0	0
	Obulesunipalli,	Jaadoo	90	12.6	5.0	0	0	0
	Durgi	Geetha	90	25.0	5.0	0	0	0
		Raja	90	20.0	0	0	0	0
	Jonnalagadda	RCH 659	90	10.0	0	0	0	0
	Ravipadu	Raja	90	5.0	0	0	0	0
	Nudurupadu	RCH 659	90	7.0	0	0	0	0
	Vemavaram	Jaadoo	90	5.0	0	0	0	0
Nov'19	Kantheru	Akira	100	10.0	7.75	0	0	0
	Tadikonda	RCH 659	100	5.0	10.0	0	0	0
	LacchannaGudipudi	Neo	120	8.5	6.0	3.0	0	0
		Crystal 999	120	4.0	5.0	0	0	0
	Koyavaripalem	RCH 659	120	2.0	12.0	0	0	0
	Abbineniguntapalem	Jaadoo	120	2.5	4.0	0	5.0	0
	Adusumilli	Akira	120	14.0	5.0	0	3.0	0
	Daggubadu	RCH 659	120	9.0	3.0	0	5.0	0
	Inkollu	Jaadoo	120	7.5	28.75	0	10.0	0
	Konikipalli	Jaadoo	120	20.0	12.0	0	5.0	0
	Tiruvuru	Crystal 999	110	2.0	5.0	0	7.0	0
		Bold	110	7.0	10.0	0	10.0	0
	Kambhampadu	RCH 659	110	3.0	7.0	10.0	18.0	0
	A Konduru	Jaadoo	110	5.0	2.5	0	10.0	0
	Krishna Rao Palem	Crystal 999	120	6.5	13.0	2.5	9.0	0
	Cheemalapadu	RCH 659	120	3.0	4.5	0	6.0	0
	Badava	Jaadoo	120	2.0	6.0	0	5.0	0
	Mylavarm	Jaadoo	120	3.0	5.0	0	12.0	0

	Gorlavaripalem	Akira	130	2.0	5.0	0	0	0
	Damarapalli	Superb	130	5.0	15.0	0	0	0
	Jonnalagadda	Atish	120	2.0	5.0	0	0	0
Dec'19	Hussanapuram	Tadakha	125	2.0	0	0	13	0
	Nannur	Tadakha	130	4.0	5.0	0	25	1.7
	Kurnool	Jaadoo	130	7.4	0	0	12.6	2.75
	Penchikalapadu	Bhakthi	130	0	0	0	20.0	2.0
	Machavaram	Raja	120	1.4	2.4	0	2.3	0
	Devanakonda	Jaadoo	120	2.0	2.0	0	14.0	0
	Asperi	ATM	125	2.8	2.5	0	2.0	0
	Virupapuram	Jaadoo	125	3.0	1.0	0	4.0	0
	Pandavagallu	Bhakthi	130	2.0	0	1.0	1.0	0
	Urukunda	Jaadoo	130	2.0	3.0	1.0	5.2	0
	Rajanagar	Jaadoo	125	10.0	0	0	28.0	0
	Kosagi	ATM	125	1.0	0	0	1.0	0
	Chetnihalli	Jaadoo	130	1.0	0	0	2.0	0
	Sugur	Bhakthi	130	18.0	3.0	0	16.25	0
	Yemmiganur	Jaadoo	125	0	0	0	11.0	0
	Ralladoddi	ATM	125	9	5.67	0	5.2	0
	Gonegandla	Jaadoo	125	0	0	0	5.75	0
Jan'20	Budampadu	Jaadoo	150	0	13.67	0	10.42	13.86
		Raja	150	0	11.67	0	18.75	20.0

ALS= Alternaria leaf spot; CoLS=Corynespora leaf spot, GM=Grey mildew

Table 11. Observations on the occurrence of cotton diseases- Guntur Center (Andhra Pradesh) Summary

Month	Hybrids (BG II)	Incidence (%)			Mean Percent Disease Intensity (PDI)								
		Wilt	Root rot	Boll Rot	ALS	HLS	CLS	ATN	CoLS	MLS	BB	GM	Rust
Aug-19	MH 5370, Crystal 999, Magna, Atish, Sadananda, Shakthi, Nava Mallika, Magic, RCH 659, Super Shine, Money Maker, Raja	0	0	0	0	0	0	0	0	0	0	0	0
Sept. 2019	Vennela , Police, Super Shine, Sidda, Jaadoo, Raja, Bhakthi, Money Maker, Moksha, Dheeraj, RCH 659, Big Boss	0.0 to 5.0	0.0 to 2.0	0	0.0 to traces	0	0	0	0	0	0	0	0
Oct. 2019	Bhakthi, Akira ,Mahyco, RCH 659, Raja, Jaadoo Money Maker, Big Boss, Sadananda, Geetha	0	0	0.0 to 5.0	0.0 to 28.0	0	0.0 to traces	0.0 to traces	0.0 to 9.0	0 to Traces	0 to 10.0	0	0
Nov. 2019	Akira, RCH 659, Neo, Crystal 999, RCH 659, Jaadoo, Bold, Superb, Atish	0	0	0.0 to 3.0	2.0 to 20.0	0	0.0 to traces	0.0 to 10.0	2.5 to 28.75	0	0	0.0 to 18.0	0
Dec. 2019	Tadakha, Jaadoo, ATM, Bhakthi, , Raja	0	0	0	0.0 to 18.0	0 .0	0 .0	0	0.0 to 5.67	0	0	1.0 to 28.0	0 to 2.75
Jan. 2020	Jaadoo, Raja	0	0	Traces	0	0 .0	0 .0	0.0 to traces	11.67 to 13.67	0	0	10.42 to 18.75	13.86 to 20.0
RARS, Lam, Guntur	Varieties and Hybrids of cotton trials	0	0	Traces to 1%	0 to 30.0	0 .0	0 to Traces	0.0 to 14.0	0.0 to 48.25	0 to Traces	0 to 25.0	0 to 35.5	0 to 44.0

ALS: Alternaria leaf spot; HLS: Helminthosporium leaf spot; CLS: Cercospora leaf spot; ATN: Anthracnose; CoLS: Corynospora Leaf spot; MLS: Myrothecium leaf spot; BB: Bacterial blight; GM: Grey mildew

Table 12: Observations on the occurrence of cotton diseases- Coimbatore Center (Tamil Nadu)

S. No.	Place	District	Area (acre)	Hybrid / Variety	Disease Incidence
1.	Thondamuthur,	Coimbatore	3	Bt Cotton	Grey mildew (2.0PDI) and *Alternaria* leaf blight (2.0PDI)
2.	Munkiltholuvu	Coimbatore	4	Bt Cotton	
3.	Pethappampatti	Coimbatore	4	Bt Cotton	
4.	Kenathukadavu,	Coimbatore	3	Bt Cotton	*Alternaria* leaf blight (2.0PDI), and Tobacco streak virus (1.0 PDI)
5.	Puttur	Coimbatore	4	Bt Cotton	
6.	Sinkaiyanpudur	Coimbatore	3	Bt Cotton	
7.	TNAU	Coimbatore	30	Variety	Grey mildew (1.0PDI), ALB (2.0PDI), TSV (1.0 PDI) and root rot (10%)
8.	Alampatti	Madurai	1	Non-Bt	*Alternaria* leaf blight minimum disease incidence.
9	S. Ammapatti	Madurai	6	Non-Bt	
10.	Rajapalayam	Virudhunagar	4	Bt Cotton and variety	*Alternaria* leaf blight, Bacterial leaf blight and root rot (5-10%) minimum disease incidence.
12.	Ramalingapuram	Virudhunagar	2	Bt Cotton and variety	
13.	Mudhukudi	Virudhunagar	2	Bt Cotton and variety	
14.	Sholapuram	Virudhunagar	3	Bt Cotton and variety	
15.	Desigapuram	Virudhunagar	3	Bt Cotton and variety	
16.	Sholaisari	Tirunelvelli	3	Bt Cotton and variety	*Alternaria* leaf blight and Bacterial leaf blight minimum disease incidence.
17.	Perumalpatti	Tirunelvelli	3	Bt Cotton and variety	
18.	Karivalamvantha-nallur	Tirunelvelli	2	Bt Cotton and variety	
	Sankarankovil	Tirunelvelli	2	Bt Cotton and variety	
22.	Kurukalpatti	Tirunelvelli	8	Bt Cotton and variety	
23.	Kuvalakanni	Tirunelvelli	3	Bt Cotton and variety	
24.	Erode	Erode	5	Bt Cotton	Grey mildew (3.0PDI)
	Chittode	Erode	5	Bt Cotton	
25.	Perambalur	Perambalur	25	Bt Cotton	*Alternaria* leaf blight (3.0PDI), Grey mildew (2.0PDI) and Bacterial leaf blight (2.0PDI)
26.	Veppanthattai	Perambalur	15	Bt Cotton	
27.	Paluvur	Perambalur	15	Bt Cotton	
28.	Kundadam	Tiruppur	6	Bt Cotton	*Alternaria* leaf blight (3.0PDI), Grey mildew (3.0PDI)
29	Dharapuram	Tiruppur	5	Bt Cotton	
30.	Palam Rajakkapatti	Dindigul	5	Bt Cotton	*Alternaria* leaf blight (3.0PDI), Grey mildew (3.0PDI)
31.	Chinnagoundanvalasu	Dindigul	5	Bt Cotton	
32.	Amplikkai	Dindigul	10	Bt Cotton	

Path 1 (b) Disease progress in relation to weather factor

NORTH ZONE

Table 13:Disease progress on F846 in relation to weather factors at Faridkot (Punjab)

SMW	Date	Temperature (°C)			Relative humidity (%)			Rainfall (mm)	Sunshine (Hour)	Wind direction	F846			HS6			RS921			RST9		
		max	min	mean	Max	Min	Mean				CLCuD (DI)	CLCuD PDI	w.fly / 3 leaf	CLCuD (DI)	CLCuD PDI	w.fly / 3 leaf	CLCuD (DI)	CLCuD 3 leaf	w.fly / 3 leaf	CLCuD (DI)	CLCuD PDI	w.fly /
25	18-24	35.[illegible]	25.[illegible]	30.8	68	44	56	18.8	5.2	S	0	0	0.6	0	0	0.3	0	0	0.3	1	0.1	0.9
26	25-01 July	39.[illegible]	28.[illegible]	33.9	62	37	50	0	6.4	SSW	0.8	0.5	1.7	0	0	1.1	0	0	0.6	2.8	0.6	2.1
27	02-08 July	37.[illegible]	28	32.5	72	54	63	26.7	5.5	E	0.8	0.7	2.7	0.8	0.5	3	1.5	1	1.9	5.2	0.8	3.3
28	09-15 July	33.[illegible]	28	30.8	78	64	71	3.7	1.3	S	1.8	1	9.3	5.4	1.3	7.2	4.2	1.8	4.8	12.8	2.6	6.5
29	16-22 July	32.[illegible]	26.[illegible]	29.4	87	69	78	102.4	4.5	ESE	2.8	1.2	12.6	6.8	2.4	14.1	5.6	2	11.8	19.6	4.8	12.2
30	23-29 July	33.[illegible]	27.[illegible]	30.6	81	64	73	0.9	4	E	6.6	1.3	13.7	11.1	3.2	15.3	8	2.4	12.3	22.1	5	16.4
31	30-05	34	27	30.5	84	68	76	25.1	4	SSE	15.8	3.5	9.6	15.8	4.1	12.2	13.2	4.8	13.5	36.4	6.2	15.1
32	06-12	34.[illegible]	27.[illegible]	31.3	83	64	74	12.4	6.7	S	24.6	5.8	5.4	24.6	5.9	7.9	22.8	5.6	8.2	40.9	8.5	8.8
33	13-19	33.[illegible]	26.[illegible]	29.7	87	66	77	20.2	4.2	SE	38.5	7.4	5.1	38.5	6.4	6.1	36.1	8.2	7.1	44.8	10.2	6.7
34	20-26	35.[illegible]	26.[illegible]	30.9	83	58	70	0	7.6	SSE	48.9	10.5	3.2	48.9	12.2	4.2	47.9	11	5.3	56.9	13.3	5.6
35	27-2 Sept	35.[illegible]	27	31.5	82	63	72	6.6	2.8	SSW	62.6	17.3	3	62.6	16.8	3.8	58.3	15.5	5.1	68.1	18	5.1
36	03-09	35.[illegible]	27.[illegible]	31.2	86	61	73	45.8	6.1	ESE	75.2	19.5	2.9	75.2	20	3.9	66.2	20	4.3	74.3	20.4	4.7
37	10-16	35.[illegible]	27.[illegible]	31.4	86	24	55	0	7	SE	83.1	23.8	4.1	83.1	22.8	4.2	78.1	22.9	4.8	78.2	26.6	4.2
38	17-23	33.[illegible]	25	29.3	84	61	72	0	8.3	ESE	85.4	24.7	4.8	85.4	26.4	6.8	82.5	26.4	5.6	86.1	29.1	6.8
39	24-30	31.[illegible]	23.[illegible]	27.8	84	60	72	1	5.2	SSE	96.6	28.9	5.8	96.6	32.2	5.1	92.6	32.8	6.1	97.2	32.4	7.4
40	01-07 Oct	30	20.[illegible]	25.2	90	59	75	3.7	4.3	S	100	34.4	5.2	100	36	6.4	100	33	4.2	100	36.8	5.9
41	08-14 Oct	32.[illegible]	18.[illegible]	25.5	86	40	63	0	7.3	S	100	34.4	4.7	100	36	3.8	100	33	3.1	100	36.8	3.4
42	15-21Oct	31	18.[illegible]	24.6	82	43	62	4	5	S	100	34.4	4.1	100	36	2.4	100	33	2.9	100	36.8	1.6
43	22-28 Oct	31.[illegible]	15.[illegible]	23.7	86	37	62	0	5.7	SW	100	34.4	1.1	100	36	0.2	100	33	0.9	100	36.8	0.4
44	29-04 Nov	30.1	15.4	22.7	89	40	65	0	2.8	W	100	34.4	0.1	100	36	0.2	100	33	0.1	100	36.8	0.1

Table14: Disease progress in relation to weather factors at Sriganganagar (Rajasthan)

Std. week No.	Date of Observation	Disease incidence (%)	Meteorological data				
			Rain fall (mm)	Temperature (°C)		RH (%)	
				Max	Min	8.30 am	17.30 pm
27	02.07.19	2.54	0	43.31	32.69	59.71	40
28	09.07.19	21.54	0	40.46	32.29	56.29	43.71
29	16.07.19	32.57	17.4	37.59	27.86	77.57	66.29
30	23.07.19	74.44	24.5	36.19	29.03	81	62.43
31	30.07.19	86.17	34.5	35.69	27.96	83.71	71.57
32	06.08.19	95.07	0.2	37.73	28.53	78.57	60.86
33	13.08.19	100.00	2.0	37.64	27.76	75.29	56.29

Table 15: Disease progress in relation to weather factors at Hisar (Haryana)

Std. Met. Week	Period	Temp. ^{0}C		RH %		WS KM/H	Sunshine (Hour)	Rain fall (mm)	Rainy Days	WF/3 leaves	CLCuD (% incidence)	CLCuD Difference (%)	CLCuD Index (%)
		Max.	Min.	M	E								
23	04 - 10.6.19	43.5	25.8	55	17	5.6	8.8	0	0	3.53	0.00	0.00	0.00
24	11 - 17.6.19	41.8	26	67	36	7.4	8.3	55.1	3	9.26	5.66	0.00	0.93
25	18-24.6.19	35.7	24.6	78	43	6.7	8.2	20.3	1	10.2	9.00	3.34	1.50
26	25.6- 01.7.19	39.1	25.5	77	44	5.5	7.6	29.7	1	18.4	9.66	0.66	1.59
27	02- 08.7.19	38.6	26.2	74	56	6.5	6.5	1.8	0	9.8	22.0	12.34	3.99
28	09- 15.7.19	37.2	27.3	72	57	9.9	0.7	13.4	1	19.1	32.66	10.66	5.83
29	16 - 22.7.19	32.5	23.7	93	70	6.3	4.5	81.5	2	20.1	49.00	16.34	9.66
30	23- 29.7.19	33.2	25.3	88	73	6.4	3.8	23.7	2	25.0	61.00	12.00	12.99
31	30.7 -	33.8	25.1	86	67	5.6	5.3	17.7	2	26.1	75.33	14.33	17.32
32	06 - 12.8.19	34.6	27	87	68	7.2	6.3	63	1	40.6	82.66	7.33	21.82
33	13 - 19.8.19	33.3	25.5	89	70	5.8	4.5	15.4	1	41.9	94.33	11.67	27.65
34	20- 26.8.19	35.6	25.8	86	56	4.7	8.2	0	0	42.1	94.33	0.00	31.32
35	27.8- 02.9.19	36.2	27.4	83	55	5.2	6.9	0	0	42.3	94.66	0.33	33.15
36	03- 09.9.19	35.7	27	89	59	4.1	6.2	27.7	1	27.7	95.66	1.00	33.65
37	10 -16.9.19	37	27.1	87	51	5.1	6.6	0	0	31.5	96.66	1.00	39.32
38	17 - 23.9.19	35.1	25.2	84	49	6.8	6.7	0	0	22.3	96.66	0.00	43.65
39	24 - 30.9.19	33.4	24.3	84	57	6.9	7.2	2.2	0	25.6	97.00	1.00	48.81
40	01 - 07.10.19	31.8	21	92	50	4.1	5.5	2.6	1	21.8	97.00	0.00	49.31
41	08 - 14.10.19	32.7	17.6	90	39	2.9	7.5	0	0	10.7	97.00	0.00	50.81
42	15 - 21.10.19	34.1	18.4	79	34	4.5	7.3	0	0	8.4	97.00	0.00	54.81
43	22 - 28.10.19	31.9	14.9	79	31	2.2	6.5	0	0	8.3	97.00	0.00	55.48
44	29- 04.11.19	30.7	16.2	90	35	1.3	1.8	0	0	3.9	97.00	0.00	55.48

Table 16: Disease progress in relation to weather factors at Sirsa (Haryana)

SMW	Date/Period	% CLCuD incidence	PDI	Whitefly/3 leaves	Temperature °C		Relative humidity (%)		Rainfall (mm)
					Max.	Mini	M	E	(Mm)
24	11 - 17.6.19				42.2	29.6	53.9	30.7	52.6
25	18-24.6.19				37.6	26.0	70.1	46.1	14.0
26	25.6- 01.7.19	0.9	0.1	2.5	39.9	26.9	62.3	41.7	0.0
27	02- 08.7.19	7.9	1.3	2.5	38.3	27.1	63.6	47.3	12.5
28	09- 15.7.19	17.7	2.9	12.7	36.1	26.2	71.7	56.3	8.4
29	16 - 22.7.19	54	10	7	33.3	22.0	83.1	66.0	72.6
30	23- 29.7.19	81.2	19.9	10.1	33.3	22.1	83.6	71.6	86.9
31	30.7 - 05.8.19	96.5	37.7	10.1	34.8	22.9	80.9	65.9	0.0
32	06 - 12.8.19	100	41.5	6.8	36.9	24.7	72.0	56.7	5.2
33	13 - 19.8.19				34.0	21.9	79.3	67.4	39.5
34	20- 26.8.19				35.9	27.2	73.1	59.1	0.0
35	27.8- 02.9.19				36.3	27.4	76.6	59.9	0.0
36	03- 09.9.19				36.1	27.0	80.0	59.1	0.0
37	10 -16.9.19				36.8	27.4	77.7	56.0	0.0
38	17 - 23.9.19				34.5	25.1	78.3	58.3	1.2

CENTRAL ZONE

Table 17: Disease progress in relation to weather factors at Nanded (Maharashtra)

SWM	Dates	Rain fall (mm)	Rainy days	Temp (C°)		R. H		Percentage disease intensity (PDI)				
				Max.	Min.	BN	AN	BLB	Alt.	G.M.	Parawilt	Anthracnose
1	2	3	4	5	6	7	8	9	10	11		
27	2 –8 July	2.4	0	33.0	20.0	68.0	51.7					
28	9 – 15 July	20.8	2	35.2	21.6	67.9	58.9					
29	16 –22 July	43.6	3	35.4	20.6	72.6	53.7					
30	23 – 29 July	51.6	4	31.7	19.7	73.3	73.2					
31	30 –5 August	126.4	5	28.8	17.4	77.5	76.5					
32	6 –12 August	65.8	3	31.1	18.6	71.3	72.4					
33	13 –19 August	53.8	2	30.4	19.0	76.9	75.7		0.2			
34	20 – 26 August	45.8	2	31.4	18.6	78.9	63.7		0.9			
35	27 –2 Sept.	85.9	3	30.9	19.1	81.6	70.1		1.1			
36	3 – 9 Sept.	11.4	3	30.1	17.7	84.0	75.0	0.1	2.9			
37	10 –16 Sept.	83.2	4	30.7	19.7	88.3	75.1	0.2	3.5			
38	17- 23 Sept.	100.8	4	29.4	17.9	80.9	72.4	0.9	5.7			
39	24 – 30 Sept.	40.0	3	31.0	19.0	85.4	79.4	2.0	6.1			
40	1 – 7 October	44.0	2	30.9	19.1	81.4	70.0	2.0	7.1			
41	8 – 14 October	13.8	1	32.0	19.3	77.6	80.3	2.2	8.3			
42	15 –21 October	155.8	3.0	31.3	18.0	79.9	79.4	3.2	9.8			
43	22 – 28 October	102.6	5.0	29.4	18.7	85.4	82.3	3.9	10.9		0.00	
44	29 Oct 4 Nov.	8.8	1.0	30.6	18.6	86.6	77.1	4.5	12.0		0.00	
45	5 – 11 Nov.	2.6	1.0	31.6	18.6	83.1	69.9	5.0	12.4	0.6	0.00	
46	12 – 18 Nov.	0.0	0.0	31.3	17.0	83.0	65.7	5.1	11.2	3.6	0.00	
47	19 –25 Nov.	0.0	0.0	28.9	16.7	79.3	72.9	6.2	8.2	7.2	0.00	
48	26 Nov - 2 Dec.	0.0	0.0	29.3	16.4	75.1	74.4	8.2	6.4	8.6	0.00	
49	3 - 9 December	0.0	0.0	28.40	17.5	64.0	66.7	7.5	5.2	10.2	0.00	
50	10-16 December	0.0	0.0	30.1	15.3	72.7	65.4	5.5	3.2	10.6	0.00	0.50
51	17-23 December	0.0	0.0	29.60	12.9	79.4	64.3	2.9	1.2	11.6	0.00	0.59
52	24-31 December	0.0	0.0	28.3	13.1	83.5	67.5	1.0	1.0	13.2	0.00	1.20
	Annual Rainfall	**1165.7**	**59**									
	Seasonal Rainfall	1150.3	57									
	Average Rainfall		44.87									

(BLB- Bacterial blight, ALT- Alternaria leaf spot, GM- Grey mildew)

Table 18a. Disease progress in relation to weather factorsat Akola(Gujrat).

Met. Week	Period	Rainy days	Rainfall in mm	Temperature ^{0}C		R. Humidity %		Sunshine hours	LRA-5166			Bhakti Bt		
				Max.	Min.	Morn.	Even	BSH	BLB	MLS	GM	BLB	MLS	GM
34	20.26 Aug.	3.0	28.5	29.6	20.0	90	76	3.1	-	-	-	-	-	-
35	27-02 Sept.	3.0	54.5	29.1	19.9	91	72	3.3	-	-	-	-	-	-
36	03.09 Sept.	1.0	9.0	29.6	20.6	92	77	1.9	-	-	-	-	-	-
37	10-16 Sept.	3.0	18.0	29.0	19.9	90	75	1.7	-	-	-	-	-	-
38	17-23 Sept.	4.0	118.1	30.3	19.4	94	70	2.8	6.25	-	-	6.25	-	-
39	24-30 Sept.	4.0	82.0	30.6	19.5	94	67	4.5	7.92	0.49	-	6.25	0.33	-
40	01-07 Oct.	1.0	6.4	32.3	20.0	90	57	7.6	13.33	1.66	-	14.17	1.23	-
41	08-14 Oct.	0.0	0.0	32.3	17.9	88	48	8.1	17.50	2.18	-	16.67	2.16	-
42	15.21 Oct.	1.0	11.2	30.5	16.5	91	58	5.0	20.42	3.33	-	21.25	3.54	-
43	22.28 Oct.	5.0	67.5	26.8	17.6	95	79	0.7	21.25	4.55	-	22.08	3.33	-
44	29.04 Nov.	1.0	11.8	30.3	18.0	93	61	4.9	17.92	2.10	-	17.50	2.10	-
45	05-11 Nov.	0.0	0.0	31.3	16.4	90	50	7.5	16.25	1.01	0.33	14.17	0.83	0.49
46	12-18 Nov.	0.0	0.0	30.2	11.9	90	40	8.0	16.25	Traces	1.66	17.50	0.66	1.61
47	19-25 Nov.	0.0	0.0	30.3	13.4	89	40	7.9	17.08	-	3.82	15.42	Traces	2.49
48	26.02 Dec.	0.0	0.0	30.3	15.6	90	44	7.2	20.42	-	4.66	19.58	-	3.66
49	03-09 Dec.	0.0	0.0	29.0	14.8	83	37	7.0	14.17	-	3.66	12.50	-	5.45
50	10-16 Dec.	0.0	1.2	29.5	16.6	89	49	5.9	9.58	-	1.66	8.33	-	4.66
51	17-23 Dec.	0.0	0.0	27.2	15.8	90	49	4.1	5.83	-	0.83	4.16	-	3.82
52	24-31 Dec.	2.0	13.0	25.9	13.5	81	47	3.9	2.92	-	0.66	2.50	-	3.33
01	1-7 Jan.20	0.0	0.0	23.1	13.1	89	57	3.6	1.67	-	0.33	0.42	-	2.18
02	8-14 Jan.20	0.0	0.0	26.9	12.2	82	41	6.5	0.0	-	0.33	0.0	-	1.33

Table 18b : Correlation values between weather parameters and bacterial blight of cotton at Akola (MS.) [Correlation coefficient (r)]

Sr. No.	Particulars	Rainfall	Temperature ^{0}C		R.Humidity		Sunshine hours/BSH
			Max.	Mini	Morn.	Even.	
1	LRA-5166 % disease intensity	-0.10705	0.595857*	0.263931	0.433089	0.077425	0.261286
2	Bhakti Bt % disease intensity	-0.07722	0.581562*	0.259372	0.439017	0.116058	0.226757

('r') values : * Significant at 5% 0.482,
** Significant at 1% 0.606

Table 19a. Disease progress in relation to weather factorsat Surat (Gujrat).

Sr. No.	SMW	Period	BLB PDI	Weather parameters						
				Temp °C		Humidity %		Sunshine hour	Rainfall (mm)	Rainy days
				Max	Min	Morning	Evening			
1	25	18-06-19	0.0	31.9	27.4	71.0	62.0	6.7	33.5	3
2	26	25-06-19	0.0	31.0	26.6	77.0	71.0	3.4	167	5
3	27	02-07-19	0.0	29.3	28.6	84.0	78.0	5.1	84	5
4	28	09-07-19	0.0	31.7	28.7	76.0	69.0	7.2	3	2
5	29	16-07-19	0.0	33.2	26.9	79.0	73.0	7.5	74	2
6	30	23-07-19	0.0	30.1	27.8	83.0	86.0	0.7	112	5
7	31	30-07-19	0.0	29.5	27.3	91.0	88.0	0.0	432	7
8	32	06-08-19	2.5	29.3	26.5	97.0	92.0	0.0	166	5
9	33	13-08-19	4.5	30.7	26.9	84.0	80.0	2.9	16	5
10	34	20-08-19	6.0	31.6	26.8	82.0	73.0	3.6	0	0
11	35	27-08-19	8.5	29.1	24.9	83.0	82.0	3.0	114	4
12	36	03-09-19	12.5	29.5	25.1	87.0	84.0	0.1	106	7
13	37	10-09-19	15.0	29.3	25.4	85.0	84.0	1.6	176	4
14	38	17-09-19	18.5	29.4	26.1	82.0	83.0	4.3	27	3
15	39	24-09-19	22.5	30.7	25.4	82.0	79.0	1.3	47	5
16	40	01-10-19	25.5	31.1	26.2	75.0	77.0	6.1	10	1
17	41	08-10-19	29.5	32.0	26.0	77.0	67.0	6.0	0	0
18	**42**	**15-10-19**	**34.0**	**35.2**	**23.7**	**69.0**	**61.0**	**5.7**	**0**	**0**
19	43	22-10-19	30.0	33.0	23.9	84.0	69.0	3.2	20	2
20	44	29-10-19	29.0	34.1	24.0	74.0	64.0	4.8	14	2
21	45	05-11-19	25.5	32.6	23.0	77.0	67.0	4.3	23	2
22	46	12-11-19	19.5	32.9	21.5	75.0	68.0	6.9	0	0
23	47	19-11-19	16.0	33.4	22.0	77.0	65.0	6.1	0	0
24	48	26-11-19	14.0	33.1	21.3	74.0	66.0	4.1	0	0
25	49	03-12-19	12.0	32.4	21.1	76.0	70.0	3.3	0	0
26	50	10-12-19	7.0	30.8	17.7	68.0	73.0	4.3	0	0
27	51	17-12-19	9.5	24.4	18.0	76.0	72.0	4.1	0	0
Correlation matrix				**0.4332***	**-0.3439**	**-0.3110**	**-0.4124***	**0.1832**	**-0.4300***	**-0.4328***

*significant at 5 % (r=0.381) and ** 1% (r=0.487) level of significance at n-2 degree of freedom

Table 20b: Disease progress in relation to weather factorsat Junagarh (Gujrat).

Sr. No	Month	Period (2019)		Percent disease incidence (PDI)			Temperature ºC		Relative Humidity (%)		Rain Fall (mm)	No. of Rainy Days
		Date	Std. Week	ALS	BLB	GM	Mean Max.	Mean Min.	M	E		
1	2	3	4	5	6	7	8	9	10	11	12	13
1	July	30-05	31	0.0	1.0	0.0	28.3	24.9	96.0	95.0	213.3	6
2	Aug	06-12	32	0.0	19.5	0.0	28.9	25.5	96.0	92.0	180.6	4
3	Aug	13-19	33	0.0	17.0	0.0	30.6	25.3	96.0	84.0	22.9	3
4	Aug	20-26	34	0.0	12.0	0.0	32.4	24.8	90.0	73.0	3.9	0
5	Aug	27-02	35	0.0	12.0	0.0	30.9	25.5	96.0	88.0	49.6	4
6	Sept	03-09	36	0.0	9.0	0.0	31.1	25.4	94.0	86.0	248.0	7
7	Sept	10-16	37	0.0	22.0	0.0	29.8	25.3	96.0	85.0	180.5	4
8	Sept	17-23	38	0.0	5.0	0.0	32.6	25.1	89.0	77.0	24.6	2
9	Sept	29-30	39	0.0	5.5	0.0	31.0	24.3	93.0	84.0	196.2	6
10	Oct	01-07	40	5.0	3.0	0.1	32.5	23.9	87.0	65.0	36.8	2
11	Oct	08-14	41	5.5	2.0	0.2	34.9	23.4	80.0	49.0	0.0	0
12	Oct	15-21	42	27.0	2.0	0.8	35.2	22.7	77.0	43.0	1.0	0
13	Oct	22-28	43	8.5	2.0	1.0	32.6	24.8	64.0	52.0	0.0	0
14	Oct	29-04	44	25.0	1.5	4.0	34.0	23.7	80.0	54.0	4.4	1
15	Nov	05-11	45	17.0	1.0	4.0	33.3	22.0	70.0	46.0	0.0	0
16	Nov	12-18	46	2.5	0.5	5.0	32.6	20.3	82.0	51.0	11.2	1
17	Nov	19-25	47	22.5	0.0	6.0	32.5	17.9	80.0	39.0	0.0	0
18	Nov	26-02	48	4.5	0.0	15.0	31.3	19.2	70.0	43.0	0.0	0
19	Dec	03-09	49	0.0	0.0	10.0	31.6	19.4	66.0	44.0	0.0	0
20	Dec	10-16	50	8.5	0.0	8.0	29.5	15.7	74.0	36.0	0.0	0
21	Dec	17-23	51	4.0	0.0	6.9	28.7	14.7	74.0	39.0	0.0	0
22	Dec	24-31	52	3.2	0.0	7.0	28.2	12.6	56.0	32.0	0.0	0

M= Morning, E= Evening,ALS-Alternaria leaf spot, BLB-Bacterial leaf blight &GM-Gray mildew

Table 20(a) Correlation values between weather parameters and alternaria leaf spot and bacterial leaf blight of cotton at Junagadh [Correlation coefficient(r)]

Sr No	Particulars	Temperature ^{0}C		Relative Humidity (%)		Rainfall mm	Rainy Days
		Maxi	Mini	Morning	Evening		
1	Alternaria leaf spot	0.569	0.337	0.237	0.004	0.123	0.398
2	Bacterial leaf blight	-0.518	0.679	0.624	0.509	-0.728	0.588
3	Grey mildew	-0.576	-0.607	-0.400	-0.540	0.123	0.398

('r') values * Significant at 5 % (*P<0.05*) : 0.433; ** Significant at 1 % (*P<0.01*): 0.549

SOUTH ZONE

Path – 1(b): Observations on the appearance and progress of foliar diseases of cotton in disease trap nursery 2019-20

Table – 21a: Disease progress in relation to weather factorsat Dharwad (Karnataka)

Sl. No	SMW	V1 Abhadita			V2 Jayadhar		V3 Bunny Bt			V4 Dr. Brent Bt			Temperature °C		Relative humidity %		Weekly Rainfall (mm)	Av. Rainfall (mm)	Rainy Days
		AB	BB	GM	AB	GM	AB	BB	GM	AB	BB	GM	Max	Min	Mor (%)	Even (%)			
1	31	3.12 (10.14)	0.00 (0.00)	0.00 (0.00)	3.37 (8.91)	0.00 (0.00)	2.77 (9.63)	0.00 (0.00)	0.00 (0.00)	3.97 (11.54)	0.00 (0.00)	0.00 (0.00)	21.4	19.9	93.0	90.4	136.2	19.5	7
2	32	3.12 (10.14)	0.00 (0.00)	0.00 (0.00)	3.98 (11.54)	0.00 (0.00)	3.72 (11.09)	0.00 (0.00)	0.00 (0.00)	4.24 (11.83)	0.00 (0.00)	0.00 (0.00)	24.4	20.1	91.6	92.0	382.0	54.6	6
3	33	4.31 (11.97)	0.00 (0.00)	0.00 (0.00)	4.82 (12.66)	0.00 (0.00)	4.46 (12.25)	0.00 (0.00)	0.00 (0.00)	4.46 (12.25)	0.00 (0.00)	0.00 (0.00)	26.9	20.8	89.1	85.9	17.0	2.4	2
4	34	10.22 (18.63)	0.00 (0.00)	0.00 (0.00)	10.62 (19.00)	0.00 (0.00)	11.11 (19.46)	0.00 (0.00)	0.00 (0.00)	12.50 (20.70)	0.00 (0.00)	0.00 (0.00)	28.2	20.5	85.9	81.6	23.0	3.3	2
5	35	13.98 (21.97)	0.00 (0.00)	0.00 (0.00)	16.09 (23.66)	0.00 (0.00)	15.20 (22.95)	0.00 (0.00)	0.00 (0.00)	16.55 (24.04)	0.00 (0.00)	0.00 (0.00)	27.0	20.7	92.1	82.7	6.4	0.9	1
6	36	17.81 (24.95)	0.00 (0.00)	0.00 (0.00)	27.53 (31.63)	0.00 (0.00)	25.91 (30.59)	0.00 (0.00)	0.00 (0.00)	23.52 (29.00)	0.00 (0.00)	0.00 (0.00)	25.1	20.9	92.0	91.6	44.0	6.3	6
7	37	20.47 (26.92)	7.54 (15.89)	6.89 (15.23)	16.61 (24.04)	5.70 (13.81)	22.38 (28.25)	8.80 (17.26)	7.85 (16.32)	24.54 (29.67)	9.63 (18.05)	9.17 (17.66)	27.7	20.9	90.4	80.1	6.0	0.9	1
8	38	22.07 (28.04)	11.71 (20.00)	9.96 (18.43)	17.25 (24.58)	9.50 (17.95)	22.50 (28.32)	9.37 (17.85)	12.91 (21.05)	21.45 (27.62)	12.50 (20.70)	11.45 (19.82)	27.9	20.8	89.0	86.0	21.2	3.0	2
9	39	24.81 (29.87)	14.31 (22.22)	12.86 (21.05)	17.66 (24.88)	11.64 (19.91)	28.65 (32.39)	17.88 (25.03)	15.57 (23.26)	25.38 (30.26)	17.88 (25.03)	16.34 (23.81)	28.9	20.9	87.3	73.0	34.4	4.9	4
10	40	30.28 (33.40)	21.74 (27.76)	26.01 (30.66)	20.32 (26.78)	18.12 (25.18)	31.09 (33.90)	22.26 (28.18)	21.84 (27.83)	30.48 (33.52)	25.21 (30.13)	24.12 (29.40)	29.5	20.3	91.7	84.7	29.8	4.3	3
11	41	36.23 (36.99)	30.04 (33.21)	30.73 (33.65)	24.67 (29.80)	25.98 (30.66)	37.85 (38.00)	33.33 (35.24)	28.09 (32.01)	38.50 (38.35)	33.00 (35.06)	28.75 (32.46)	29.5	20.3	21.3	78.4	169.8	24.3	4
12	42	38.26 (38.23)	32.14 (34.51)	32.65 (34.88)	28.14 (32.01)	26.11 (30.72)	44.23 (41.67)	37.91 (38.00)	32.96 (35.06)	42.81 (40.86)	40.22 (39.35)	34.77 (36.15)	29.4	21.0	92.4	80.7	157.6	22.5	5
13	43	44.34 (41.73)	36.60 (37.23)	37.20 (37.58)	31.62 (34.20)	29.27 (32.77)	42.40 (40.63)	39.20 (38.76)	39.24 (38.76)	45.51 (42.42)	41.34 (39.99)	39.10 (38.70)	26.6	20.0	90.0	88.1	42.2	6.3	3
14	44	53.81 (47.18)	45.18 (42.25)	49.30 (44.60)	36.25 (37.05)	35.75 (36.75)	53.87 (47.29)	40.49 (39.52)	43.66 (41.38)	48.89 (44.37)	50.73 (45.40)	48.16 (43.97)	29.1	19.5	86.4	73.1	4.0	0.6	1
15	45	58.87 (50.13)	49.19 (44.54)	56.04 (48.45)	35.96 (36.87)	36.47 (37.17)	58.19 (49.72)	50.00 (45.00)	54.09 (47.35)	54.23 (47.41)	53.81 (47.18)	62.28 (52.12)	30.2	19.1	84.9	68.9	21.0	3.0	1
16	46	60.64 (51.12)	53.70 (47.12)	63.42 (52.77)	44.00 (41.55)	44.00 (41.55)	61.32 (51.53)	62.73 (52.36)	54.71 (47.70)	63.88 (53.67)	57.83 (49.49)	65.27 (53.91)	29.5	18.1	77.7	57.4	0.0	0.0	0

Path– 21 (a): Correlation values for foliar diseases of cotton with weather parameters Dharwad (Karnataka)

Sl. no	r'values / weather parameters	V1 Abhadita			V2 Jayadhar		V3 Bunny Bt			V4 Dr.BrentBt		
		AB	BB	GM	AB	GM	AB	BB	GM	AB	BB	GM
1	Max. Temp	0.687	0.644	0.635	0.610	0.647	0.697	0.643	0.639	0.680	0.654	0.637
2	Min. Temp	-0.646	-0.703	-0.749	-0.568	-0.696	-0.587	-0.695	-0.702	-0.612	-0.667	-0.740
3	RH Morning (%)	-0.253	-0.286	-0.268	-0.202	-0.318	-0.250	-0.305	-0.250	-0.270	-0.270	-0.233
4	RH Evening (%)	-0.749	-0.737	-0.757	-0.678	-0.735	-0.741	-0.760	-0.733	-0.743	-0.725	-0.770
5	Total Rainfall	-0.329	-0.214	-0.224	-0.382	-0.202	-0.323	-0.189	-0.224	-0.320	-0.204	-0.236
6	Rainy Days	-0.484	-0.427	-0.446	-0.430	-0.416	-0.434	-0.400	-0.431	-0.454	-0.407	-0.453

Critical Values of the Pearson Product-Moment Correlation Coefficient (df:n-2) = 0.497

Table 22: Disease progress in relation to weather factors at Guntur (Andhra Pradesh)

SMW	Month & Date	Temperature (^{0}C)		Relative Humidity (%)		Rain Fall (mm)	Rainy days	Sun shine hours	Wind speed km/h	Evaporation	Per cent Disease Index (PDI)			
											JadooBG II			L 1060
		Max	Min	I	II						ALS	Grey mildew	Rust	CoLS
34	20-26 Aug	35.4	25.2	85.6	70.1	57.1	2.0	3.5	8.5	4.8				
35	27Aug-2Sept	35.6	26.6	86.6	66.0	20.7	2.0	6.4	8.5	6.5	5.0			
36	3-9 Sept	33.8	25.6	88.3	65.4	6.0	0.0	6.2	10.2	3.0	8.0			
37	16-Oct	37.0	26.3	86.6	65.3	73.6	2.0	7.9	8.1	3.9	9.3			
38	17-23	32.3	24.9	90.6	84.3	81.8	4.0	3.8	7.8	2.7	11.8			
39	24-30Sept	35.6	24.9	82.3	52.6	3.0	1.0	6.4	5.4	5.9	12.8			
40	Oct.1-7	33.7	25.1	90.3	70.4	5.6	1.0	2.2	2.4	3.5	15.0			
41	14-Aug	32.9	25.2	92.0	72.3	61.0	3.0	3.3	2.1	3.7	17.0			4.0
42	15-21	31.5	24.7	94.1	82.9	74.4	3.0	0.0	2.9	3.3	24.5			6.0
43	22-28	31.1	24.4	91.4	83.7	40.6	4.0	2.6	4.7	3.2	30.0			11.3
44	29Oct-4 Nov	31.5	24.8	91.1	74.1	41.0	2.0	4.5	3.5	3.5	24.8	3.0		15.3
45	11-May	33.1	22.4	92.9	72.0	0.0	0.0	6.2	3.5	3.9	22.8	6.5		20.8
46	18-Dec	32.2	23.3	93.4	74.6	0.0	0.0	5.7	3.6	4.5	15.8	10.8		28.8
47	19-25	31.7	22.0	93.3	80.9	0.0	0.0	5.0	4.0	4.2	8.8	15.8		31.3
48	26- 2Dec	31.0	20.7	90.3	84.7	0.0	0.0	4.5	4.5	4.1	5.5	16.8		37.0
49	9-Mar	30.4	19.9	88.7	88.6	1.6	0.0	2.0	3.6	3.5	4.0	23.8	5.6	41.0
50	16-Oct	31.1	18.1	92.4	79.3	0.0	0.0	4.9	3.3	4.1	0.8	25.5	19.3	48.3
51	17-23	31.3	18.0	92.1	80.1	0.0	0.0	4.9	4.2	4.1	0.8	35.5	26.3	40.3
52	24-31Dec	30.7	18.1	90.9	79.6	0.0	0.0	4.5	3.5	4.1	0.8	34.8	30.0	36.3
1	1-7 Jan	29.7	21.0	89.0	84.7	7.6	1.0	2.6	3.6	3.9		29.0	32.3	35.8
2	14-Aug	30.4	18.4	90.3	83.9	0.0	0.0	4.4	5.7	4.2		27.3	33.0	34.8
3	15-21	30.1	18.0	87.9	78.0	0.0	0.0	6.2	5.1	4.4		24.3	35.5	33.8
4	22-28	32.4	19.1	88.9	71.6	0.0	0.0	6.8	3.9	4.7		7.8	44.0	26.0
5	29Jan-4Feb	32.5	20.5	89.0	63.0	0.0	0.0	7.0	4.0	5.3		3.5	25.0	16.3

Note: SMW - Standard Meteorological Week

Table 23: Disease progress in relation to weather factors at Coimbatore (Tamil Nadu)

Std. metrological week	Std Week No.	Foliar disease									Soil borne disease		
		Bacterial leaf blight			*Tobacco streak virus*			*Alternaria* leaf blight			Root rot		
		CO 14	RCHIIBGII	MCU5	CO 14	RCHII BGII	MCU5	CO14	RCHII BGII	MCU5	CO14	RCHIIBGII	MCU5
Aug10-16	**33**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17-23	**34**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24-30	**35**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sep 1-7	**36**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8-14	**37**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15-21	**38**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22-28	**39**	3.0	3.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29-Oct5	**40**	5.0	5.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6-12	**41**	5.0	5.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13-19	**42**	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	0.0	0.0	0.0
20-26	**43**	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	0.0	7.0	7.0
27-Nov2	**44**	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	0.0	7.0	7.0
Nov3-9	**45**	8.0	8.0	8.0	5.0	5.0	5.0	5.0	5.0	5.0	0.0	7.0	7.0
10-16	**46**	10.0	10.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	0.0	7.0	7.0
17-23	**47**	10.0	10.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	0.0	7.0	7.0
24-30	**48**	10.0	10.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	0.0	7.0	7.0
Dec1-7	**49**	0.0	0.0	0.0	0.0	0.0	0.0	10.0	10.0	10.0	0.0	7.0	7.0
8-14	**50**	0.0	0.0	0.0	0.0	0.0	0.0	10.0	10.0	10.0	10.0	10.0	10.0
15-21	**51**	0.0	0.0	0.0	0.0	0.0	0.0	10.0	10.0	10.0	10.0	10.0	10.0
22-28	**52**	0.0	0.0	0.0	0.0	0.0	0.0	10.0	10.0	10.0	10.0	10.0	10.0
29-Jan4,20	**1**	0.0	0.0	0.0	0.0	0.0	0.0	10.0	10.0	10.0	10.0	10.0	10.0
5-11	**2**	0.0	0.0	0.0	0.0	0.0	0.0	10.0	10.0	10.0	10.0	10.0	10.0
12-18	**3**	0.0	0.0	0.0	0.0	0.0	0.0	10.0	10.0	10.0	10.0	10.0	10.0
19-25	**4**	0.0	0.0	0.0	0.0	0.0	0.0	10.0	10.0	10.0	10.0	10.0	10.0
26-Feb1	**5**	0.0	0.0	0.0	0.0	0.0	0.0	10.0	10.0	10.0	10.0	10.0	10.0

Path 1c: Studies on the variability in Alternaria causing leaf spot in cotton

Table 24: Presence of *Alternaria* species in cotton leaf spot samples during *kharif* 2019: RARS Lam

S. No.	Date	Place (district)	Hybrid / variety	Presence of Alternaria spores
1	26.09.19	RARS, Lam	Jaadoo (Field No 17)	Positive
2	26.09.19	RARS, Lam	Jaadoo (Field No 12)	Positive
3	29.10.19	RARS, Lam	NDLH 1938 (Field No 2)	Positive
4	29.10.19	RARS, Lam	L 1060 (PG trial)	Positive
5	29.10.19	RARS, Lam	Jadoo (Field No 16)	Positive
6	30.10.19	Karempudi (Guntur)	RCH 659	Positive
7	30.10.19	Durgi (Guntur)	Geetha	Positive
8	30.10.19	Gundlapalli (Guntur)	Raja	Positive
9	15.11.19	Adusumilli (Prakasam)	Akira	Positive
10	15.11.19	Konikapalli (Prakasam)	Jaadoo	Positive
11	20.11.19	Tiruvuru (Krishna)	Bold	Positive
12	05.12.19	Kurnool (Kurnool)	Jaadoo	Positive
13	05.12.19	Sugur (Kurnool)	Bhakthi	Positive
14	05.12.19	Rajanagar (Kurnool)	Jaadoo	Positive
15	05.12.19	Ralladoddi(Kurnool)	ATM	Positive

Table 25: Morphological studies of *Alternaria* cultures

Days	Mycelial diameter of isolates in cm			
	Coimbatore	Guntur	Bathinda	Junagadh
3	2.1	2.5	2.8	3.8
	2.2	2.2	3.0	4.1
	2.15	2.35	2.9	3.95
5	4.2	4.0	4.5	6.5
	4.0	4.2	5.5	6.0
	4.1	4.1	5.0	6.25
7	6.0	6.5	6.0	8.0
	5.7	6.2	7.0	8.0
	5.85	6.35	6.5	8.0
9	6.7	7.0	7.0	8.5
	6.7	7.0	7.5	8.5
	6.7	7.0	7.25	8.5

Path 1 (d) Survey and Epidemiology of TSV

SOUTH ZONE

Table-26a: Incidence of TSV on Cotton in farmers' fields in Guntur during *kharif* 2019

Month	Location (Village/ District)	Hybrid (BG II)	Age/ Stage of the crop (days)	TSV Incidence (%)
Aug'19	Gorantla	MH 5370	21	0
		Crystal 999	21	0
	Jonnalagadaa	Crystal 999	21	0
		Magna	21	0
		Atish	21	0
	Tatireddypalem	Crystal 999	20-Oct	0
	Nidumukkala	Sadananda	30-Oct	0
	Gudipudi	Shakthi	28	3
		Magna	30	0
		Nava Mallika	30	0
		Magic	30	0
	Bejathpuram	RCH 659	30	0
		Magna	30	0
		Crystal 999	30	0
	Damarapalli	Nava Mallika	30	Traces
		Super Shine	30	0
		RCH 659	30	0
		Money Maker	30	0
		Raja	30	0
	Lam	RCH 659	7	Traces
Sept.'19	Ramapuram	Vennela	90	0
		Police	90	0
		Super Shine	90	0
	Damarapalli	Sidda	50	4
		Super Shine	50	0
		Jaadoo	50	Traces
		Raja	50	Traces
	Kurnoothala	Bhakthi	55	Traces
		Money Maker	55	0
		Moksha	55	0
		Dheeraj	55	0
		RCH 659	55	Traces
	Abbineniguntapalem	Big Boss	55	Traces
	Palaparru	Super Shine	55	0
	Pedanandipadu	Jaadoo	55	0
	Chilakaluripet	Jaadoo	55	Traces
Oct'19	Kakani	Bhakthi	55	2

	Repudi	Akira	55	Traces
	Satuluru	Mahyco	55	0
	Narasingapadu	RCH 659	60	0
	Gundlapalli	Raja	60	Traces
	Zulakallu	Jaadoo	60	0
	Karempudi	RCH 659	60	Traces
	Oppicharla	RCH 659	60	Traces
	Narmalapadu	Money Maker	90	0
		Big Boss	90	0
	Adigoppula	Sadananda	90	0
	Obulesunipalli,	Jaadoo	90	0
	Durgi	Geetha	90	Traces
		Raja	90	0
	Jonnalagadda	RCH 659	90	0
	Ravipadu	Raja	90	0
	Nudurupadu	RCH 659	90	Traces
	Vemavaram	Jaadoo	90	0
Nov'19	Kantheru	Akira	100	0
	Tadikonda	RCH 659	100	0
	LacchannaGudipudi	Neo	120	1
		Crystal 999	120	Traces
	Koyavaripalem	RCH 659	120	Traces
	Abbineniguntapalem	Jaadoo	120	Traces
	Adusumilli	Akira	120	0
	Daggubadu	RCH 659	120	0
	Inkollu	Jaadoo	120	0
	Konikipalli	Jaadoo	120	0
	Tiruvuru	Crystal 999	110	0
		Bold	110	0
	Kambhampadu	RCH 659	110	0
	A Konduru	Jaadoo	110	0
	Krishna Rao Palem	Crystal 999	120	0
	Cheemalapadu	RCH 659	120	0
	Badava	Jaadoo	120	0
	Mylavarm	Jaadoo	120	0
	Gorlavaripalem	Akira	130	0
	Damarapalli	Superb	130	0
	Jonnalagadda	Atish	120	0
Dec'19	Hussanapuram	Tadakha	125	0
	Nannur	Tadakha	130	0
	Kurnool	Jaadoo	130	0
	Penchikalapadu	Bhakthi	130	0
	Machavaram	Raja	120	0

	Devanakonda	Jaadoo	120	0
	Asperi	ATM	125	0
	Virupapuram	Jaadoo	125	1
	Pandavagallu	Bhakthi	130	1
	Urukunda	Jaadoo	130	0
	Rajanagar	Jaadoo	125	1
	Kosagi	ATM	125	1
	Chetnihalli	Jaadoo	130	2
	Sugur	Bhakthi	130	0
	Yemmiganur	Jaadoo	125	0
	Ralladoddi	ATM	125	0
	Gonegandla	Jaadoo	125	0
Jan'20	Budampadu	Jaadoo	150	0
		Raja	150	0

Table 26b: Abstract

Month	Hybrids (BG II)	Incidence of TSV (%)
Aug-19	MH 5370, Crystal 999, Magna, Atish, Sadananda, Shakthi, Nava Mallika, Magic, RCH 659, Super Shine, Money Maker, Raja	0 to 3.0
Sep-19	Vennela , Police, Super Shine, Sidda, Jaadoo, Raja, Bhakthi, Money Maker, Moksha, Dheeraj, RCH 659, Big Boss,	0 to 4.0
Oct-19	Bhakthi, Akira ,Mahyco, RCH 659, Raja, Jaadoo, Money Maker, Big Boss, Sadananda, Geetha	0 to 2.0
Nov-19	Akira, RCH 659, Neo, Crystal 999, RCH 659, Jaadoo, Bold, Superb, Atish	0 to 1.0
Dec-19	Tadakha, Jaadoo, ATM, Bhakthi, , Raja	0 to 2.0
Jan-20	Jaadoo, Raja	0

Table-27 : Progress of TSV incidence (%) and intensity in RCH 2 BG II at RARS, Lam, Guntur during *kharif* 2019

SMW	Month & Date	Tobacco Streak Virus Disease					
		RCH 2 BG II		Jaadoo		L 1060	
		(%)	PDI	(%)	PDI	(%)	PDI
36	3-9 Sept'19	19.7	4.95	23.4	5.86	7.33	1.83
37	16-Oct	17.9	4.49	18.5	4.63	18.3	4.59
38	17-23	23	7.51	18.5	7.41	22.94	5.85
39	24-30	16.1	5.68	18.1	6.58	17.8	4.47
40	Oct.1-7	19.7	6.68	16.4	4.53	15.5	4.01
41	14-Aug	16.8	5.31	13.1	3.29	11.9	3.21
42	15-21	19.7	6.68	17.6	4.42	14.67	3.67
43	22-28	19.04	7.69	18.1	5.76	11.9	2.98
44	29Oct- 4 Nov	23.44	7.88	20.16	6.79	17.88	4.24
45	11-May	17.58	6.14	18.51	6.58	15.59	3.9
46	18-Dec	16.48	5.4	17.28	5.79	14.67	3.67
47	19-25	13.91	3.66	14.81	3.7	11.92	2.98
48	26Nov- 2Dec	14.28	5.22	12.34	3.29	9.6	2.52
49	9-Mar	15.1	5.13	11.1	3.09	9.6	2.41
50	16-Oct	13.91	4.83	10.28	2.88	9.1	2.29
51	17-23	12.82	4.11	9.47	2.78	7.34	1.83
52	24-31	10.32	3.48	8.2	2.47	5.5	1.38
1	1-7Jan'20	9.16	2.29	6.58	1.65	4.59	1.15
2	8-14Jan'20	7.69	1.92	5.56	1.34	4.13	1.03

Table 28: Occurrence of TSV from major cotton growing areas of Coimbatore Tamil Nadu

S. No.	Location	Area (acres)	TSV (%)
1.	Madurai (hybrid and variety)	22	-
2.	Tirunelvelli (hybrid and variety)	40	-
3.	Virudhunagar (hybrid and variety)	35	-
4.	Dindigul (Hybrid)	50	5.0
5.	Kanathukadavu (Hybrid)	5	5.0-10.0
6.	Puttur (Hybrid)	5	5.0-8.0
7.	Coimbatore (TNAU) – CO14 (Field no.12) and MCU5 (New area)	5	5.0-10.0

Path. 2(a): Screening of breeding lines for disease reaction

NATIONAL TRIALS

Table 29: Br. 02a – Initial Evaluation Trial of *G. hirsutum* (irrigated)

Entry code	Entry name	Cotton leaf curl disease										Bacterial Leaf Blight				Fungal foliar leaf spot			
		Faridkot		Bathinda		Hisar		Sriganganagar		Sirsa		Faridkot		Bathinda		Faridkot		Bathinda	
		PDI	RE	PDI	RE	PDI	RE	PDI	RE	PDI	RE	GR	RE	GR	RE	GR	RE	GR	RE
101	RS 2915	13.6	R	30.0	MR	16.7	R	22.83	MR	28.3	MR	1	R	0	DF	1	R	0	DF
102	F 2685	12.2	R	48.3	S	5.6	HR	33.33	MS	31	MS	1	R	0	DF	1	R	0	DF
103	HS 304	23.9	MR	66.7	HS	16.7	R	46.58	S	43.5	S	1	R	0	DF	2	MR	0	DF
104	LC	13.6	R	48.3	S	14.9	R	22.17	MR	31.5	MS	1	R	0	DF	1	R	0	DF
105	CSH 1715	16.3	R	58.3	HS	23.5	MR	28.83	MR	40.2	S	1	R	0	DF	1	R	0	DF
106	H 1528	15.0	R	43.3	S	8.6	HR	23.83	MR	27.8	MR	1	R	0	DF	1	R	1	R
107	PBH 56	18.0	R	53.3	HS	13.1	R	24.17	MR	29.2	MR	1	R	0-1	R	1	R	1.0-2.0	MR
108	Quality Check (CSH 3129)	16.0	R	50.0	S	15.3	R	24.67	MR	27.1	MR	1	R	0	DF	1	R	0	DF
109	RS 2920	6.7	HR	43.3	S	13.9	R	25.33	MR	27.9	MR	1	R	0	DF	1	R	0	DF
110	F 2720	12.2	R	71.7	HS	12.2	R	26.33	MR	30.2	MS	1	R	0	DF	1	R	0	DF
111	H 1520	16.1	R	70.0	HS	20.1	MR	33.08	MS	41	S	1	R	0	DF	1	R	0	DF
112	CSH 1725	16.8	R	70.0	HS	19.4	R	43.33	S	28.3	MR	1	R	0	DF	1	R	0	DF
113	PBH 86	19.9	R	71.7	HS	21.2	MR	26.33	MR	34.6	MS	2	MR	0-1	R	1	R	1	R
114	ZC (F 2228)	16.1	R	63.3	HS	14.3	R	25.25	MR	33.5	MS	1	R	0	DF	1	R	0	DF
LC	LC					41.7	S							1	R				
LC	RST-9							58.33	HS					1	R				
LC	GA									35.8	MS			1	R				
LC	RS2013									35.1	MS								
LC	F 846(SC)			86.7	HS									1	R			0	DF
LC	HS 6(SC)			73.3	HS									1	R			1	R
LC	RS 2013(SC)			80	HS									1	R			1	R
LC	HS6									45.6	S								

Table 30: Br. 06 a – Initial Evaluation Trial of Compact genotypes under irrigated condition

Entry code	Entry name	Cotton leaf curl disease								Fungal Foliar Leaf Spots		Bacterial Leaf Blight	
		Faridkot		Bathinda		Hisar		Sriganganagar		Bathinda		Bathinda	
		PDI	RE	PDI	RE	PDI	RE	PDI	RE	GR	RE	GR	RE
121	F 2560	22.92	MR	48.33	S	3.8	HR	28.75	MR	1	R	1	R
122	Local Check	15.00	R	53.33	HS	16.66	R	39.75	MS	1	R	0	DF
123	PBH 78	25.42	MR	86.67	HS	22.21	MR	40.17	S	DF	R	0	DF
124	RS 2928	12.50	R	43.33	S	11.42	R	20.92	MR	1	R	0	DF
125	ZC (CSH 3075)	19.58	R	51.67	HS	22.21	MR	31.25	MS	1	R	0	DF
126	CSH 100	20.00	R	80.00	HS	16.66	R	27.42	MR	DF	R	0	DF
127	F 2757	27.50	MR	90.00	HS	29.49	MR	26.08	MR	1	R	0	DF
128	RS 2921	12.92	R	61.67	HS	3.19	HR	20.92	MR	1	R	0	DF
129	H 1563	24.58	MR	86.67	HS	16.66	R	27.25	MR	2	MR	0	DF
LC	F 846(SC)			91.67	HS					2	MR	1	R
LC	HS 6(SC)			76.62	HS					2	MR	1	R
LC	LC HS6					41.65	MS						
LC	RST-9							57.89	HS				

Table 31: Br. 22 a/b Initial Evaluation Trial -*G. arboreum*

Entry code	Entry name	Root Rot		Bacterial blight				Fungal foliar leaf spot			
		Sirsa		Faridkot		Bathinda		Faridkot		Bathinda	
		PDI	RE	GR	RE	GR	RE	GR	RE	GR	RE
131	PBD 88	95.0	S	1	R	0	DF	1	R	0	DF
132	CISA 17	76.8	S	1	R	0	DF	1	R	0	DF
133	LC	92.6	S	1	R	0	DF	1	R	0	DF
134	FDK 298	91.1	S	1	R	1	R	1	R	1	R
135	RG 870	97.8	S	1	R	0	DF	1	R	1	R
136	HD 535	92.4	S	1	R	0	DF	1	R	0	DF
137	CISA 41-1	57.3	S	1	R	1	R	1	R	1.0-2.0	MR
138	ZC (FDK 124)	75.5	S	1	R	0	DF	1	R	1	R
139	FDK 304	78.9	S	1	R	0	DF	1	R	1	R
140	PBD 92	81.6	S	1	R	0	DF	1	R	0	DF
141	RG 868	25.9	MS	1	R	0	DF	1	R	1	R
142	HD 544	44.4	S	1	R	0	DF	1	R	0	DF
LC	LD 949(LC)					1	R			1.0-2.0	MR
LC	CISA 614	73.8	S								
LC	CISA 614	14	MR								
LC	CISA 310	88.5	S								
LC	CISA 614	58.5	S								

Table 32: Br. 25 a/b Preliminary Hybrid Trial - Desi Hybrid

Entry code	Entry Name	Fungal Foliar Leaf Spots		Bacterial Blight		Root rot	
		Bathinda		Bathinda		Sirsa	
		Grade	Reaction	Grade	Reaction	PDI	Reaction
151	KR 147	0	R	0	R	18.4	MR
152	AJAH 103	0	R	0	R	15.8	MR
153	KR 144	0	R	0	R	4.5	R
154	CISAA 18-3	0-1	R	0-1	R	20.7	MS
155	LC	0	R	0	R	26.2	MS
156	AAH 42	0	R	0-1	R	27.2	MS
157	ZC (KR 64-NZ)	0-1	R	0	R	32.7	MS
158	CISAA 18-4	0	R	0	R	40.4	MS
159	KR 155	0	R	0	R	18.6	MR
LC	LD 949 (LC)	1-2	R	0-1	R		
LC	CISA310					24.6	MS
LC	CICR 2					6.8	MR

Table 33a. Br. 02a - IET- *G. hirsutum* (IRRIGATED)

Entry code	Entries name	Alternaria leaf spot								Bacterial leaf blight								CLS	
		Junagarh		Surat		Coimbatore		Guntur		Junagarh		Surat		Coimbatore		Guntur		Guntur	
		G	R	G	R	G	R	G	R	G	R	G	R	G	R	G	R	G	R
201	CPD 1902	2	MR	0	DF	1	R	3	MS	1	R	0	DF	1	R	2	MR	3	MS
202	GISV319	3	MS	0	DF	0	DF	2	MR	1	R	0	DF	0	DF	2	MR	2	MR
203	RAH 1047	2	MR	0	DF	0	DF	2	MR	1	R	0	DF	0	DF	1	R	2	MR
204	CCH 19-2	3	MS	0	DF	0	DF	2	MR	2	MR	0	DF	0	DF	2	MR	2	MR
205	BS 8-19	3	MS	0	DF	1	R	2	MR	1	R	0	DF	1	R	2	MR	3	MS
206	CPD 1901	3	MS	0	DF	0	DF	2	MR	1	R	0	DF	1	R	2	MR	3	MS
207	GJHV 557	3	MS	1	R	1	R	2	MR	1	R	0	DF	1	R	2	MR	2	MR
208	ZC (Phule Yamuna/BGDS 1063)	3	MS	1	R	1	R	2	MR	2	MR	0	DF	1	R	3	MS	2	MR
209	TSH 363	3	MS	0	DF	1	R	2	MR	1	R	0	DF	1	R	2	MR	3	MS
210	RB 614	2	MR	0	DF	1	R	2	MR	1	R	0	DF	1	R	2	MR	3	MS
211	GTHV 15/34	2	MR	0	DF	0	DF	3	MS	1	R	0	DF	1	R	1	R	3	MS
212	RHC 1419	2	MR	0	DF	0	DF	2	MR	1	R	0	DF	1	R	2	MR	2	MR
213	GISV 323	2	MR	0	DF	1	R	2	MR	1	R	0	DF	1	R	1	R	2	MR
214	ARBH 1901	3	MS	0	DF	1	R	3	MS	1	R	0	DF	0	DF	2	MR	4	S
215	Quality Check (Suraj)	3	MS	0	DF	1	R	3	MS	1	R	0	DF	0	DF	2	MR	3	MS
216	RAH 1046	3	MS	0	DF	1	R	3	MS	2	MR	0	DF	0	DF	1	R	3	MS
217	BGDS 1047	3	MS	0	DF	1	R	1	R	1	R	0	DF	0	DF	1	R	2	MR
218	RB 615	3	MS	0	DF	1	R	3	MS	1	R	0	DF	1	R	2	MR	2	MR
219	L 1527	3	MS	0	DF	1	R	2	MR	1	R	0	DF	0	DF	2	MR	3	MS
220	BS 7-19	3	MS	0	DF	1	R	2	MR	1	R	0	DF	0	DF	1	R	3	MS
221	SHS 234	2	MR	0	DF	1	R	2	MR	1	R	0	DF	1	R	1	R	3	MS
222	CCH 19-1	3	MS	0	DF	1	R	2	MR	1	R	0	DF	1	R	2	MR	2	MR
223	LC	2	MR	0	DF	1	R	2	MR	1	R	0	DF	1	R	1	R	2	MR
224	TSH 383	3	MS	0	DF	1	R	2	MR	1	R	0	DF	1	R	1	R	2	MR
225	RHC 1409	2	MR	0	DF	1	R	1	R	2	MR	0	DF	1	R	1	R	3	MS
226	GJHV 566	2	MR	0	DF	1	R	1	R	1	R	0	DF	1	R	2	MR	3	MS
LC	RCH 2 BG II							3	MS							3	MS	2	MR
LC	Jaadoo BG II							3	MS							2	MR	2	MR
LC	Check (RCHIIBGII)					1	R							1	R				

Table 33b. Br. 02a - IET- *G. hirsutum* (IRRIGATED)

Entry code	Entries name	Grey Mildew				Rust		MLS		TSV		Root Rot	
		Junagarh		Guntur		Guntur		Coimbatore		Coimbatore		Coimbatore	
		G	R	G	R	G	R	PDI	R	PDI	R	PDI	R
201	CPD 1902	1	R	3	MS	2	MR	0	DF	0	DF	1	R
202	GISV319	1	R	2	MR	3	MS	0	DF	1	R	0	DF
203	RAH 1047	1	R	3	MS	3	MS	0	DF	0	DF	0	DF
204	CCH 19-2	1	R	1	R	2	MR	0	DF	0	DF	1	R
205	BS 8-19	1	R	2	MR	3	MS	0	DF	1	R	1	R
206	CPD 1901	1	R	2	MR	3	MS	0	DF	1	R	0	DF
207	GJHV 557	1	R	3	MS	3	MS	0	DF	0	DF	0	DF
208	ZC (Phule Yamuna/BGDS 1063)	1	R	3	MS	3	MS	0	DF	0	DF	0	DF
209	TSH 363	1	R	2	MR	3	MS	0	DF	0	DF	0	DF
210	RB 614	1	R	2	MR	3	MS	0	DF	0	DF	0	DF
211	GTHV 15/34	1	R	2	MR	2	MR	0	DF	0	DF	0	DF
212	RHC 1419	1	R	3	MS	3	MS	0	DF	0	DF	0	DF
213	GISV 323	1	R	1	R	3	MS	0	DF	0	DF	1	R
214	ARBH 1901	1	R	3	MS	3	MS	0	DF	0	DF	1	R
215	Quality Check (Suraj)	1	R	2	MR	3	MS	0	DF	0	DF	0	DF
216	RAH 1046	1	R	3	MS	3	MS	0	DF	0	DF	0	DF
217	BGDS 1047	1	R	2	MR	2	MR	0	DF	0	DF	0	DF
218	RB 615	1	R	2	MR	3	MS	0	DF	0	DF	0	DF
219	L 1527	1	R	3	MS	3	MS	0	DF	0	DF	0	DF
220	BS 7-19	1	R	3	MS	3	MS	0	DF	0	DF	0	DF
221	SHS 234	1	R	2	MR	2	MR	0	DF	0	DF	0	DF
222	CCH 19-1	1	R	2	MR	2	MR	1	R	0	DF	0	DF
223	LC	1	R	3	MS	2	MR	1	R	0	DF	0	DF
224	TSH 383	1	R	3	MS	3	MS	1	R	0	DF	0	DF
225	RHC 1409	1	R	2	MR	3	MS	0	DF	0	DF	0	DF
226	GJHV 566	1	R	3	MS	2	MR	0	DF	0	DF	0	DF
LC	RCH 2 BG II			1	R	3	MS						
LC	Jaadoo BG II			3	MS	3	MS						
LC	Check (RCHIIBGII)							1	R	1	R	1	R

Table 34-Br. 02 b – IET- *G. hirsutum* (rainfed): Dharwad

Entry Code	Entry Name	Alternaria leaf spot		Bacterial leaf blight		Grey Mildew	
		Grade	Reaction	Grade	Reaction	Grade	Reaction
231	TSH 375	4	S	1	R	4	S
232	GBHV 206	3	MS	1	R	3	MS
233	NH 702	4	S	1	R	4	S
234	ARBH 1951	4	S	2	MR	4	S
235	ZC (NH 615/ NDLH 1938)	4	S	1	R	4	S
236	NDLH 2051-3	4	S	2	MR	4	S
237	BS 8-19	4	S	2	MR	4	S
238	RHC 1419	4	S	3	MS	4	S
239	TVH 007	4	S	4	S	3	MS
240	CNDTS 283	4	S	4	S	3	MS
241	RB 610	3	MS	1	R	3	MS
242	CCH 19-3	4	S	1	R	4	S
243	RAH 1046	2	MR	1	R	2	MR
244	NH 703	4	S	1	R	4	S
245	AKH 2013-2	4	S	1	R	4	S
246	CPD 1951	4	S	1	R	4	S
247	CNH 09-119	4	S	2	MR	3	MS
248	BGDS 1047	4	S	2	MR	4	S
249	CNH 2077	4	S	2	MR	4	S
250	RB 603	4	S	1	R	4	S
251	TSH 356	3	MS	3	MS	4	S
252	GTHV 15/36	4	S	1	R	3	MS
253	RHC 1409	4	S	4	S	3	MS
254	CPD 1952	4	S	4	S	4	S
255	CCH 19-2	4	S	4	S	3	MS
256	CNH 17393	4	S	4	S	3	MS
257	LC	4	S	3	MS	4	S
258	GBHV 209	4	S	1	R	4	S
259	RAH 1045	4	S	2	MR	4	S
260	NDLH 2056-4	4	S	1	R	4	S
261	NH 701	4	S	1	R	4	S
262	BS 7-19	4	S	2	MR	4	S
263	CNH 1134	4	S	2	MR	3	MS
264	Quality Check (Suraj)	4	S	4	S	3	MS
LC	Jayadhar	4	S	0	DF	4	S
LC	Abhadita	4	S	4	S	4	S

Table35 : Br. 02 a/b CC – IET- *G. hirsutum* – Coloured Cotton Trial(IRRIGATED / RAINFED)

Entry code	Entry name	Alternaria leaf spot				Bacterial leaf blight				CLS		Grey Mildew		Rust	
		Surat		Guntur		Surat		Guntur		Guntur		Guntur		Guntur	
		Grade	Reac	Grade	Reac	Grade	Reac	Grade	Reac	Grade	Reac	Grade	Reac	Grade	Reac
271	CCHC 19-2	0	DF	2	MR	0	DF	2	MR	2	MR	2	MR	3	MS
272	CNH 18529	0	DF	2	MR	0	DF	1	R	3	MS	2	MR	2	MR
273	ZC (Phule Yamuna/Suraj)	1	R	3	MS	0	DF	2	MR	3	MS	2	MR	2	MR
274	DHCC 1901	0	DF	3	MS	0	DF	1	R	3	MS	2	MR	2	MR
275	CCHC 19-1	0	DF	1	R	0	DF	1	R	2	MR	2	MR	3	MS
276	CNH 18528	0	DF	1	R	0	DF	1	R	3	MS	2	MR	3	MS
277	Local Check	1	R	2	MR	0	DF	1	R	3	MS	2	MR	2	MR
278	DHCC 1902	0	DF	2	MR	1	R	1	R	3	MS	3	MS	2	MR
LC	RCH 2 BG II		-	3	MS		-	3	MS	3	MS	1	R	3	MS
LC	Jaadoo BG II		-	3	MS		-	2	MR	3	MS	3	MS	3	MS

Table 36: Br. 06 a – IET of Compact genotypes under irrigated condition

Entry code	Entry name	Alternaria leaf spot						CLS		Grey Mildew				Rust		Bacterial leaf blight						Root Rot		MLS	
		Junagarh		Guntur		Coimbatore		Guntur		Junagarh		Guntur		Guntur		Junagarh		Guntur		Coimbatore		Coimbatore		Coimbatore	
		GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE
281	CCH 19-4	3	MS	1	R	1	R	3	MS	1	R	2	MR	2	MR	1	R	1	R	0	DF	0	DF	1	R
282	BS 9-19	3	MS	2	MR	1	R	3	MS	1	R	3	MS	2	MR	1	R	1	R	1	R	0	DF	0	DF
283	RHC-HD 1405	3	MS	2	MR	1	R	3	MS	1	R	2	MR	3	MS	1	R	1	R	0	DF	0	DF	0	DF
284	DSC 1902	3	MS	2	MR	1	R	4	S	1	R	1	R	2	MR	1	R	1	R	0	DF	0	DF	0	DF
285	GTHV 18/17	3	MS	1	R	1	R	3	MS	1	R	3	MS	2	MR	1	R	1	R	0	DF	0	DF	0	DF
286	Local Check	3	MS	1	R	0	DF	3	MS	1	R	2	MR	3	MS	1	R	1	R	1	R	0	DF	0	DF
287	CCH 15-1	3	MS	2	MR	1	R	2	MR	1	R	2	MR	3	MS	1	R	1	R	0	DF	0	DF	0	DF
288	GJHV 584	3	MS	1	R	1	R	2	MR	1	R	2	MR	2	MR	1	R	1	R	0	DF	0	DF	0	DF
289	RAHC 1902	3	MS	2	MR	1	R	3	MS	1	R	2	MR	3	MS	1	R	1	R	0	DF	0	DF	0	DF
290	CCH 19-2	3	MS	2	MR	1	R	3	MS	1	R	1	R	2	MR	1	R	2	MR	0	DF	0	DF	0	DF
291	TCH 1875	3	MS	2	MR	1	R	4	S	1	R	2	MR	2	MR	1	R	1	R	0	DF	0	DF	0	DF
292	Common Check (Suraj)	3	MS	2	MR	1	R	3	MS	1	R	2	MR	2	MR	1	R	2	MR	0	DF	1	R	0	DF
293	DSC 1901	2	MR	2	MR	1	R	2	MR	1	R	2	MR	3	MS	1	R	1	R	1	R	0	DF	0	DF
294	RAHC 1901	2	MR	1	R	1	R	3	MS	1	R	2	MR	3	MS	2	MR	1	R	0	DF	0	DF	0	DF
295	RHC-HD 1312	3	MR	2	MR	1	R	3	MS	1	R	2	MR	3	MS	2	MR	2	MR	1	R	0	DF	0	DF
LC	RCH 2 BG II			3	MS	1	R	3	MS			1	R	3	MS			3	MS	1	R	0	DF	0	DF
LC	Jaadoo BG II			3	MS			3	MS			3	MS	3	MS			2	MR						

Table 37. Br. 06 b – Initial Evaluation of Compact genotypes under rainfed condition

Entry code	Entry Name	Alternaria leaf spot		Bacterial leaf blight		Grey Mildew	
		Grade	Reaction	Grade	Reaction	Grade	Reaction
301	RAHC 1901	4	S	4	S	4	S
302	TCH 002	4	S	2	MR	4	S
303	GBHV 187	2	MR	1	R	3	MS
304	CNH 09-77	4	S	1	R	4	S
305	RHC-HD 1312	2	MR	4	S	4	S
306	CCH 15-1	4	S	3	MS	4	S
307	DSC 1951	4	S	3	MS	4	S
308	Common Check (Suraj)	4	S	4	S	4	S
309	CNH 1133	4	S	1	R	4	S
310	CCH 19-4	4	S	4	S	4	S
311	CNH 2046	4	S	1	R	4	S
312	RHC-HD 1405	4	S	4	S	3	MS
313	GTHV 18/19	4	S	4	S	4	S
314	CNH 1132	4	S	4	S	4	S
315	Local Check	4	S	3	MS	4	S
316	CNDTS 44	4	S	3	MS	3	MS
317	DSC 1952	2	MR	3	MS	4	S
318	CNH 09-45	4	S	4	S	4	S
319	RAHC 1902	4	S	4	S	4	S
320	CCH 19-5	4	S	4	S	4	S
LC	Jayadhar	4	S	0	DF	4	S
LC	Abhadita	4	S	4	S	4	S

Table 38: Br. 12a IET of *G. barbadense* under irrigated condition

Entry code	Entries	Alternaria leaf spot								CLS		Grey Mildew				Rust		Bacterial leaf blight							
		Surat		Guntur		Coimb		Dharwad		Guntur		Dharwad		Guntur		Guntur		Surat		Guntur		Coimb		Dharwad	
		GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE
321	SBSD 5-6	0	DF	1	R	1	R	4	S	1	R	0	DF	0	DF	1	R	1	R	1	R	0	DF	4	S
322	CCB 64B	0	DF	1	R	0	DF	4	S	2	MR	0	DF	0	DF	2	MR	1	R	1	R	0	DF	1	R
323	DB 1901	0	DF	1	R	1	R	2	MR	2	MR	0	DF	0	DF	2	MR	1	R	1	R	1	R	2	MR
324	ZC (Phule Rukhmai-CZ &Suvin-SZ)	0	DF	1	R	1	R	4	S	2	MR	0	DF	0	DF	2	MR	1	R	1	R	0	DF	4	S
325	CCB 142	0	DF	1	R	1	R	4	S	2	MR	0	DF	0	DF	2	MR	2	MR	1	R	1	R	4	S
326	CCB 141	0	DF	1	R	1	R	2	MR	2	MR	0	DF	0	DF	2	MR	3	MS	1	R	1	R	2	MR
LC	RCH 2 BG II			2	MR	-		-		3	MS	-		1	R	3	MS			3	MS	-		-	
LC	Jadoo BG II			2	MR	-		-		3	MS	-		3	MS	3	MS			2	MR	-		-	
LC	Jayadhar			-		-		4	S	-		4	S	-		-				-		-		0	DF
LC	Abhadita			-		-		4	S	-		4	S	-		-				-		-		4	S
LC	RCHIIBGII					1	R	-		-		-		-		-				-		1	R	-	

Table 39:Br. 15 a - PHT- Interspecific -Hybrid (hir x barb)

Entry code	Entry name	Alternaria leaf spot						CLS		Grey Mildew				Rust		Bacterial leaf blight						TSV	
		Guntur		Dharwad		Coimb		Guntur		Guntur		Dharwad		Guntur		Guntur		Dharwad		Coimb		Coimb	
		GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE
331	DHB 1902	1	R	4	S	1	R	2	MR	0	DF	1	R	3	MS	1	R	4	S	0	DF	1	R
332	RHB 1401	1	R	2	MR	1	R	2	MR	1	R	2	MR	3	MS	1	R	2	MR	0	DF	1	R
333	LC	2	MR	4	S	1	R	2	MR	0	DF	2	MR	3	MS	2	MR	2	MR	0	DF	0	DF
334	DHB 1901	2	MR	2	MR	1	R	1	R	0	DF	1	R	3	MS	3	MS	4	S	0	DF	1	R
335	Phule Dhara (CC)	1	R	4	S	0	DF	1	R	0	DF	1	R	3	MS	3	MS	4	S	0	DF	0	DF
336	LAHB 2	1	R	2	MR	1	R	2	MR	1	R	1	R	3	MS	3	MS	1	R	0	DF	1	R
LC	RCH 2 BG II	3	MS	-				3	MS	1	R	-		3	MS	3	MS	-					
LC	Jaadoo BG II	3	MS	-				3	MS	3	MS	-		3	MS	2	MR	-					
LC	Jayadhar			4	S			-		-		4	S	-		-		0	DF				
LC	Abhadita			4	S			-		-		4	S	-		-		4	S				
LC	RCHIIBGII					1	R													1	R	0	DF

Table 40.Br. 22 a/b IET-*G. arboreum: Dharwad*

Entry code	Entry name	Alternaria leaf spot		Bacterial leaf blight		Grey Mildew	
		Grade	Reaction	Grade	Reaction	Grade	Reaction
341	DWDA 1902	4	S	0	DF	4	S
342	CNA 2036	4	S	0	DF	4	S
343	CNA 2037	4	S	0	DF	4	S
344	NDLA 3116-3	2	MR	0	DF	2	MR
345	JLA 1102	4	S	0	DF	3	MS
346	ZC (AKA 7/DLSa 17)	4	S	0	DF	2	MR
347	PA 863	2	MR	0	DF	2	MR
348	MDL 2689	2	MR	0	DF	2	MR
349	GAM 267	4	S	0	DF	2	MR
350	CNA 1042	3	MS	0	DF	2	MR
351	NDLA 3104-4	4	S	0	DF	3	MS
352	LC	4	S	0	DF	2	MR
353	JLA 1313	4	S	0	DF	4	S
354	GAM 273	4	S	0	DF	4	S
355	PA 860	2	MR	0	DF	4	S
356	MDL 2679	4	S	0	DF	4	S
357	AKA 2013-8	4	S	0	DF	4	S
358	CNA 2035	4	S	0	DF	4	S
359	DWDA 1901	4	S	0	DF	2	MR
LC	Jayadhar	4	S	0	DF	4	S
LC	Abhadita	4	S	4	S	4	S

Table 41.Br. 22 a/b IET-*G. arboreum* - Colour Cotton: Surat

Entry code	Entry Name	Bacterial leaf blight			Alternaria leaf spot		
		PDI	Max Grade	Reaction	PDI	Max Grade	Reaction
381	DDCC 1902	0.0	0	DF	0.0	0	DF
382	ZC (AKA 7/DLSa 17)	0.0	0	DF	0.0	0	DF
383	CNA 18562	0.0	0	DF	0.0	0	DF
384	DDCC 1 (Common Check)	0.0	0	DF	0.0	0	DF
385	DDCC 1901	0.0	0	DF	0.0	0	DF
386	Local Check	0.0	0	DF	0.0	0	DF
387	CNA 18563	0.0	0	DF	0.0	0	DF
LC	G Cot	0.0	0	DF	0.0	0	DF

Table 42. Br. 32b: IET of *G. herbaceum* cotton

Entry Code	Entry Name	Alternaria leaf spot				Bacterial leaf blight				Grey Mildew	
		Surat		Dharwad		Surat		Dharwad		Dharwad	
		Grade	Reaction	Grade	Reaction	Grade	Reaction	Grade	Reaction	Grade	Reaction
421	GBhv 312	0	DF	4	S	0	DF	0	DF	4	S
422	DDhc 1901	0	DF	4	S	0	DF	0	DF	4	S
423	ZC (G Cot 23/DDhc 11)	0	DF	4	S	0	DF	0	DF	4	S
424	GShv 780/16	0	DF	4	S	0	DF	0	DF	4	S
425	GShv 797/16	0	DF	4	S	0	DF	0	DF	4	S
426	GVhv 845	0	DF	4	S	0	DF	0	DF	4	S
427	GShv 829/16	0	DF	4	S	0	DF	0	DF	4	S
428	GBhv 313	0	DF	4	S	0	DF	0	DF	4	S
429	GShv 329/15	0	DF	4	S	0	DF	0	DF	3	MS
430	LC	0	DF	4	S	0	DF	0	DF	4	S
431	GVhv 936	0	DF	4	S	0	DF	0	DF	4	S
LC	Jayadhar			4	S			0	DF	4	S
LC	Abhadita			4	S			4	S	4	S

ZONAL TRIAL: NORTH ZONE

Table 43: Br-04 a – Coordinated Variety trial of *G. hirsutum*

Entry code	Entry Name	Cotton leaf curl disease								Bacterial blight				Fungal foliar leaf spot			
		Faridkot		Bathinda		Hisar		Sriganganagar		Faridkot		Bathinda		Faridkot		Bathinda	
		PDI	RE	PDI	RE	PDI	RE	PDI	RE	GR	RE	GR	RE	GR	RE	GR	RE
9001	F 2596	16.15	R	40.00	S	13.88	R	32.92	MS	2	MR	0	DF	1	R	0	DF
9002	ZC (F 2228)	14.22	R	70.00	HS	16.66	R	31.25	MS	2	MR	0	DF	1	R	0	DF
9003	PBH 116	17.19	R	69.17	HS	22.21	MR	38.00	MS	1	R	1	R	1	R	1	R
9004	LC	15.63	R	67.50	HS	12.66	R	37.83	MS	2	MR	0	DF	1	R	0	DF
9005	F 2662	15.69	R	75.83	HS	11.42	R	28.33	MR	2	MR	0	DF	1	R	0	DF
9006	Quality Check (CSH 3129)	17.78	R	72.50	HS	16.66	R	36.00	MS	1	R	0	DF	1	R	0	DF
LC	F 846 (SC)			84.17	HS	41.65	S					1	R			1	R
LC	HS 6 (SC)			87.50	HS							0	DF			1	R
LC	RST-9(SC)			89.17	HS							1	R			1	R
LC	RS 2013 (SC)			69.17	HS							1	R			1.0-2.0	MR
LC	LC	HS 6				41.65											
LC	RST-9							60.25	HS								

Table 44: Br-06a - Coordinated Variety trial of compact *G. hirsutum*

Entry code	Entry Name	Cotton leaf curl disease										Fungal Foliar Leaf Spots		Bacterial Leaf Blight	
		Faridkot		Bathinda		Hisar		Sriganganagar		Sirsa		Bathinda		Bathinda	
		PDI	RE	PDI	RE	PDI	RE	PDI	RE	PDI	RE	GR	RE	GR	RE
9011	RS 2914	3.75	HR	71.67	HS	11.42	R	26.92	MR	36.9	MS	0	DF	0	DF
9012	PBH 115	20	R	89.17	HS	2.68	HR	29.00	MR	33.2	MS	1	R	0	DF
9013	Zonal Check (CSH3075)	14.58	R	82.5	HS	15.44	R	32.75	MS	**30.4**	MS	0	DF	0	DF
9014	H 1530	22.92	MR	85.83	HS	14.33	R	26.50	MR	31.7	MS	0	DF	0	DF
9015	RS 2913	9.17	HR	72.5	HS	14.66	R	28.42	MR	**41.2**	**S**	1	R	1	R
9016	Local Check	17.5	R	80.83	HS	14.55	R	41.00	S	41.0	**S**	0	DF	0	DF
9017	PBH 174	14.58	R	82.5	HS	13.05	R	24.17	MR	31.7	MS	1	R	0	DF
LC	F 846 (SC)			96.67	HS							1	R	1	R
LC	RS 2013 (SC)			77.5	HS					38.0	MS	1	R	1	R
LC	LC HS6					41.65	MS			49.2	**S**				
LC	RST-9							55.26	HS						
LC	MRC 7017 N BT									44.2	**S**				
LC	GA									35.3	MS				

Table 45: Br-24 a - Coordinated Variety trial of *G. arboreum*

Entries code	Entry Name	Root rot		Bacterial blight				Fungal foliar leaf spot			
		Sirsa		Faridkot		Bathinda		Faridkot		Bathinda	
		PDI	RE	GR	RE	GR	RE	GR	RE	GR	RE
9021	PBD 22	31.0	MS	1	R	1	R	1	R	1	R
9022	CISA 10	36.5	MS	1	R	1	R	1	R	0	DF
9023	FDK 124 (ZC)	54.6	S	1	R	1	R	1	R	0	DF
9024	PBD 35	49.3	S	1	R	DF	R	1	R	0	DF
9025	FDK 281	18.7	MR	1	R	DF	R	1	R	0	DF
9026	Local Check	14.4	MR	1	R	1	R	1	R	0	DF
9027	PBD 36	32.5	MS	1	R	1	R	1	R	1	R
LC	LD 949					1.0-2.0	MR			1	R

Table 46: Br-25 a Coordinated Desi Hybrid trial

Entries code	Entries	Root Rot		Bacterial blight				Fungal foliar leaf spot			
		Sirsa		Faridkot		Bathinda		Faridkot		Bathinda	
		PDI	RE	GR	RE	GR	RE	GR	RE	GR	RE
9031	KR 139	43.2	S	1	R	0	DF	1	R	0	DF
9032	Zonal Check (KR 64)	31.0	MS	1	R	1	R	1	R	1	R
9033	KR 133	41.4	S	1	R	0	DF	1	R	0	DF
9034	CISAA 18-1	12.7	R	1	R	0	DF	1	R	1	R
9035	Local Check	37.1	MS	1	R	1	R	1	R	1	R
9036	KR 136	25.9	MR	1	R	0	DF	1	R	0	DF
LC	HD123	33.3	MS								
LC	CISA614	47.3	S								
LC	FDK 124	73.3	HS								
LC	CISA614	49.5	S								
LC	LD 949 (LC)					0-1	R			1.0-2.00	MR

ZONAL TRAIL: CENTRAL ZONE

Table 47:Br. 03 (a) Preliminary Varietal Trial (PVT) of *G. hirsutum* – Irrigated

Entry code	Entry Name	Alternaria leaf spot				Bacterial leaf blight				Grey Mildew	
		Junagarh		Surat		Junagarh		Surat		Junagarh	
		Grade	Reaction	Grade	Reaction	Grade	Reaction	Grade	Reaction	Grade	Reaction
9101	TSH 367	3	MS	0	DF	1	R	1	R	1	R
9102	SHS 113	3	MS	0	DF	1	R	1	R	1	R
9103	ZC (Phule Yamuna)	3	MS	0	DF	1	R	0	DF	1	R
9104	GJHV-522	3	MS	0	DF	2	MR	1	R	1	R
9105	LC	2	MR	0	DF	1	R	0	DF	1	R
9106	F 2662	3	MS	0	DF	3	MS	1	R	1	R
9107	RAH 1076	3	MS	0	DF	2	MR	1	R	1	R
9108	GJHV-554	3	MS	0	DF	2	MR	1	R	1	R
9109	Quality Check (Suraj)	3	MS	0	DF	1	R	1	R	1	R

Table 48: Br. 04 (a) Co-ordinated Varietal Trial (CVT) of *G. hirsutum* – Irrigated

Entry code	Entry Name	Alternaria leaf spot				Bacterial leaf blight				Grey Mildew	
		Junagarh		Surat		Junagarh		Surat		Junagarh	
		Grade	Reaction	Grade	Reaction	Grade	Reaction	Grade	Reaction	Grade	Reaction
9111	TCH 1828	3	MS	0	DF	2	MR	1	R	1	R
9112	Quality Check (Suraj)	3	MS	0	DF	1	R	1	R	1	R
9113	RAH 1071	3	MS	0	DF	2	MR	1	R	1	R
9114	ZC (Phule Yamuna)	3	MS	0	DF	1	R	0	DF	1	R
9115	CPD-1501	3	MS	1	R	1	R	1	R	1	R
9116	LC	3	MS	0	DF	2	MR	0	DF	1	R
9117	SIMA 5	3	MS	0	DF	2	MR	1	R	1	R

Table 49: Br. 05 (a) Co-ordinated Hybrid Trial (CHT) of *G. hirsutum* – Irrigated)

Entry code	Entry name	Alternaria leaf spot				Bacterial leaf blight				Grey Mildew	
		Surat		Junagarh		Surat		Junagarh		Junagarh	
		Grade	Reaction	Grade	Reaction	Grade	Reaction	Grade	Reaction	Grade	Reaction
9121	ZC (Phule Asmita)	1	R	4	S	0	DF	2	MR	1	R
9122	GSHH 15032	0	DF	3	MS	0	DF	1	R	1	R
9123	LC	0	DF	3	MS	1	R	4	S	1	R
9124	GJHH 13	0	DF	2	MR	0	DF	2	MR	1	R

Table 50: 6 (a)- Zonal trial (Junagarh)

Entry code	Entries	Alternaria leaf spot		Bacterial leaf blight		Grey Mildew	
		Grade	Reaction	Grade	Reaction	Grade	Reaction
9131	GJHV 534	3	MS	1	R	1	R
9132	RHC-HD 1438	3	MS	1	R	1	R
9133	Local Check	3	MS	1	R	1	R
9134	SHC 374	3	MS	1	R	1	R
9135	DS C 1801	3	MS	1	R	1	R
9136	RHC HD 1420	3	MS	1	R	1	R
9137	Zonal check (Suraj)	Missing		Missing			
9138	RHC HD 1406	3	MS	1	R	1	R
9139	TCH 1897	3	MS	1	R	1	R

Table 51: Br.03b P.V.T of *G. hirsutum* cotton

Entry Code	Entry name	ALS				MLS		BLB						GM				Anthracnose		Wilt	
		Nanded		Bharuch		Akola		Akola		Nanded		Bharuch		Akola		Nanded		Nanded		Bharuch	
		GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE
9171	BS 3-17	2	MR	0	DF	2	MR	2	MR	2	MR	1	R	2	MR	2	MR	0	DF	0	DF
9172	RAH 1075	3	MS	1	R	3	MS	1	R	1	R	1	R	1	R	1	R	0	DF	0	DF
9173	CPD-1751	2	MR	0	DF	2	MR	2	MR	2	MR	0	DF	2	MR	2	MR	0	DF	0	DF
9174	LC	3	MS	0	DF	3	MS	2	MR	2	MR	0	DF	1	R	1	R	0	DF	0	DF
9175	NH 704	3	MS	1	R	3	MS	2	MR	2	MR	1	R	2	MR	2	MR	0	DF	0	DF
9176	NDLH – 2035-5	2	MR	1	R	2	MR	2	MR	2	MR	1	R	2	MR	2	MR	0	DF	0	DF
9177	CPD-1752	3	MS	0	DF	3	MS	1	R	1	R	0	DF	2	MR	2	MR	0	DF	0	DF
9178	Quality Check (Suraj)	2	MR	0	DF	2	MR	2	MR	2	MR	0	DF	3	MS	3	MS	0	DF	0	DF
9179	AKH 10-3	1	R	0	DF	1	R	2	MR	2	MR	0	DF	2	MR	2	MR	0	DF	0	DF
9180	NDLH – 2057-1	3	MS	0	DF	3	MS	2	MR	2	MR	1	R	3	MS	3	MS	0	DF	0	DF
9181	ZC (NH 615)	1	R	1	R	1	R	1	R	1	R	2	MR	2	MR	2	MR	0	DF	0	DF
9182	RHC 1307	2	MR	1	R	2	MR	2	MR	2	MR	2	MR	2	MR	2	MR	0	DF	0	DF
LC	LRA5166					2	MR	4	S					2	MR						

Table 52:Br.04bPromoted entries CZ

Entry Code	Entry name	Alternaria leaf spot				Bacterial leaf blight						Grey Mildew				Anthracnose		MLS		Wilt	
		Nanded		Bharuch		Akola		Nanded		Bharuch		Akola		Nanded		Nanded		Akola		Bharuch	
		GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE
9191	ZC (NH 615)	2	MR	1	R	1	R	2	MR	1	R	1	R	2	MR	1	R	1	R	0	DF
9192	NDLH 20511	3	MS	0	DF	1	R	3	MS	0	DF	2	MR	2	MR	1	R	1	R	0	DF
9193	Local Check	2	MR	0	DF	2	MR	2	MR	0	DF	1	R	3	MS	0	DF	1	R	0	DF
9194	CNH 11-11	2	MR	1	R	1	R	2	MR	1	R	1	R	2	MR	0	DF	1	R	0	DF
9195	Quality Check (Suraj)	1	R	0	DF	1	R	2	MR	1	R	1	R	3	MS	0	DF	2	MR	0	DF
LC	LRA5166	3	MS	2	MR	3	MS	3	MS	3	MS	2	MR	3	MS	1	R	1	R	0	DF
LC	1027 ALF		-	0	DF				-	0	DF				-		-			0	DF
LC	Digvijay		-	0	DF				-	0	DF				-		-			0	DF

Table 53: Br. 06 (b) : Coordinated hybrid trial of compact *G. hirsutum* genotype

Entry Code	Entry name	Bacterial leaf blight				Alternaria leaf spot		MLS		Grey Mildew	
		Surat		Akola		Surat		Akola		Akola	
		Grade	Reaction	Grade	Reaction	Grade	Reaction	Grade	Reaction	Grade	Reaction
9201	AKH 1302	1	R	1	R	0	DF	1	R	1	R
9202	DSC 1851	1	R	1	R	0	DF	1	R	1	R
9203	RHC HD 1433	1	R	2	MR	0	DF	1	R	1	R
9204	Local Check	1	R	1	R	0	DF	1	R	2	MR
9205	RAHC 1029	0	DF	2	MR	1	R	1	R	1	R
9206	AKH 1301	0	DF	1	R	0	DF	1	R	1	R
9207	GISV 312	0	DF	1	R	0	DF	1	R	1	R
9208	ZC (Suraj)	1	R	1	R	0	DF	1	R	1	R
9209	RHC HD 1406	1	R	3	MS	0	DF	1	R	2	MR
LC	LRA 5166 (Ch)			4	S			1	R	2	MR

Table 54: Br. 24 (b) CVT: Coordinated varietal trial *G.arboreum* cotton: Akola

Entry Code	Entry Name	Bacterial leaf blight		Mycrothecium leaf spot		Grey mildew	
		Grade	Reaction	Grade	Reaction	Grade	Reaction
9221	CNA 1054	1	R	1	R	1	R
9222	AKA 14-51	1	R	1	R	1	R
9223	MDL 2667	1	R	1	R	2	MR
9224	MDL 2663	1	R	1	R	1	R
9225	LC	1	R	1	R	1	R
9226	JLA-1207	1	R	1	R	2	MR
9227	GAM 259	1	R	1	R	1	R
9228	ZC (AKA 7)	1	R	1	R	1	R
9229	DWDa 1802	1	R	1	R	1	R
9230	CNA 1031	1	R	1	R	2	MR
LC	AKA-8 (Ch)	1	R	2	MR	2	MR

Table 55: Br. 24 (b)LL : Coordinated varietal trial *G. arboreum* cotton (LL) : Akola

Entry Code	Entry Name	Bacterial leaf blight		Mycrothecium leaf spot		Grey mildew	
		Grade	Reaction	Grade	Reaction	Grade	Reaction
9231	PA 809	1	R	1	R	1	R
9232	PA 842	1	R	1	R	1	R
9233	PAIG 379	1	R	1	R	2	MR
9234	PAIG 380	1	R	1	R	1	R
9235	PAIG 384	1	R	1	R	1	R
9236	PA 806	1	R	1	R	1	R
9237	PAIG 377	1	R	1	R	1	R
9238	PA 839	1	R	1	R	2	MR
9239	PA 837	1	R	1	R	1	R
9240	PAIG 373	1	R	1	R	1	R
9241	QC (PA 255)	1	R	1	R	1	R
9242	CNA 1065	1	R	1	R	1	R
LC	AKA-8 (Ch)	2	MR	2	MR	2	MR

Table 56: Br.25 (b) : Coordinated hybrid trial *G.arboreum: Akola*

Entry Code	Entry Name	Bacterial leaf blight		Mycrothecium leaf spot		Grey mildew	
		Grade	Reaction	Grade	Reaction	Grade	Reaction
9251	AJCH 102	1	R	1	R	1	R
9252	NACH 560	1	R	1	R	1	R
9253	LC	1	R	1	R	1	R
9254	NACH 556	1	R	1	R	1	R
9255	PKV DH 1 (ZC)	1	R	1	R	1	R
LC	AKA-8 (Ch)	2	MR	2	MR	2	MR

Table 57:*G. hirsutum*colourcotton trial: Surat

Entry Code	Entry Name	Alternaria leaf spot		Bacterial leaf blight	
		PDI	Reaction	PDI	Reaction
9261	Phule Yamuna(Zonal Check)	0.0	DF	2.0	R
9262	LHCC 4	0.0	DF	2.5	R
9263	Local Check	0.0	DF	6.5	R
9264	DHCC 1801	0.0	DF	0.0	DF
9265	CNH 17395	0.0	DF	0.0	DF
LC	LRA 5166, SC	2.0	R	36.5	MR

ZONAL TRIAL: SOUTH ZONE

Table 58:Br.03a: Reaction of *G. hirsutum* L. entries (PVT) -(Lam Guntur)

Entry code	Entry Name	Alternaria leaf spot		Corynospora leaf spot		Grey mildew		Rust		Bacterial Leaf blight	
		GR	RE	GR	RE	GR	RE	GR	RE	GR	RE
9501	RAH 1075	1	R	3	MS	1	R	2	MR	1	R
9502	BS 4-18	1	R	3	MS	2	MR	3	MS	2	MR
9503	GSHV 208	2	MR	3	MS	2	MR	3	MS	1	R
9504	CPD 1701	2	MR	3	MS	3	MS	3	MS	2	MR
9505	ZC (BGDS 1063)	2	MR	3	MS	3	MS	3	MS	1	R
9506	GISV 322	2	MR	3	MS	2	MR	3	MS	1	R
9507	GJHV-554	2	MR	3	MS	3	MS	2	MR	2	MR
9508	LC	1	R	3	MS	2	MR	2	MR	1	R
9509	RAH 1076	2	MR	3	MS	2	MR	2	MR	1	R
9510	TSH 357	2	MR	3	MS	3	MS	2	MR	1	R
9511	TCH 1837	2	MR	3	MS	2	MR	2	MR	2	MR
9512	QC (Suraj)	2	MR	3	MS	2	MR	2	MR	2	MR
LC	RCH 2 BG II	3	MS	3	MS	1	R	3	MS	3	MS
LC	Jaadoo BG II	3	MS	3	MS	3	MS	3	MS	2	MR

Table 59. Br.04a: Reaction of *G. hirsutum* L. entries (CVT) – (Lam Guntur)

Entry code	Entry Name	Alternaria leaf spot		Corynospora leaf spot		Grey mildew		Rust		Bacterial Leaf blight	
		GR	RE	GR	RE	GR	RE	GR	RE	GR	RE
9521	RHC 1217	2	MR	3	MS	2	MR	2	MR	1	R
9522	GSHV 185	1	R	3	MS	2	MR	3	MS	1	R
9523	LC	1	R	3	MS	1	R	3	MS	1	R
9524	SIMA-5	1	R	3	MS	2	MR	2	MR	2	MR
9525	QC (Suraj)	2	MR	3	MS	2	MR	2	MR	2	MR
9526	CPD 1702	1	R	2	MR	1	R	3	MS	2	MR
9527	TSH 325	1	R	3	MS	2	MR	3	MS	2	MR
9528	ZC (BGDS 1063)	2	MR	2	MR	3	MS	3	MS	1	R
9529	BS 1	1	R	3	MS	2	MR	3	MS	2	MR
9530	HS 298	2	MR	3	MS	2	MR	2	MR	2	MR
LC	RCH 2 BG II	3	MS	3	MS	1	R	3	MS	3	MS
LC	Jaadoo BG II	3	MS	3	MS	3	MS	3	MS	2	MR

Table 60:Br.05a: Reaction of CHT Intra specific cotton hybrid entries – (Lam Guntur)

Entry code	Entry Name	Alternaria leaf spot		Corynospora leaf spot		Grey mildew		Rust		Bacterial Leaf blight	
		GR	RE	GR	RE	GR	RE	GR	RE	GR	RE
9531	DHH 1902	2	MR	2	MR	2	MR	3	MS	1	R
9532	BGDHH 697	1	R	2	MR	3	MS	2	MR	1	R
9533	ARBHH 1901	2	MR	3	MS	2	MR	2	MR	1	R
9534	ZC (RAHH 455)	1	R	2	MR	2	MR	2	MR	1	R
9535	LAHH 36	1	R	3	MS	2	MR	2	MR	1	R
9536	ARBHH 1902	1	R	3	MS	1	R	1	R	1	R
9537	LC	1	R	3	MS	1	R	2	MR	2	MR
9538	DHH 1901	1	R	2	MR	2	MR	2	MR	3	MS
9539	RAHH 1952	1	R	3	MS	2	MR	2	MR	2	MR
9540	RAHH 1951	1	R	3	MS	2	MR	3	MS	1	R
LC	RCH 2 BG II	3	MS	3	MS	1	R	3	MS	3	MS
LC	Jaadoo BG II	3	MS	3	MS	3	MS	3	MS	2	MR

Table 61:Br.06a: Reaction of entries under compact planting –(Lam Guntur)

Entry code	Entry Name	Alternaria leaf spot		Corynospora leaf spot		Grey mildew		Rust		Bacterial Leaf blight	
		GR	RE	GR	RE	GR	RE	GR	RE	GR	RE
9551	RHC HD 1433	1	R	3	MS	3	MS	2	MR	3	MS
9552	LHDP 5	1	R	3	MS	2	MR	1	R	1	R
9553	RAHC 1028	1	R	3	MS	2	MR	2	MR	1	R
9554	DS C 1801	1	R	2	MR	2	MR	1	R	2	MR
9555	Local Check	2	MR	3	MS	1	R	2	MR	2	MR
9556	RHC HD 1420	1	R	3	MS	1	R	3	MS	1	R
9557	LHDP 2	2	MR	3	MS	2	MR	3	MS	3	MS
9558	Zonal Check (Suraj)	2	MR	3	MS	3	MS	2	MR	2	MR
9559	RHC-HD 1438	2	MR	3	MS	2	MR	3	MS	2	MR
LC	RCH 2 BG II	3	MS	3	MS	1	R	3	MS	3	MS
LC	Jaadoo BG II	3	MS	3	MS	3	MS	3	MS	2	MR

Table 62:Br 13a: Reaction of PVT *G. barbadense*

Entry code	Entry Name	Alternaria leaf spot						Bacterial Leaf blight						Grey mildew				Rust		Corynospora leaf spot	
		Guntur		Dharwad		Coimb		Guntur		Dharwad		Coimb		Guntur		Dharwad		Guntur		Guntur	
		GE	RE	GE	RE	GE	RE	GE	RE	GE	RE	GE	RE	GE	RE	GE	RE	GE	RE	GE	RE
9571	CCB 26	1	R	4	S	1	R	1	R	4	S	0	DF	1	R	0	DF	2	MR	1	R
9572	CCB 51	1	R	4	S	1	R	1	R	2	MR	0	DF	0	DF	0	DF	2	MR	1	R
9573	ZC (Suvin)	1	R	4	S	1	R	1	R	3	MS	0	DF	1	R	0	DF	2	MR	1	R
9574	CCB 28	1	R	4	S	0	DF	1	R	4	S	0	DF	0	DF	0	DF	2	MR	1	R
9575	CCB 29	1	R	4	S	0	DF	1	R	4	S	0	DF	0	DF	0	DF	2	MR	1	R
9576	DB 1801	1	R	4	S	0	DF	1	R	3	MS	1	R	1	R	0	DF	1	R	1	R
9577	CCB 64	1	R	4	S	0	DF	2	MR	3	MS	1	R	1	R	0	DF	2	MR	2	MR
LC	RCH 2 BG II	3	MS	-	-	-	-	3	MS	-	-	-	-	1	R	-	-	3	MS	3	MS
LC	Jaadoo BG II	3	MS	-	-	-	-	2	MR	-	-	-	-	3	MS	-	-	3	MS	3	MS
LC	Jayadhar	-	-	4	S	-		-	-	0	DF	-	-	-	-	4	S	-	-	-	-
LC	Abhadita	-	-	4	S	-		-	-	4	S	-		-	-	4	S	-	-	-	-
LC	RCHIIBGII	-	-	-	-	1	R	-	-	-	-	1	R	-	-	-	-	-	-	-	-

Table 63:Br.14a Reaction of *G. barbadense* L. entries (CVT)

Entry code	Entry Name	Alternaria leaf spot								Bacterial Leaf blight				Grey mildew				Rust		MLS		Corynospora leaf spot	
		Guntur		Dharwad		Coimbatore		Guntur		Dharwad		Coimbatore		Guntur		Dharwad		Guntur		Coimbatore		Guntur	
		GE	RE	GE	RE	GE	RE	GE	RE	GE	RE	GE	RE	GE	RE	GE	RE	GE	RE	GE	RE	GE	RE
9581	CCB 51-2	1	R	4	S	1	R	3	MS	4	S	0	DF	0	DF	0	DF	2	MR	0	DF	1	R
9582	DB-1701	1	R	4	S	1	R	2	MR	4	S	0	DF	1	R	0	DF	2	MR	1	R	1	R
9583	SB SG 1-5	1	R	4	S	0	DF	3	MS	3	MS	0	DF	1	R	0	DF	2	MR	0	DF	1	R
9584	ZC (Suvin)	1	R	4	S	0	DF	4	S	4	S	0	DF	1	R	0	DF	1	R	0	DF	1	R
9585	CCB 143B	1	R	4	S	1	R	2	MR	4	S	0	DF	0	DF	0	DF	1	R	0	DF	1	R
9586	CCB 129	1	R	4	S	0	DF	4	S	4	S	1	R	0	DF	0	DF	1	R	0	DF	2	MR
LC	RCH 2 BG II	3	MS	-	-	-	-	3	MS	-	-	-	-	1	R	-	-	3	MS	-	-	3	MS
LC	Jaadoo BG II	3	MS	-	-	-	-	2	MR	-	-	-	-	3	MS	-	-	3	MS	-	-	3	MS
LC	Jayadhar	-	-	4	S	-	-	-	-	0	DF	-	-	-	-	4	S	-	-	-	-	-	-
LC	Abhadita	-	-	4	S	-	-	-	-	4	S	-	-	-	-	4	S	-	-	-	-	-	-
LC	RCHIIBGII	-	-	-	-	1	R	-	-	-	-	1	R	-	-	-		-	-	1	R	-	-

Table 64:Br.15a: Reaction of CHT Inter-specific cotton hybrid entries

Entry code	Entry Name	Alternaria leaf spot						Bacterial Leaf blight						Grey mildew				Rust		CLS		TSV	
		Guntur		Dharwad		Coimbatore		Guntur		Dharwad		Coimbatore		Guntur		Dharwad		Guntur		Guntur		Coimbatore	
		GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE	GR	RE
9591	RHB 1623	1	R	4	S	1	R	3	MS	4	S	1	R	1	R	0	DF	3	MS	2	MR	0	DF
9592	ZC (DCH 32)	1	R	4	S	1	R	1	R	3	MS	0	DF	2	MR	0	DF	3	MS	2	MR	0	DF
9593	RHB 1624	2	MR	4	S	1	R	1	R	4	S	0	DF	2	MR	0	DF	3	MS	2	MR	0	DF
9594	LC	1	R	4	S	1	R	1	R	3	MS	0	DF	2	MR	0	DF	3	MS	2	MR	1	R
9595	RHB 1002	1	R	4	S	1	R	1	R	4	S	0	DF	1	R	-	-	3	MS	2	MR	1	R
LC	RCH 2 BG II	3	MS	-	-	-	-	-	-	-	-	-	-	1	R	-	-	3	MS	3	MS	-	-
LC	Jaadoo BG II	3	MS	-	-	-	-	-	-	-	-	-	-	3	MS	-	-	3	MS	3	MS	-	-
LC	Jayadhar	-	-	4	S	-	-	3	MS	0	DF	-	-	-	-	4	S	-	-	-	-	-	-
LC	Abhadita	-	-	4	S	-	-	2	MR	4	S	-	-	-	-	4	S	-	-	-	-	-	-
LC	RCHIIBGII	-	-	-	-	1	R	-	-	-	-	1	R	-	-	-	-	-	-	-	-	5	R

Table 65:Br – 03(b)(Dharwad)

Entry code	Entry Name	Alternaria leaf spot		Bacterial Leaf blight		Grey mildew	
		GR	RE	GR	RE	GR	RE
9601	BGDS 1033	4	S	4	S	4	S
9602	LC	4	S	2	MR	4	S
9603	RAH 1075	4	S	3	MS	4	S
9604	GBHV-193	4	S	3	MS	4	S
9605	ZC (Sahana)	4	S	3	MS	3	MS
9606	BS 6-18	4	S	3	MS	4	S
9607	QC (Suraj)	4	S	4	S	4	S
9608	NDLH – 2035-5	4	S	4	S	3	MS
LC	Jayadhar	4	S	0	DF	4	S
LC	Abhadita	4	S	4	S	4	S

Table 66:Br – 04(b) (Dharwad)

Entry code	Entry Name	Foliar Diseases Grades					
		Alternaria leaf spot		Bacterial Leaf blight		Grey mildew	
		GR	RE	GR	RE	GR	RE
9611	RAH 1071	4	S	4	S	4	S
9612	LC	4	S	4	S	4	S
9613	BS 1	4	S	4	S	4	S
9614	NDLH 20511	4	S	4	S	4	S
9615	ZC (Sahana)	4	S	3	MS	4	S
9616	BGDS 1072	4	S	3	MS	4	S
9617	GSHV 191	4	S	3	MS	4	S
9618	QC (Suraj)	4	S	4	S	3	MS
LC	Jayadhar	4	S	0	DF	4	S
LC	Abhadita	4	S	4	S	4	S

Table 67:Br – 05(b) (Dharwad)

Entry code	Entry Name	Alternaria leaf spot		Bacterial Leaf blight		Grey mildew	
		GR	RE	GR	RE	GR	RE
9621	ARBHH 1951	4	S	4	S	3	MS
9622	ZC (DHH 11)	4	S	4	S	4	S
9623	ARBHH 1952	4	S	3	MS	4	S
9624	RAHH 1952	4	S	4	S	4	S
9625	DHH 1951	4	S	4	S	4	S
9626	GAP	--		--		--	
9627	BGDHH 697	2	MR	4	S	2	MR
9628	DHH 1952	4	S	4	S	4	S
9629	RAHH 1951	4	S	4	S	3	MS
LC	Jayadhar	4	S	0	DF	4	S
LC	Abhadita	4	S	4	S	4	S

Table 68:Br-06(b) CVT (Dharwad)

Entry code	Entry Name	Alternaria leaf spot		Bacterial Leaf blight		Grey mildew	
		GR	RE	GR	RE	GR	RE
9631	AKH 1302	4	S	4	S	4	S
9632	DSC 1851	4	S	4	S	3	MS
9633	Local Check	4	S	4	S	4	S
9634	RAHC 1029	4	S	4	S	3	MS
9635	GISV 312	4	S	3	MS	4	S
9636	RHC HD 1420	4	S	3	MS	4	S
9637	AKH 1301	4	S	3	MS	4	S
9638	CNH 1128	4	S	3	MS	4	S
9639	BRCC 1621 S	4	S	4	S	3	MS
9640	Zonal Check (Suraj)	4	S	4	S	3	MS
LC	Jayadhar	4	S	0	DF	4	S
LC	Abhadita	4	S	4	S	4	S

Table 69:Br-24(b) CVT*G arboreum* (Dharwad)

Entry code	Entry Name	Alternaria leaf spot		Bacterial Leaf blight		Grey mildew	
		GR	RE	GR	RE	GR	RE
9651	GAM 260	4	S	0	DF	3	MS
9652	LC	2	MR	0	DF	4	S
9653	NDLA 3116-4	4	S	0	DF	4	S
9654	MDL 2667	4	S	0	DF	2	MR
9655	ZC (DLSa 17)	4	S	0	DF	4	S
9656	JLA-1227	4	S	0	DF	4	S
9657	CNA 1054	4	S	0	DF	4	S
9658	GAM 259	4	S	0	DF	4	S
9659	DWDa 1801	4	S	0	DF	4	S
9660	DWDa 1802	4	S	0	DF	4	S
9661	CNA 1031	4	S	0	DF	4	S
LC	Jayadhar	4	S	0	DF	4	S
LC	Abhadita	4	S	4	S	4	S

Table 70:Br-24(b) CVT – Long linted G. arboreum (Dharwad)

Entry code	Entry Name	Alternaria leaf spot		Bacterial Leaf blight		Grey mildew	
		GR	RE	GR	RE	GR	RE
9671	PA 837	4	S	0	DF	4	S
9672	PA 833	4	S	0	DF	3	MS
9673	PAIG 377	4	S	0	DF	3	MS
9674	PA 839	4	S	0	DF	4	S
9675	PA 778	4	S	0	DF	4	S
9676	PAIG 380	4	S	0	DF	3	MS
9677	PAIG 384	4	S	0	DF	4	S
9678	PA 806	4	S	0	DF	3	MS
9679	ZC (DLSa 17)	4	S	0	DF	4	S
9680	PA 807	4	S	0	DF	4	S
9681	PA 809	4	S	0	DF	4	S
9682	CNA 1065	4	S	0	DF	4	S
LC	Jayadhar	4	S	0	DF	4	S
LC	Abhadita	4	S	4	S	4	S

Table 71:Br.02a Colourdcotton*G. hirsutum* L. entries (IET) (Lam Guntur)

Entry code	Entry Name	Alternaria leaf spot		Corynespora leaf spot		Grey mildew		Rust		Bacterial blight	
		GR	RE	GR	RE	GR	RE	GR	RE	GR	RE
9701	LHCC 3	1	R	2	MR	2	MR	2	MR	1	R
9702	LHCC 4	1	R	2	MR	2	MR	2	MR	1	R
9703	LHCC 1	1	R	2	MR	2	MR	2	MR	1	R
9704	CNH 17395	1	R	2	MR	1	R	1	R	2	MR
9705	Suraj (Zonal	1	R	2	MR	2	MR	2	MR	2	MR
9706	16301 DB	1	R	2	MR	1	R	2	MR	1	R
9707	DHCC 1801	1	R	3	MS	2	MR	2	MR	1	R
9708	LHCC 2	1	R	2	MR	2	MR	2	MR	1	R
9709	Local Check	1	R	3	MS	2	MR	2	MR	1	R
9710	16337 LB	1	R	2	MR	2	MR	2	MR	1	R
9711	16315 LB	1	R	2	MR	2	MR	2	MR	1	R
9712	DHCC 1802	1	R	2	MR	2	MR	2	MR	2	MR
LC	RCH 2 BG II	3	MS	3	MS	1	R	3	MS	3	MS
LC	Jaadoo BG II	3	MS	3	MS	3	MS	3	MS	2	MR

Path 2 (b)Confirmation and maintenance of disease resistant lines

CENTRAL ZONE

Table 72: Confirmation and maintenance of disease resistant lines at Junagarh (Gujrat)

Sr. No.	Variety / year of testing	Alternaria leaf spot		Bacterial leaf blight		Grey mildew	
		Grade	Reaction	Grade	Reaction	Grade	Reaction
1	RAH-1071	III	MS	III	MS	I	R
2	RHC-1217	III	MS	II	MR	I	R
3	CPD-1602	II	MR	II	MR	I	R
4	GISV-310	III	MS	I	R	I	R
5	PBH-42	III	MS	II	MR	I	R
6	GJHV-523	II	MR	III	MS	I	R
7	BS2-17	III	MS	III	MS	I	R
8	RAH-0603	I	R	II	MR	I	R
9	TSH-325	II	MR	II	MR	I	R
10	H-1488	III	MS	III	MS	I	R
11	RAH-0604	II	MR	III	MS	I	R
12	RAH1075	II	MR	III	MS	I	R
13	L1384	II	MR	III	MR	I	R
14	GJHV554	II	MR	II	MR	I	R
15	RS2909	II	MR	II	MR	I	R
16	RAH1076	IV	S	II	MR	I	R
17	TSH357	II	MR	III	MS	I	R

Table 73:Confirmation and maintenance of disease resistant lines at Akola against bacterial blight

Sr. No.	Name of varieties	Grade	Reaction
1	NDLH 1938	1	R
2	GSV-173	1	R
3	GIHV 497	2	MR
4	THS 0499	1	R
5	AKH-09-5	1	R
6	AKH 2006-2	1	R
7	GISV 319	1	R
8	GISV 310	1	R
9	JK-4	1	R
10	JK-5	1	R
11	Khandwa 2 (Ch)	3	MS
12	DCH 32 (Susceptible ch)	4	S

SOUTH ZONE

Table 74: Confirmation and maintenance of disease resistant lines Dharwad (Kantatka)

Sl. No	Genotypes	Foliar Diseases Grades (0 to 4 Scale)					
		AB		BB		GM	
		Grade	Reaction	Grade	Reaction	Grade	Reaction
1	DB-14	2	MR	2	MR	0	DF
2	SVA-1118	1	R	0	DF	0	DF
3	GSB-41	4	S	4	S	0	DF
4	DB-40	4	S	4	S	0	DF
5	BD-16	4	S	4	S	3	MS
6	SUVIN	4	S	3	MS	3	MS
7	SCS-1206	4	S	4	S	0	DF
8	RHB-1005	4	S	4	S	3	MS
9	DB-1302	4	S	4	S	4	S
10	GSHB-989	4	S	4	S	0	DF
	Jayadhar (LC)	4	S	0	DF	4	S
	Abhadita (LC)	4	S	4	S	4	S

Table 75:Confirmation and maintenance of disease resistant lines Guntur(Lam)

Variety	Disease Grade (0-4 Scale)											
	Grey mildew				Rust				Alternaria Leaf Spot			
	2018-19	Reaction	2019-20	Reaction	2018-19	Reaction	2019-20	Reaction	2018-19	Reaction	2019-20	Reaction
BS 4-18	1	R	1	R	2	MR	3	MS	2	MR	2	MR
SHS 113	1	R	1	R	2	MR	2	MR	2	MR	2	MR
CPD 1802	1	R	1	R	2	MR	2	MR	2	MR	2	MR
ZC (Suraj)	1	R	1	R	2	MR	2	MR	2	MR	2	MR
LHCC 3	1	R	1	R	2	MR	2	MR	2	MR	2	MR
LHCC 4	1	R	1	R	2	MR	2	MR	2	MR	2	MR
CSH 3158	1	R	1	R	2	MR	2	MR	2	MR	2	MR
SHC 374	1	R	1	R	3	MS	3	MS	2	MR	2	MR
CPD 1702	1	R	1	R	2	MR	2	MR	2	MR	2	MR
RHC 1217	1	R	2	MR	2	MR	2	MR	2	MR	2	MR
GISV 298	1	R	1	R	2	MR	3	MS	2	MR	2	MR
ZC (Suvin)	1	R	1	R	1	R	2	MR	2	MR	2	MR
NDLH 1938	1	R	1	R	2	MR	2	MR	2	MR	2	MR
Jadoo	3	MS	3	MS	3	MS	3	MS	3	MS	3	MS
RCH 2 BG II	1	R	1	R	3	MS	3	MS	3	MS	3	MS

Path. 2 (c) Monitoring of breakdown of resistance against CLCuD in cotton.

NORTH ZONE

Table 76. Monitoring of breakdown of resistance against CLCuD in North Zone

	Sriganganagar		Bathinda		Hisar		Cumulative mean	Reaction
Entries	**CLCuD (PDI)**	**Reaction**	**CLCuD (PDI)**	**Reaction**	**CLCuD (PDI)**	**Reaction**		
Susceptible varieties								
HS-6	49.72	S	72.78	HS	46.28	S	56.3	HS
F-846	40.83	S	73.89	HS	48.80	S	54.5	HS
RST-9	53.33	HS	75.56	HS	45.52	S	58.1	HS
Tolerant varieties								
F 2228	26.94	MR	55.56	HS	43.80	S	42.1	S
H 1098 (i)	30.56	MS	67.78	HS	43.61	S	47.3	S
CSH 3075	30.83	MS	43.33	S	44.49	S	39.6	MS
Hybrids								
Bio 6317 (Susceptible)	31.39	MS	51.11	HS	37.84	MS	40.1	S
RCH 773 (Tolerant)	28.33	MR	34.44	MS	21.21	MR	28.0	MR

Path.3 (f) ; Management of sooty mold (*Capnodium*spp.) in cotton

Path. 77: Management of sooty mold (*Capnodium*spp.) in cotton (Poly House Experiment: Prophylactic spray twice)) at Sirsa

Treatments	% Sooty mold per plant (Polyhouse study: Sirsa)							
	Before I spray	7DAS	15 DAS	Before II spray	15 DAS	Before III spray	7 DAS	15 DAS
T1-COC 50 WP @ 1.25 g/litre	50.7(45.4)	51.9(46.12)	39.0(38.1)	64.7(53.72)	61.1(51.4)	56.3(48.6)	30.5(33.3)	14.1(21.9)
T2-COC 50 WP @ 2.50 g/litre	47.4(43.5)	48.3(44.0)	54.8(47.8)	69.8(56.8)	55.3(48.0)	54.7(47.6)	40.4(39.4)	19.6(26.1)
T3-Propiconazole 25 EC @ 1 ml / litre	4.7(9.9)	19.7(24.6)	21.8(27.1)	46.6(42.9)	37.0(37.1)	49.0(44.4)	22.7(28.3)	8.5(16.3)
T4-Mancozeb 50 WP @2.0 g /litre	0.0(0.0)	0.0(0.0)	1.0(3.2)	46.1(42.7)	44.1(41.6)	56.8(48.9)	27.4(31.4)	7.6(15.8)
T5-Neem oil 1500ppm @5ml / litre	27.5(31.6)	30.8(33.6)	44.1(41.6)	62.3(52.3)	61.1(51.4)	56.5(48.7)	20.8(27.0)	3.6(10.0)
T6-Flonicamid 0.4g/L	30.8(33.5)	31.8(33.8)	31.7(33.5)	52.3(46.3)	39.3(38.7)	40.2(39.3)	20.3(26.2)	0.0(0.0)
T7-Control	47.5(43.5)	70.7(57.2)	76.4(61.6)	66.1(54.5)	53.9(47.2)	56.9(48.9)	32.0(34.3)	13.9(21.6)
C.D.	11.561	11.728	18.644	N/A	10.148	6.494	N/A	7.2
C.V.	21.712	19.058	28.664	16.893	12.509	7.739	15.365	24.852

Path. 78: Management of sooty mold (*Capnodium*spp.) in cotton : Whitefly population / 3 leaves (Poly House Experiment: Prophylactic spray twice) at Sirsa

Treatments	Whitefly population / 3 leaves (Polyhouse study: Sirsa)							
	Before I spray	7DAS	15 DAS	Before II spray	15 DAS	Before III spray	7 DAS	15 DAS
T1-COC 50 WP @ 1.25 g/litre	63.4(7.9)	113.1(10.6)	101.1(10.0)	19.3(4.4)	13.7(3.8)	7.1(2.8)	2.9(1.9)	0.8(1.3)
T2-COC 50 WP @ 2.50 g/litre	34.7(5.8)	94.6(9.75)	47.3(6.9)	8.4(3.0)	11.6(3.5)	4.1(2.2)	2.4(1.8)	0.6(1.2)
T3-Propiconazole 25 EC @ 1 ml / litre	36.0(6.0)	72.8(8.4)	31.9(5.7)	10.0(3.3)	9.1(3.1)	3.2(2.0)	2.4(1.8)	1.2(1.4)
T4-Mancozeb 50 WP @2.0 g /litre	44.1(6.7)	53.3(7.1)	78.8(8.7)	10.2(3.3)	5.4(2.5)	3.8(2.1)	1.0(1.3)	0.0(1.0)
T5-Neem oil 1500ppm @5ml / litre	77.8(8.7)	45.3(6.7)	24.0(4.9)	6.8(2.7)	6.0(2.5)	2.9(1.9)	1.2(1.4)	0.0(1.0)
T6-Flonicamid 0.4g/L	44.4(6.7)	18.6(4.4)	22.6(4.8)	4.6(2.3)	1.4(1.5)	0.4(1.2)	0.0(1.0)	0.0(1.0)
T7-Control	88.7(9.4)	47.9(6.9)	39.7(6.3)	47.5(6.96)	16.4(4.1)	14.9(3.9)	9.4(3.2)	3.1(2.0)
C.D.	2.1	2.232	2.051	0.729	0.821	0.554	0.621	0.343
C.V.	15.865	16.029	16.794	10.808	14.988	13.167	19.107	14.758

* Value in parentheses are arcsine transformation values

Table 79: Management of sooty mold (*Capnodium*spp.) in cotton (Field Experiment (Spray thrice))

Treatments	Reduction at 15 days after 3rd spray (%)		Pooled mean	SCY (q/ha)
	Faridkot	Hisar		Hisar
T_1 - Copper oxy chloride (COC) 50 WP @ 0.75 g/litre of water	11.68	11.20	11.44	23.0
T_2 - Copper oxy chloride (COC) 50 WP @ 1.25 g/litre of water	14.14	12.14	13.14	24.0
T_3- Copper oxy chloride (COC) 50 WP @ 1.75 g/litre of water	27.96	16.43	22.20	25.0
T_4- Copper oxy chloride (COC) 50 WP @ 2.25 g/litre of water	37.64	31.43	34.54	30.0
T_5- Propiconazole 25 EC @ 1 ml / litre of water	40.88	19.28	30.08	28.0
T_6 - Mancozeb 50 WP @2.0 g /litre of water	36.07	29.00	32.54	28.0
T_7- Detergent powder @ 5.0 g / litre of water	15.38	12.85	14.12	23.0
T_8- Water spray	9.27	4.3	6.79	20.0
T_9- Control	0	-	0.00	20.0
CD 0.05%				

Table 80: Management of sooty mold (*Capnodium*spp.) in cotton (Field Experiment- Spray thrice)

Treatment	TNAU, Coimbatore				Junagarh									
	Treatment details	Sooty mold (%)	% Inhibition over control (%)	Seed Cotton Yield (q/ha)		1st SPRAY				2nd spray				
					Before spray	7 day DAS PDI	15 day DAS PDI	% reduction	APHID GR.	7 day DAS PDI	15 day DAS PDI	% reduction	APHID GR.	SCY Q/ha
T_1	Copper oxy chloride (COC) 50 WP @ 1.25 g/litre of water	4.8	42.86	9.2	3.97 (15.79)	4.85 (23.49)	4.69 (21.96)	1.1	2	26.78 (31.17)	53.77 (47.17)	15.3	4	27.9
T_2	Copper oxy chloride (COC) 50 WP @ 2.25 g/litre of water	4.2	50.00	9.9	4.00 (16.00)	4.52 (20.46)	4.65 (-21.65)	1.9	2	25.86 (30.57)	51.45 (45.83)	19.0	4	28.8
T_3	Propiconazole 25EC @ 1ml / litre of water	4.53	46.07	9.5	3.94 (15.50)	4.16 (17.33)	4.97 (-24.67)	-4.9	2	23.75 (29.17)	41.31 (40.00)	34.9	4	29.2
T_4	Mancozeb 50 WP @ 2.0g / litre of water	6.4	23.81	9	3.67 (13.49)	4.22 (17.81)	4.83 (23.30)	-1.9	2	29.66 (33.00)	52.03 (46.17)	18.1	4	25.8
T_5	Neemoil@5ml/l	5.95	29.16	9	3.91 (15.31)	4.40 (19.33)	4.56 (-20.82)	3.8	2	24.74 (29.83)	56.84 (48.93)	10.5	4	28.2
T_6	Fluonicamid-3 spray at monthly interval	6	28.57	8.5	4.04 (16.32)	2.79 (-7.8)	2.67 (7.15)	43.5	2	4.93 (12.83)	3.01 (10.00)	95.3	4	32.5
T_7	Control	8.4	0	7.97	3.97 (15.79)	4.20 (17.67)	4.74 (-22.5)			30.19 (33.33)	63.50 (52.83)			25.8
	S.E.m+				0.11	0.1	0.14			0.4763	1.4079			0.86
	CD				NS	0.32	0.44			1.4678	4.3385			2.66
	CV%				4.62	4.28	5.52			2.57	6.15			5.28

Path. 3 (g): Management of parawilt of cotton

Table 81: Management of parawilt of cotton at Bathinda& Hisar

	Bhatinda									Hisar		Overall recovery
Treatment	**% Recovery**	**No. of Monopods**	**No. of Sympods**	**Shoot length(cm)**	**No. of open bolls per plant**	**Total root mass (gm.)**	**Fresh Root Length Density (g)**	**Boll Wt. gm)**	**Yield (Q/ha)**	**Diseased plants**	**% Recovery**	
T.1 Cobalt chloride foliar spray 10 ppm foliar spray immediately after occurrence of disease	**91.7**	1.8	26.5	161.1	48.4	25.0	2.0	4.3	29.6	15 (22.49)	**85.0**	**88.4**
T.2 Sodium Benzoate foliar spray 50ppm foliar spray immediately after occurrence of disease	33.3	1.1	19.9	143.9	38.7	22.2	2.0	3.7	27.0	60 (34.59)	**65.0**	**49.2**
T3. Salicylic acid (Commercial grade) @ 250ppm foliar spray immediately after occurrence of disease	41.7	1.2	24.5	154.5	36.9	25.4	1.9	4.0	25.8	100 (90.0)	0.0	**20.9**
T4. Foliar spray of *Pseudomonas fluorescens* @ 10ml/litre of water (University strain)	25.0	0.7	23.4	154.4	41.9	20.9	1.9	3.8	22.8	100 (90.0)	0.0	**12.5**
T5. Drench Plants with mixture of Copper oxychloride (COC) 50 WP@ 25g and 200 Urea in 10 litre of water	**83.3**	1.7	23.4	160.6	46.8	23.5	2.0	4.1	27.7	75 (60.1)	25.0	**54.2**
T6. Drench plants with Carbendazim 1g/L	25.0	0.9	21.7	152.2	37.6	21.3	1.8	3.9	20.1	90 (71.5)	10.0	**17.5**
T.7 Control	16.7	0.8	21.2	136.7	35.6	17.8	1.8	3.6	18.8	100 (90.0)	0.0	**8.4**
CD @ 0.05%	20.54	0.57	NS	11.51	NS	NS	NS	0.35	0.6	**6.4**		
CV %	3.38	22.06	16.11	9.15	25.06	10.63	17.92	3.63	2.71	10.90	-	

Path. 3 (h): Evaluation of efficacy of bioagents against cotton diseases

Table 82. Evaluation of efficacy of bioagents against bacterial and fungal foliar diseases

	Treatments	*Alternaria Leaf spot PDI (%)*				Bacterial Leaf Blight *PDI (%)*					Grey mildew PDI(%)			
		Nanded	**Akola**	**Surat**	**Overall mean**	**Nanded**	**Akola**	**Nagpur**	**Surat**	**Overall mean**	**Nanded**	**Akola**	**Nagpur**	**Overall mean**
T1	Seed and soil application of *Bacillus aryabhattai*	5.0 (12.9)	5.7 (13.8)	8.3 (16.5)	6.3	6.6 (14.8)	5.3 (13.3)	4.2	17.2 (24.3)	8.3	7.4 (15.7)	5.8 (13.8)	2.7	5.3
T2	Seed and soil application of *Bacillus tequeilencis*	7.5 (15.9)	6.2 (14.3)	7.5 (15.6)	7.1	6.4 (14.6)	4.8 (12.7)	4.1	15.7 (23.2)	7.8	6.0 (14.2)	6.0 (14.1)	0	4.0
T3	Seed and soil application of *Bacillus aryabhattai* + *Bacillus tequeilencis.*	5.0 (12.9)	4.3 (11.9)	4.2 (11.3)	**4.5**	5.3 (13.2)	4.3 (11.9)	2.0	9.7 (17.9)	5.3	6.0 (14.1)	4.9 (12.7)	**0**	3.6
T4	Seed and soil application of commercial product *Bacillus subtilis*	5.6 (13.7)	5.9 (14.1)	11.5 (19.6)	7.7	6.2 (14.3)	5.6 (13.7)	2.5	19.7 (26.2)	8.5	7.4 (15.8)	6.4 (14.6)	0	4.6
T5	Seed and soil application of*Pf CICR.*	5.3 (13.3)	6.3 (14.5)	6.0 (14.0)	**5.9**	4.9 (12.8)	4.9 (12.9)	3.3	13.5 (21.3)	6.7	5.3 (13.3)	7.0 (15.2)	0	4.1
T6	Chemical seed treatment (vitavax powder @ 0.2%)	4.6 (12.4)	5.3 (13.3)	12.2 (20.3)	7.4	4.7 (12.5)	5.1 (13.0)	3.3	20.8 (27.0)	8.5	3.6 (10.9)	6.1 (14.2)	0	**3.2**
T7	Foliar application of Pyraclostrobin in 0.1%	4.1 (11.6)	4.7 (12.5)	10.2 (18.5)	6.3	3.5 (10.8)	4.9 (12.8)	4.3	18.8 (25.4)	7.9	2.6 (9.2)	5.2 (13.1)	0	**2.6**
T8	Control	9.4 (17.9)	7.4 (15.7)	17.5 (24.6)	11.4	7.5 (15.9)	7.6 (15.9)	9.6	42.3 (40.5)	16.8	8.7 (7.7)	7.8 (16.2)	2.7	6.4
	SE±	0.28	0.63	1.90		0.47	0.48		1.50		0.53	0.84		
	CD at 5%	0.85	1.91	5.75		1.42	1.46		4.53		1.65	-		
	CV (%)	3.53	7.95	18.70		5.99	6.30		10.06		6.74	10.29		

*Figure in the parenthesis are retransformed values

Table 83: Evaluation of efficacy of bioagents against soil borne and foliar cotton diseasesat Nagpur

	Treatment	**Nagpur**			
		***Myrothecium* leaf spot (PDI)**	***Corynespora* leaf spot (PDI)**	**Wilt (% incidence)**	**Root rot (% incidence)**
T1	Seed and soil application of *Bacillus aryabhattai,* Seed application: 10^8cfu/g @10g per kg of seed at the time of sowing, Soil application: 2.5 kg/ha (30 & 60 DAS) with FYM/compost	5.3	5.2	3.3	3.3
T2	Seed and soil application of *Bacillus tequeilencis* Seed application: 10^8cfu/g @10g per kg of seed at the time of sowing, Soil application: 2.5 kg/ha (30 & 60 DAS) with FYM/compost	4.4	4.8	0	1.7
T3	T_1+T_2 Seed application: 10^8cfu/g @10g per kg of seed at the time of sowing & Soil application: 2.5 kg/ha (30 & 60 DAS) with FYM/compost	**1.7**	**2.7**	**0**	**0**
T4	Seed and soil application of Commercial product *Bacillus subtilis* Seed application: 10^8cfu/g @10g per kg of seed at the time of sowing Soil application: 2.5 kg/ha (30 & 60 DAS) with FYM/compost	2.7	4.4	1.7	1.7
T5	Seed and soil application *Pf*CICR Seed application: 10^8cfu/g @10g per kg of seed at the time of sowingSoil application: 2.5 kg/ha (30 & 60 DAS) with FYM/compost	2.7	4.9	1.7	1.7
T6	Chemical seed treatment (Vitavax power @ 0.2%) 2 gm/kg seed at the time of sowing	0	5.5	0	3.3
T7	Foliar application of Pyraclostrobin @ 0.1% 1.0 gm/lit of water	0	2.7	3.3	3.3
T8	Control	12.4	8.7	6.7	8.3

Table 84: Effect bioagents against cotton diseases and seed cotton yield at various locations

	Treatment	Germination	Seed cotton yield Q/ha				
		Nanded	Nanded (RASI BG-II)	Akola	Nagpur (Suraj cv.)	Surat (RCH 2 BG II).	Overall mean
T1	Seed and soil application of *Bacillus aryabhattai,* Seed application: 10^8cfu/g @10g per kg of seed at the time of sowing, Soil application: 2.5 kg/ha (30 & 60 DAS) with FYM/compost	**97.4** (82.4)	**13.2**	11.9	44.7	21.1	22.7
T2	Seed and soil application of *Bacillus tequeilencis* Seed application: 10^8cfu/g @10g per kg of seed at the time of sowing, Soil application: 2.5 kg/ha (30 & 60 DAS) with FYM/compost	96.9 (81.7)	11.7	10.5	45.1	23.0	22.6
T3	T_1+T_2 Seed application: 10^8cfu/g @10g per kg of seed at the time of sowing & Soil application: 2.5 kg/ha (30 & 60 DAS) with FYM/compost	97.0 (81.8)	**14.8**	13.7	46.2	**26.8**	**25.4**
T4	Seed and soil application of Commercial product *Bacillus subtilis* Seed application: 10^8cfu/g @10g per kg of seed at the time of sowing Soil application: 2.5 kg/ha (30 & 60 DAS) with FYM/compost	95.4 (79.8)	11.8	10.5	39.1	19.5	20.2
T5	Seed and soil application *Pf*CICR Seed application: 10^8cfu/g @10g per kg of seed at the time of sowing Soil application: 2.5 kg/ha (30 & 60 DAS) with FYM/compost	95.8 (78.3)	12.9	11.7	41.9	24.2	22.7
T6	Chemical seed treatment (Vitavax power @ 0.2%) 2 gm/kg seed at the time of sowing	95.4 (79.8)	**13.5**	13.0	46.0	18.1	22.7
T7	Foliar application of Pyraclostrobin @ 0.1% **2.0** gm/lit of water	95.4 (79.8)	**13.1**	12.4	43.6	20.4	22.4
T8	Control	94.2 (76.3)	10.6	9.7	37.5	17.2	18.8
	SE±	4.16	0.38	1.197		1.332	
	CD at 5%	12.60	1.17	3.631		4.039	
	CV (%)	9.01	5.29	18.38		0.108	

Path.4(e). Crop loss estimation due to CLCuD and distribution pattern of CLCuD in north zone.

Expt.1.To work out relationship between disease index and yield reduction due to CLCuD.

NORTH ZONE

Table 85: Seed cotton yield (%) reduction disease grade wise in different Bt hybrids in North Zone.

Grades	US51				RCH 773 BGII				NCS 9013 BGII				Bioseed 6688 BGII			
	HSR	FDK	SGR	Avg.	HSR	FDK	SGR	Avg.	HSR	FDK	SGR	Avg.	HSR	FDK	SGR	Avg.
1	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-
2	20.3	23.8	16.8	20.3	12.8	23.2	13.3	16.4	10.0	34.0	16.6	20.2	5.7	36.0	12.3	18.0
3	41.9	30.8	55.2	42.6	31.7	30.9	45.1	35.9	25.8	43.8	58.8	42.8	10.6	37.5	47.8	32.0
4	56.7	37.3	76.3	56.8	45.1	39.3	74.2	52.8	38.4	50.4	79.3	56.0	30.1	45.0	67.4	47.5
5	72.5	-	-	72.5	60.2	-	-	60.2	56.0	-	-	56.0	31.0	-	-	31.0
6	85.2	-	-	85.2	73.5	-	-	73.5	69.4	-	-	69.4	69.0	-	-	69.0
Mixed	53.8	20.2	37.1	37.0	46.2	23.0	33.1	34.1	42.8	31.3	38.7	37.6	35.2	25.6	31.9	30.9

Expt.2. Study on distribution pattern of cotton leaf curl virus disease on local popular Bt hybrid at farmer's in Punjab, Rajasthan and Haryana field.

Table 86: CLCuD incidence in different districts of the North Zone Punjab, Rajasthan and Haryana

Punjab		Rajasthan		Haryana	
Districts	**Mean (PDI)**	**Districts**	**Mean (PDI)**	**Districts**	**Mean (PDI)**
Faridkot	**11.84**	Sriganganagar	**14.27**	Sirsa	**16.44**
Fazilka	10.13	Hanumangarh	9.10	Fatehabad	13.65
Muktsar	8.82			Hisar	15.20
Bathinda	5.70			Jind	16.01
				Bhiwani	10.28
				Rohtak	11.20
				Palwal	11.00

Agron. V: Technology for organic cotton production

Table87.Intensity of diseases under organic cotton production*kharif*-2019: Junagarh

Sr.	Treatments	PDI(%)		
		Bacterial leaf blight	Alternaria leaf spot	Grey mildew
1	Absolute control (No organic & Inorganic)	1.0 (1.0)#	29.4 (24.2)*	0
2	Control (RDN through inorganic)	0.6 (0.7)	30.2 (25.3)	0
3	RD of Nutrient through organic based on P -equivalent basis.	0.9 (1.2)	30.4 (25.7)	0
4	Seed treatment and soil application of rec. bio fertilisers and foliar application of PPFM @1 % at flowering and boll development.	0.7 (0.8)	31.3 (27.0)	0
5	Neem cake 250 kg/ha.	0.9 (1.2)	29.6 (24.3)	0
6	Raising of Sunhemp / between rows incorporated before flowering.	0.6 (0.5)	31.2 (26.8)	0
7	Intercropping with black gram & crop residue has to be incorporated after harvesting insitu condition.	0.7 (0.8)	28.8 (23.2)	0
8	T_4+T_5	1.0 (1.0)	30.0 (25.0)	0
9	T_4+T_6	1.2 (1.5)	29.7 (24.5)	0
10	T_4+T_5+T_6	0.9 (0.8)	29.9 (24.8)	0
11	T_4+ T_5 + T_7	0.9 (1.2)	29.7 (24.5)	0
S. Em. ±			0.7	0
C.D. at 5 %		NS	NS	0
CV%		25.74	3.99	0

Square root transformation, * Arcsine transformation

Table88. Intensity of diseases under organic cotton production (G. Cot. 20) (2019-20) Surat

Sr. No.	Treatments	Bacterial leaf blight			Alternaria leaf spot		
		PDI	Max Grade	Rating	PDI	Max Grade	Rating
1	Absolute control (No organic & Inorganic)	12.5	3	MS	0.0	0	DF
2	Control (RDN through inorganic)	6.5	2	MR	0.0	0	DF
3	RD of Nutrient through organic based on P - equivalent basis.	8.5	2	MR	0.0	0	DF
4	Seed treatment and soil application of rec. bio fertilisers and foliar application of PPFM @1 % at flowering and boll development.	5.5	2	MR	0.0	0	DF
5	Neem cake 250 kg/ha.	2.0	2	MR	0.0	0	DF
6	Raising of Sunhemp / between rows incorporated before flowering.	11.5	3	MS	0.0	0	DF
7	Intercropping with black gram & crop residue has to be incorporated after harvesting insitu condition.	9.5	2	MR	0.0	0	DF
8	T_4+T_5	3.0	2	MR	0.0	0	DF
9	T_4+T_6	4.5	2	MR	0.0	0	DF
10	$T_4+T_5+T_6$	5.5	2	MR	0.0	0	DF
11	$T_4+ T_5 + T_7$	2.5	2	MR	0.0	0	DF

Table 89. Intensity of diseases under organic cotton production *(G. hirsutum)*2019-20 Dharwad

Sl. No	Treatments		120 DAS		Yield (kg/ha)
		AB PDI	BB PDI	GM PDI	
T1	Absolute control (No organics & No inorganic)	51.88(46.10)	36.75(37.34)	33.35(35.29)	470
T2	Control (RDN through inorganic)	40.46(39.52)	31.88(34.39)	28.00(31.96)	961
T3	RD of Nutrient through organic based on P equivalent basis	49.81(44.91)	28.24(32.12)	30.97(33.83)	735
T4	Seed treatment and soil application of rec. bio fertilizers and foliar application of PPFM @ 1% at flowering and boll development	50.01(45.03)	29.35(32.82)	29.75(33.07)	592
T5	Neem cake 250kg/ha	45.67(42.54)	28.32(32.17)	30.89(33.78)	775
T6	Raising of Sunhemp /fodder cowpea between rows incorporated before flowering	48.59(44.21)	29.40(32.85)	29.96(33.20)	443
T7	Intercropping with green gram/black gram/ground nut/soybean	45.28(42.31)	28.80(32.47)	30.10(33.29)	493
T8	T4 + T5	44.15(41.66)	28.27(32.14)	30.48(33.53)	653
T9	T4 +T6	45.99(42.72)	27.25(31.48)	29.93(33.18)	533
T10	T4 + T5 + T6	47.69(43.70)	25.73(30.50)	28.06(32.00)	728
T11	T4 + T5 + T7 (PPFM from TNAU)	40.47(39.53)	22.65(28.43)	24.82(29.90)	609
T12	T4 + T5 + T7 (PPFM from UASD)	39.25(38.81)	21.32(27.51)	23.95(29.32)	588
	SEm±	0.871	0.971	0.763	54
	CD at 5%	2.578	2.863	2.250	159

Table 90. Intensity of diseases in organic cotton production during *kharif* 2019-20 at RARS, Lam, Guntur

S. No.	Treatment	Corynespora leaf spot
		Per cent Disease Index
1	Absolute control (No organic or inorganic)	12.67 (20.84)
2	Control (RDN through inorganic)	10.33 (18.72)
3	RD through organic based on P equivalent basis	11.17 (19.51)
4	ST and ST of biofertilizers and FA of PPFM	11.5 (19.82)
5	Neem cake @250kg/ha	10.67 (19.05)
6	Sunhemp /fodder cowpea, incorporated	7.00 (15.34)
7	Intercrop GG/BG/Groundnut/soy	10.33 (18.72)
8	T4+T5 (ST and ST of biofertilizers and FA of PPFM+ Neem cake @250kg/ha)	13.67 (21.68)
9	T4+T6 (ST and ST of biofertilizers and FA of PPFM+ Sunhemp/fodder cowpea, incorporated)	8.67 (17.11)
10	T4+T5+T6 (ST and ST of biofertilizers and FA of PPFM+ Neem cake @250kg/ha+ Sunhemp/fodder cowpea, incorporated)	7.17 (15.51)
11	T4+T5+T7 (ST and ST of biofertilizers and FA of PPFM+ Neem cake @250kg/ha+ Intercrop GG/BG/Groundnut/soy)	10.00 (18.44)
	CD (p=0.05)	3.46
	CV (%)	19.8

Agron. Vb: Standardization of geometry for Bt varieties: Junagarh

Table 91: The incidence of Alternaria leaf spot diseases under different plant spacing: Junagarh

Sr	Treatment	Alternaria leaf spot(ALS) Percent Disease Index
		Mean
1	Suraj Bt with 60 X 15 cm	40.0 (41.5)
2	Suraj Bt with 60 X 30 cm	42.6 (45.8)
3	Suraj Bt with 90 X 15 cm	37.1 (36.7)
4	Suraj Bt with 90 X 30 cm	36.5 (35.3)
5	PKV 081 Bt with 60 X 15 cm	43.7 (47.7)
6	PKV 081 Bt with 60 X 30 cm	45.2 (50.3)
7	PKV 081 Bt with 90 X 15 cm	42.4 (45.5)
8	PKV 081 Bt with 90 X 30 cm	45.4 (50.7)
9	Rajat Bt with 60 X 15 cm	23.3 (15.7)
10	Rajat Bt with 60 X 30 cm	23.7 (16.2)
11	Rajat Bt with 90 x 15 cm	18.4 (10.0)
12	Rajat Bt with 90 X 30 cm	20.5 (12.3)
13	GJHV374 Bt with 60X 15 cm	36.5 (35.3)
14	GJHV374 Bt with 60X 30 cm	24.0 (16.5)
15	GJHV374 Bt with 90 x 15 cm	27.4 (21.3)
16	GJHV374 Bt with 90X 30 cm	30.0 (25.0)
17	Bt hybrid with RD spacing G.COT.HY. 8 BGII	24.1 (16.7)
S. Em ±		2.1
C.D. at 5 %		6.0
C.V. %		10.96

* Transformed value Arcsine transformation

Agron. Vc: Enhancing Nitrogen use efficiency in Bt Cotton. Junagarh (GTHH 49 BG II)

Table:92.The intensity of alternaria leaf spot diseases with respect to fertilizer doses : Junagarh

	Treatment	Bacterial leaf blight diseases PDI	Alternaria leaf spot(ALS) PDI
1	N_0 Control	*1.0 (1.0)	*30.8 (26.2)
2	100 % of RDN (Band application in 2 splits at Basal & Flowering)	0.7 (0.8)	30.6 (26.0)
3	75 % of RDN (Band application in 2 splits at Basal & Flowering)	0.6 (0.7)	30.7 (26.0)
4	75 % of RDN +Placement (Spot application in 2 splits at Basal & Flowering)	1.0 (1.0)	30.9 (26.3)
5	75 % of RDN + Placement (Spot application in 4 Split: Basal, Squaring, Flowering, Boll development)	0.6 (0.7)	30.9 (26.3)
6	T_5 + Foliar application of 1 % urea (3 times: Squaring, Flowering, Boll development)	0.6 (0.7)	31.7 (27.7)
7	T_6+raising of Sunhemp / fodder cowpea between rows incorporated before flowering	0.7 (0.5)	31.0 (26.5)
	S. Em ±	0.3	0.6
	C.D. at 5 %	NS	NS
	C.V. %	20.12	3.43

* Transformed value Arcsine transformation

ALS and BLB Grade: 0=Immune, 1=Resistant, 2= Moderately resistant, 3=Moderately susceptible, 4=Susceptible ALS- Alterneria Leaf spot

Concluded Experiment:

Table 93. Management of sooty mold (*Capnodium*spp.) in cotton (Field Experiment- Spray thrice)

Treatment	Reduction of sooty mold over control (%)												Overall
	Coimbatore			Junagarh	Faridkot				Hisar			Pooled	
	17-18	18-19	Pooled	18-19	17-18	18-19	19-20	Pooled	17-18	18-19	19-20		
Copper oxychloride (COC) 50 WP @ 0.75 g/litre of water	27.27	17.6	22.4	9.5	25.18	33.3	11.68	23.4	0.39	15.2	11.2	8.9	16.1
Copper oxychloride (COC) 50 WP @ 1.25 g/litre of water	29.69	20.5	25.1	11.8	30.13	66.7	14.14	37.0	3.28	18.6	12.14	11.3	21.3
Copper oxychloride (COC) 50 WP @ 1.75 g/litre of water	51.51	31.8	41.7	11.8	32.4	66.7	27.96	42.4	7.37	20.7	16.43	14.8	27.7
Copper oxychloride (COC) 50 WP @ 2.25 g/litre of water	65.45	43.1	54.3	13.7	41	66.7	37.64	48.4	12.45	31.2	31.43	25.0	35.4
Propiconazole 25EC @ 1ml / litre of water	67.75	34.7	51.2	16.4	23.98	33.3	40.88	32.7	7.79	23.9	19.28	17.0	29.3
Mancozeb 50 WP @ 2.0g / litre of water	21.21	16	18.6	13.7	26.84	33.3	36.07	32.1	9.38	25.9	29	21.4	21.5
Detergent powder @ 5.0 g/litre of water	63.63	25	44.3	1.9	16.95	33.3	15.38	21.9	8.56	16.2	12.85	12.5	20.2
Water spray	7.63	6.3	7.0	7.6	9.05	33.3	9.27	17.2	4.28	14	4.3	7.5	9.8
Control	0	0	0.0	0	0		0	0.0	0	0	-	0.0	0.0

Table 94. Pooled effect of management of sooty mold (*Capnodium*spp.) on seed cotton yield (Field Experiment- Spray thrice)

	Treatments	Seed cotton yield (Q/ha)							
		Coimbatore		Junagarh	Faridkot	Hisar			
		2017	2018	2018	2017	2017	2018	2019	Pooled
T_1	Copper oxychloride (COC) 50 WP @ 0.75 g/L of water	10	9.5	27.97	19.43	15.1	21.1	23	18.0
T_2	Copper oxychloride (COC) 50 WP @ 1.25 g/L of water	10.2	9.2	28.16	18.52	16.45	22	24	18.4
T_3	Copper oxychloride (COC) 50 WP @ 1.75 g/L of water	10.5	9.5	27.52	20.8	17.23	22.4	25	19.0
T_4	Copper oxychloride (COC) 50 WP @ 2.25 g/L of water	11	10.7	29.96	24.69	19.8	28	30	22.0
T_5	Propiconazole 25EC @ 1ml / Lof water	11.9	9.8	29.7	19.43	17.4	26	28	20.3
T_6	Mancozeb 50 WP @ 2.0g /L of water	9	9	29.9	19.66	18.65	26.4	28	20.1
T_7	Detergent powder @ 5.0 g/L of water	10.9	9	27.01	18.06	17.8	21.6	23	18.2
T_8	Water spray	8.1	8.8	27.14	16.92	16.9	19	20	16.7
T_9	Control	7.95	8.5	28.16	16.61	14.5	18	20	16.2

AICRP on COTTON

ANNUAL REPORT:2019-20

Results of Fiber Technology Analyses

Photo: M. Sabesh

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Quality Analysis of ICAR-AICRP on Cotton samples

The Indian Council of Agricultural Research (ICAR) launched the All India Coordinated Cotton Improvement Project (AICCIP) in the year 1967 with its Headquarters at Coimbatore (Tamil Nadu). Since then the cotton has moved a great deal from varieties to genetically modified cotton cultivars. Presently the future of genetically modified cotton is being discussed widely in the country along with the change in the weather pattern. Therefore, the importance of the project has received a thrust in terms of multi-disciplinary and multi-centre approaches with the active involvement of State Agricultural Universities across cotton growing states for the development of better varieties suiting to different agro climatic conditions. Currently, the AICCIP Project, now All India Co-ordinated Research Project on Cotton (ICAR-AICRP on Cotton) is in operation with its headquarters at Coimbatore and spread over 21 participating centres involving 16 State Agricultural Universities. The ICAR-Central Institute for Research on Cotton Technology (ICAR-CIRCOT), Mumbai and its Regional units at Nagpur, Coimbatore, Sirsa, Guntur, Dharwad and Surat are closely associated with ICAR-AICRP on Cotton in assessing the fibre quality parameters of cotton cultures under trial. It is heartening to note that vide letter no. F.No. A.Engg.17(13)/2014-AE dated 30.08.2016 from SMD, a new discipline, **Quality Research**, has been added in AICRP-on Cotton and ICAR-CIRCOT has been included as Principal Investigator. This letter was issued with approval of DDG (CS).

Since the quality plays an important role in varietal improvement research and it takes several years to evolve a variety endowed with good yield and desired fibre quality parameters. Starting with a few seeds initially obtained either from Germ Plasm collection or from a new cross, the cotton breeder has to select good plants during several successive generations until a strain which gives consistent results is evolved, year after year, as regards yield, quality and other characteristics.

The successful development of a new variety involves close collaboration of scientists from various disciplines, *viz.* the cotton breeder, agronomist, physiologist, pathologist, entomologist and technologist. The work of developing new varieties can be speeded up if an integrated approach covering all these aspects is made. The multi location evaluation of the new varieties for various characteristics in each cotton growing zone is necessarily to be carried out on the promising varieties.

India has become the world's largest producer and exporter of cotton. Indian cotton also typically trades at a discount upto the extent of 7 %, in the international market, compared to cotton from other countries due to practices followed in market yards and other subsequent processes. Opportunities may exist to improve the income of cotton producers in India and of global cotton consumers by improving the communication of consumer's quality needs to the farm level researchers.

The quality of the cotton fibre is dependent on the pedigree or genetic composition of the variety as well as on the conditions under which the plant is grown. Although fibre quality parse cannot be improved during processing however improper handling or processing can adversely affect the quality.

ICAR-CIRCOT undertakes the fibre and yarn quality assessment of ICAR-AICRP on Cotton samples and presented in the Annual Technological Report. Quality parameter data was generated on the cotton samples received from the cotton breeders throughout the country from breeders pertaining to the ICAR-AICRP on Cotton Zonal Trials (North Zone, Central Zone and South Zone) and National Trials.

HVI and ICC Mode Comparison

Since last season onwards the testing of all the lint samples under the AICRP-on Cotton is being carried out in HVI mode of testing. This has brought the fibre attributes data at par with international method of testing. While most institutions in India use either International Calibration Cotton (ICC) or HVI tenacity, many foreign cottons, especially those from the US and Australia, are labeled with only HVI tenacity values which are much higher. Cotton exporters in India are also familiar with HVI mode of testing as they have to submit HVI mode values to get their produce sold in international markets. In international markets, the transaction occur mainly using HVI mode fibre properties. The comparisons with foreign cottons have led to the misnomer that Indian cottons are weaker compared to their foreign counterparts in a given category.In order to get acquainted with the different parameters obtained in HVI mode following explanation is given. The comparison between ICC and HVI mode parameters are also explained.

Fibre length: The 2.5 per cent span length (ICC mode) is the distance up to which 2.5 per cent of the fibres caught in the sample holding comb are found to extend. On the other hand, Upper Half Mean Length (UHML), obtained in HVI mode, is the average length by number of the longer half (50 per cent) of the fibres distributed by weight. Though different by definition, the

two length measures are nearly equal. Hence, there is no difficulty in switching over from the old set of parameters to the new.

Fibre length variation: The length variability index in the ICC mode is the uniformity ratio of span length at 50 per cent and 2.5 per cent density levels.

UR % = (L50 / L2.5) × 100

The UR per cent for all varieties of cotton lies in the 40-54 range.

The uniformity index (UI) determined in the HVI mode is the ratio of the mean length and the UHML:

UI = (Mean length/UHML) × 100

As mean length is very close to, though smaller than, UHML, the ratio is much larger than the UR per cent. Generally, the UI per cent is in the 70-98 range, the theoretical limit being 100 when the fibres are all of constant length.

Tenacity: The fibre tenacity in the ICC mode is available at the Stelo level. These are adjusted to agree with the tenacity obtained with conventional mechanical machines known as the Stelometer. In the HVI mode, the tenacity given by the machine is much higher than the measures obtained in the ICC mode. The HVI tenacity is about 25-30 per cent higher than the tenacity obtained in the ICC mode.

A relationship between ICC & HVI Modes of testing is given below in the form of a regression equation is given. ***It is cautioned that one should not use the equations/thumb rule as an alternate to actual testing.***

ICC Mode	HVI mode	Conversion (ICAR-CIRCOT)	Thumb rule
2.5% Span Length (SL)	Upper Half Mean Length (UHML)	UHML=0.98 x 2.5 SL+0.1827	**2.5% SL is equal to UHML**
Uniformity Ratio (UR)	Uniformity Index (UI)	UI% = -0.1841xUR% + 91.17	**UI is 1.8 times UR**
Tenacity (g/tex) T(ICC)	Tenacity (g/tex) T(HVI)	T(HVI) = 1.0395 x T(ICC) + 4.967	**T (HVI) is 1.25 times of T (ICC)**
Note: Other fibre properties like micronaire, elongation and short fibre index remain the same in both the modes of HVI testing			

The Quality Norms in HVI mode of testing

Over the past 55 years, USTER® STATISTICS has earned legendary status throughout textiles – and its value is more significant than ever in the globalized trading environment today and in the future. Therefore, it is pertinent to take into the account the Uster statistics while formulating the norms for the AICRP- on cotton system. In order to get the realistic scenario, the statistical analysis was carried out on samples of cotton fibre received during the season 2015-16 from all over the country under AICRP-on cotton. These samples were tested on HVI mode on different makes of HVI systems following relevant standard procedures. As per prevailing system the UHML was categorized into 9 groups. The UHML below 24 mm was not considered since fibres with this attribute mostly utilized either by Open end spinning Industry or other purposes such as absorbent cottons. The Uster statistics 2013 values for different parameters were taken as base, since these data are based on the cottons from different part of world. An attempt was made to find out the position of samples received under AICRP-on cotton with respect to world average. Uster statistics gives the value of the fibre attributes for 5 %, 25 %, 50 %, 75 % and 95 % percentiles. These percentiles may be labeled as Excellent, Good, Average, Fair and poor respectively. The case may be reversed in case of micronaire values. The percentages of samples under these labels were determined by calculating the frequencies of samples in these categories. After statistical analysis of the fibre attributes data norms are proposed for HVI mode of testing. The analysis of data will be carried out for the current season and norms will be finalized.

Highest Spinnability Count Index

The commercial value of a cotton variety is related to its spinning performance, which, in turn, is dependent on the yarn count that can be spun from the given cotton and the yarn quality obtained for that count. The quality of any yarn spun from cotton depends on its fibre quality, particularly length, strength, fineness, uniformity ratio, short fibre content and breaking elongation. The prediction of yarn quality and spinnability of a particular cotton is necessary for a better product design. Presently, the test for yarn quality is done by processing a small quantity of a cotton sample to a particular count and ascertaining the quality of yarn so produced. As Initial Evaluation Trials are having very small sample size, it is not possible to spin the cotton by mechanical processing to decide its spinning potential.

An integrated index called highest standard cotton (HSC) was developed by ICAR-CIRCOT long back and it was mainly for used comparing cottons after actual spinning of cottons into 2 to 3 counts. HSC is the finest count of yarn that can be spun economically with a standard optimum twist and has a certain standard lea CSP. The counts that are spun higher than HSC will have less CSP and counts that are spun lower than HSC will have more CSP than the standard. Thus, the HSC of cotton is a single integrated index, which provides an easy way for comparing the quality of cottons. Measurement of HSC involves the spinning of under-spun and over-spun counts using a full spinning test and calculating HSC from their CSP values. This is a time consuming as well as labour and machine intensive process apart from requiring minimum sample size of 6.0 kg. To overcome these problems, ICAR-CIRCOT has developed regression equations. HSC being an integrated index reflecting the spinnability of cotton is more suitable index to compare cottons than FQI.

Abbreviations

Abbreviation	Description
Mic	Micronaire (micrograms/inch)
Str	Bundle tenacity in grams/tex
E%	Bundle elongation in %
HSC	Highest Standard Count Index
Mean HSC	Mean of HSC of different locations of particular entry
Count1	Under spun count in English count (Ne)
CSP1	Corrected count strength product of under spun count
Count2	Over spun count in English count (Ne)
CSP2	Corrected count strength product of over spun count
UHML	Upper Half Mean length in mm (HVI mode)
Tenacity	Bundle tenacity in grams/tex (HVI mode)
UI	Uniformity Index (HVI mode)

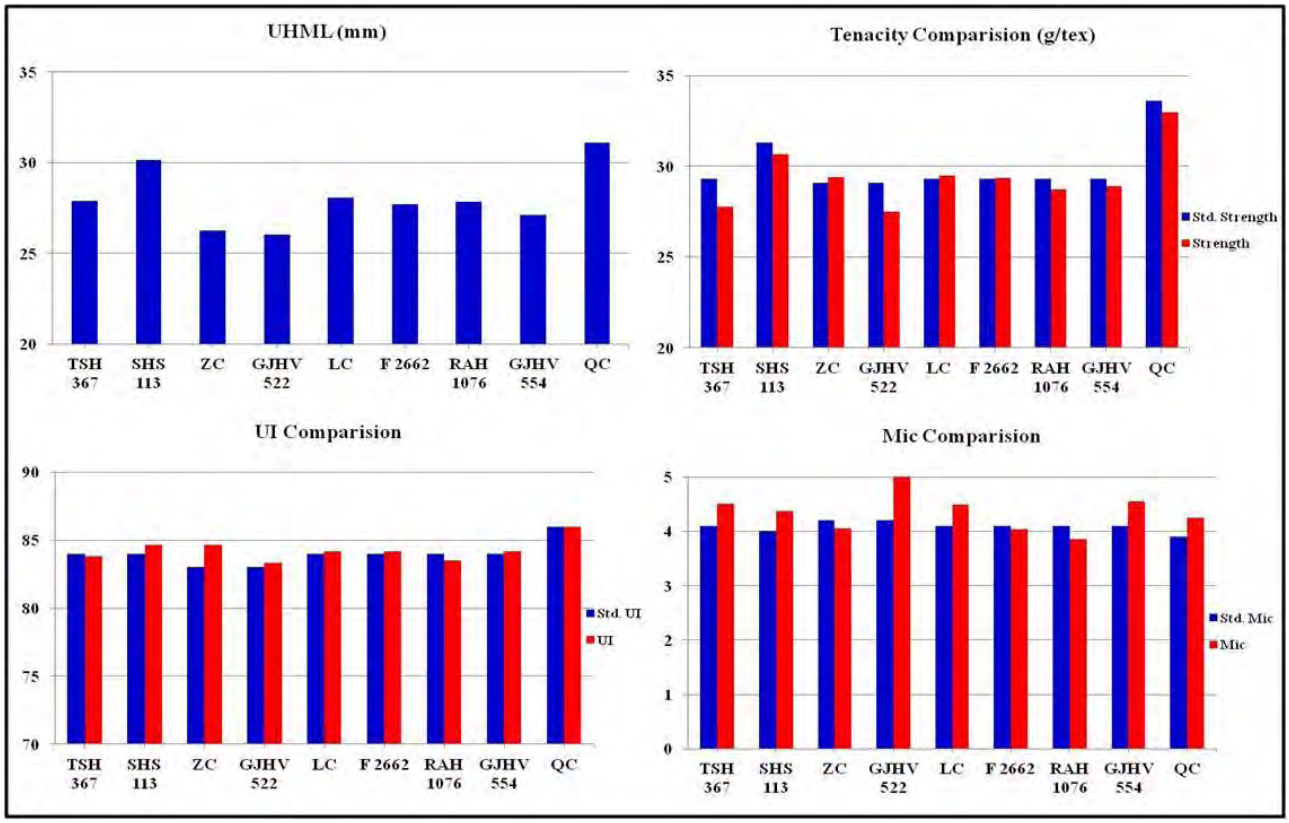
Research highlights

Central Zone Trials

Br-03a trial

Observations

- Samples were having UHML from 26 mm to 31 mm.
- The UI of the samples under the trial were either better or at par with the minimum requirement.
- The micronaire values were equal to the required minimum.
- Tenacity was at par or marginally lower than the minimum required.



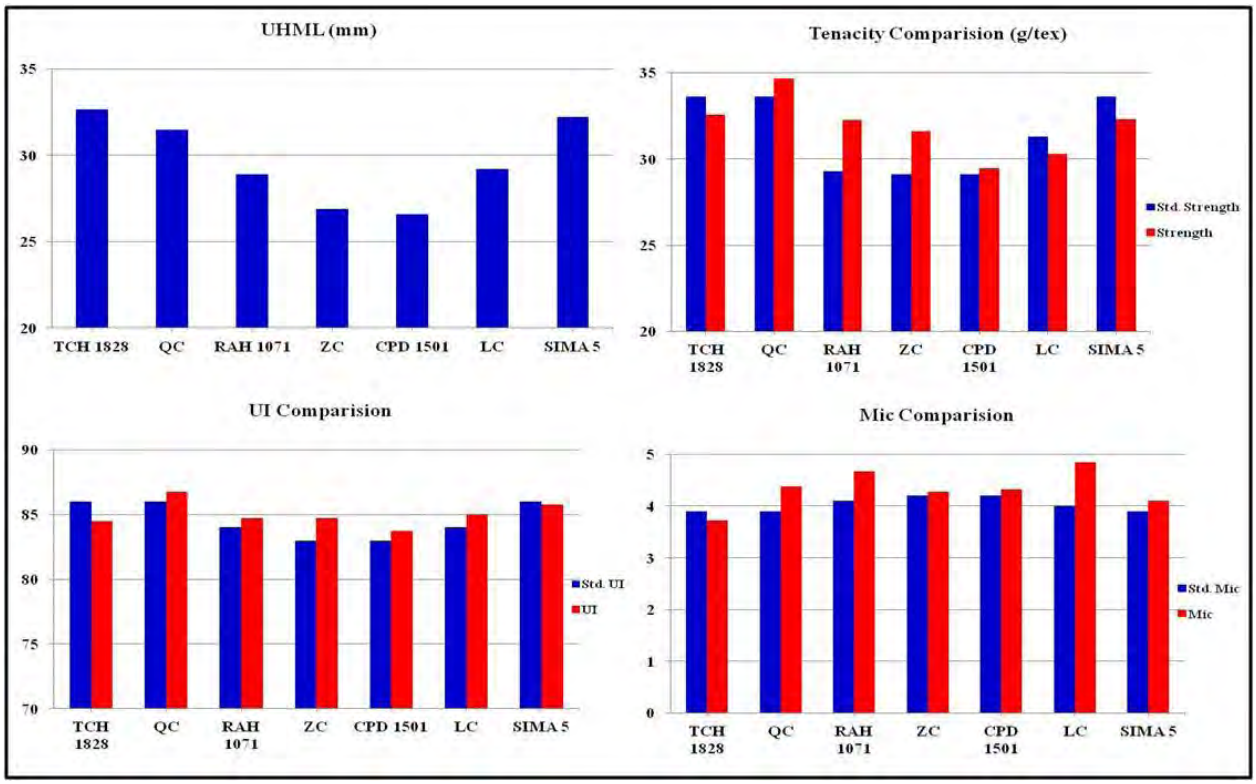
Recommendations

- Not recommended.

Br-04a trial

Observations

- The samples were having UHML from 25 mm to 33 mm.
- The UI of the samples under the trial were better than compared to minimum requirement
- Micronaire values were marginally higher than optimum requirement and higher in the UHML range of 25-26 mm.
- Tenacity values were marginally higher than the minimum required, barring the UHML range 29 -31 mm.



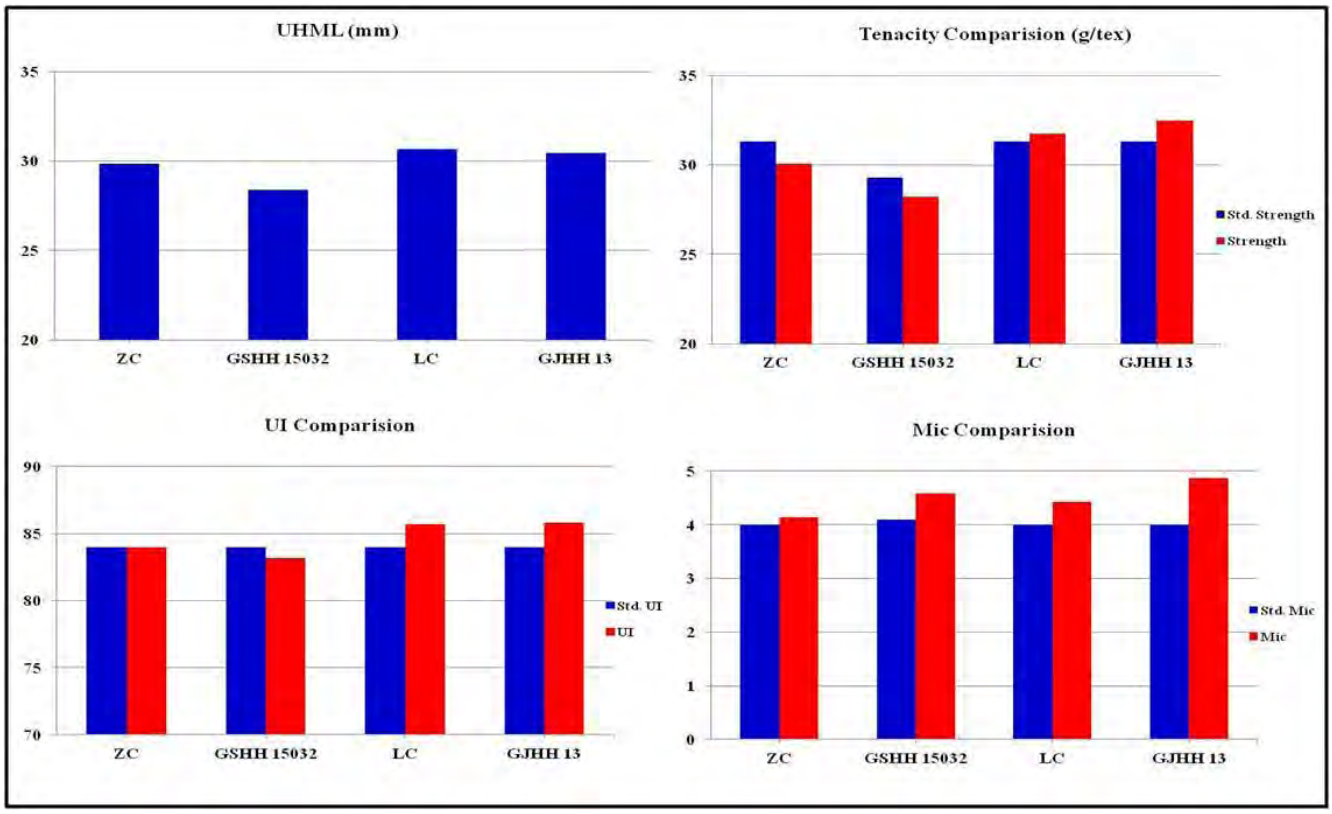
Recommendations

- Entry TCH 1828 (32.7 mm UHML, Tenacity 32.6 g/tex, Mic 3.7, Uniformity Index 85) SIMA 5 (32.2 mm UHML, Tenacity 32.3 g/tex, Mic 4.1, Uniformity Index 86) have performed well.

Br-05a trial

Observations

- In this trial, majority of the samples were having UHML from 26 mm to 30 mm.
- Micronaire values marginally higher in the samples.
- Tenacity values were at par with the minimum requirement as shown below with the help of charts.



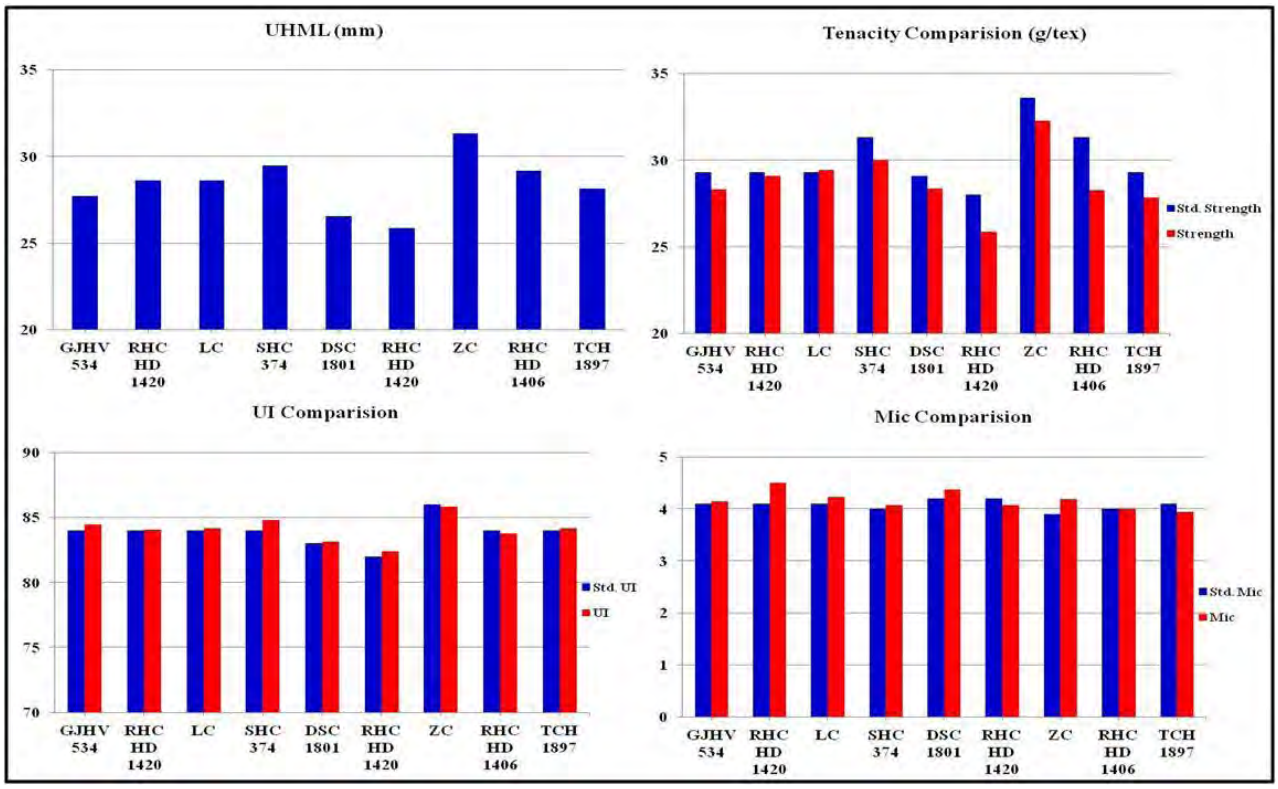
Recommendations

- Entry GJHH 13 (30.5 mm UHML, Tenacity 32.5 g/tex, Mic 4.9, Uniformity Index 86) has performed well.

Br-06a trial

Observations

- Majority of the samples were having UHML range from 26 mm to 31 mm.
- UI of the samples across the UHML ranges were either better or at par compared to minimum requirement.
- Micronaire values were higher than the maximum value required.
- Tenacity values were lower than the minimum requirement in most of the samples as shown below with the help of charts.



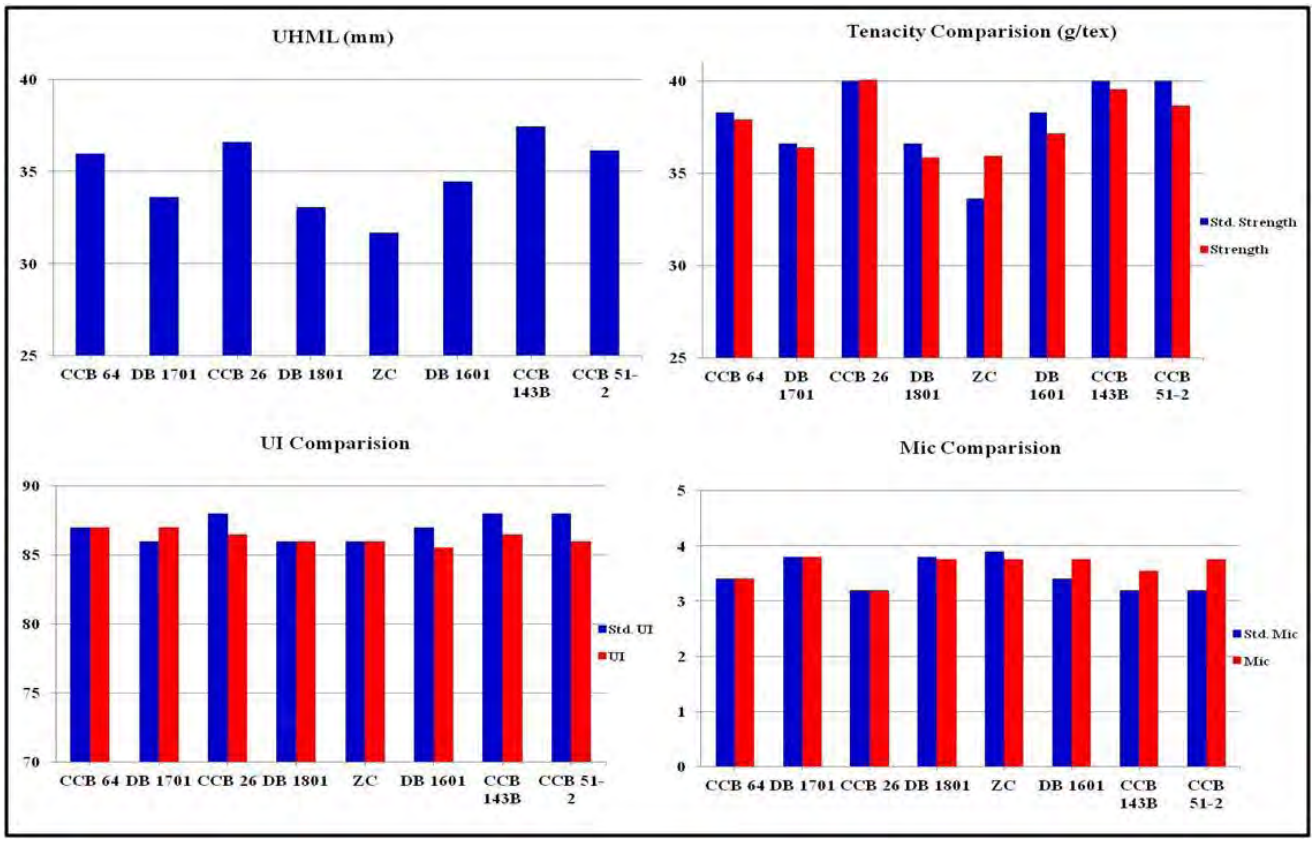
Recommendations

Not recommended.

Br-13a PVT G. barbadense trial

Observations

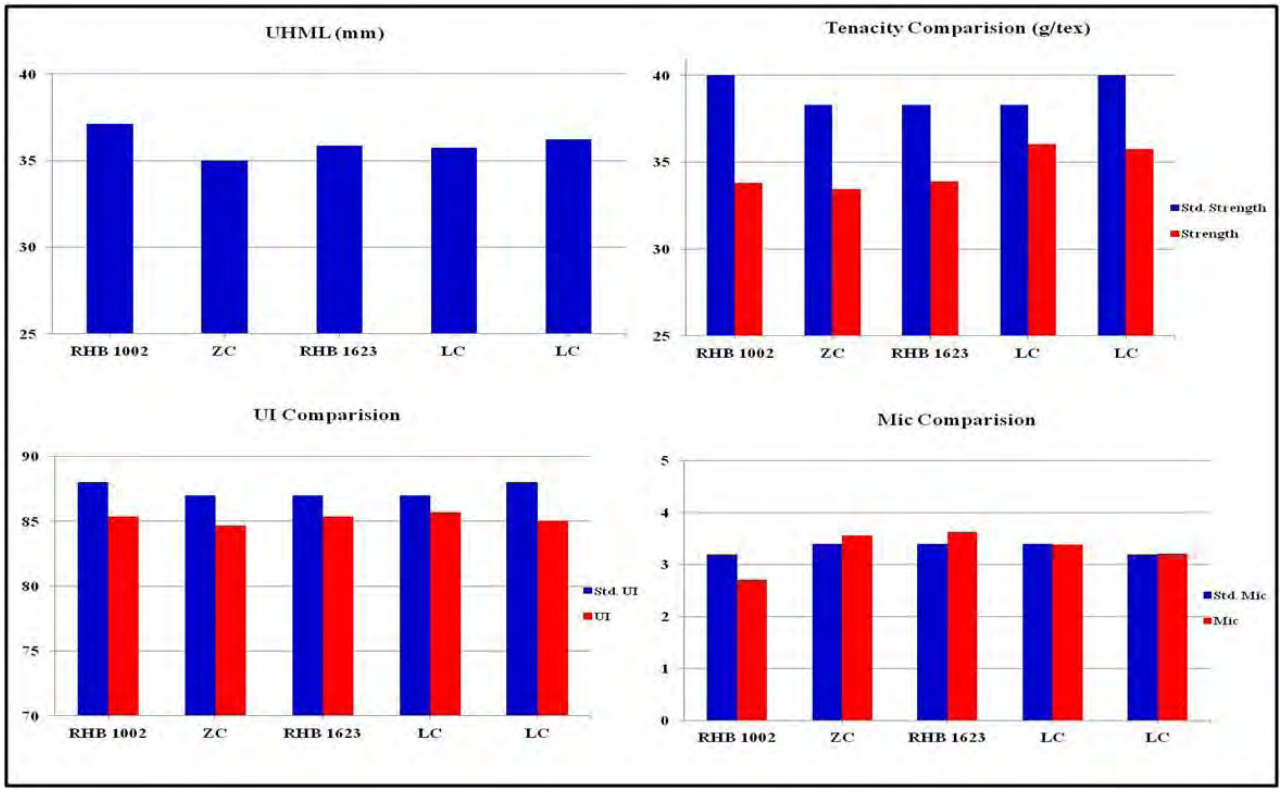
- Majority of the samples were having UHML range from 30 mm to 37 mm.
- UI of the samples across the UHML ranges were either better or at par compared to minimum requirement.
- Micronaire values were equal to the maximum value required.
- Tenacity values were lower than the minimum requirement in most of the samples



Recommendations

- Entry CCB 143 B (37.5 mm UHML, Tenacity 39.6 g/tex, Mic 3.6, Uniformity Index 87) has performed well.

Br-15a trial



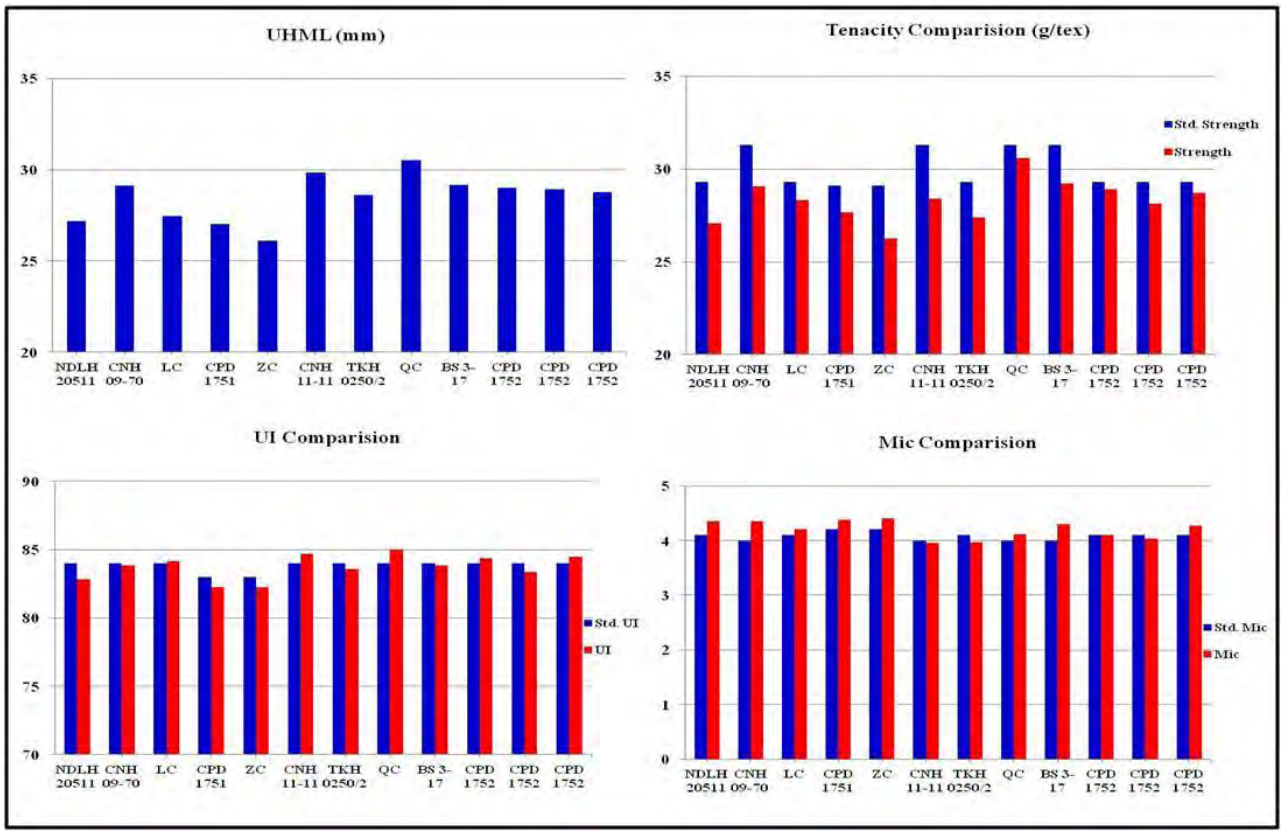
Recommendations

- Entry RHB 1002 (35.8 mm UHML, Tenacity 33.9 g/tex, Mic 3.6, Uniformity Index 85) has performed well.

Br-03b trial

Observations

- Majority of the samples were in UHML range of 27 mm to 33mm.
- UI of the samples across the UHML ranges was at par compared to minimum requirement.
- Tenacity values were at marginally lower than requirement for all UHML ranges.
- Micronaire values were at marginally higher than requirement for all UHML ranges.



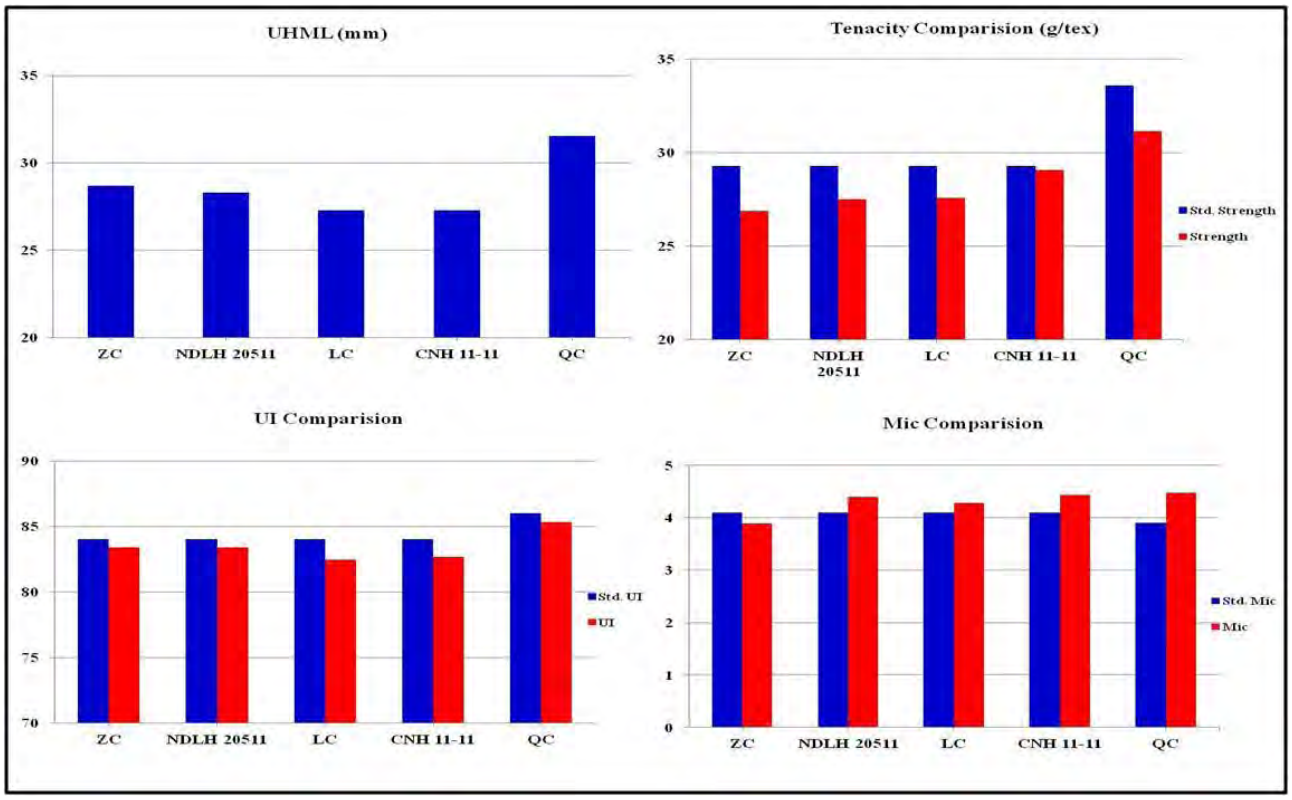
Recommendations

- Not recommended.

Br-04b trial

Observations

- Majority of the samples were in UHML range of 26 mm to 31 mm.
- Tenacity values were observed to be lower compared to minimum requirement for samples with UHML range of 26-33 mm.
- UI of the samples across the UHML ranges at par compared to minimum requirement.
- Micronaire values were lower than the maximum required value in UHML groups 26.1-27.0 and 29.1 -31.0.



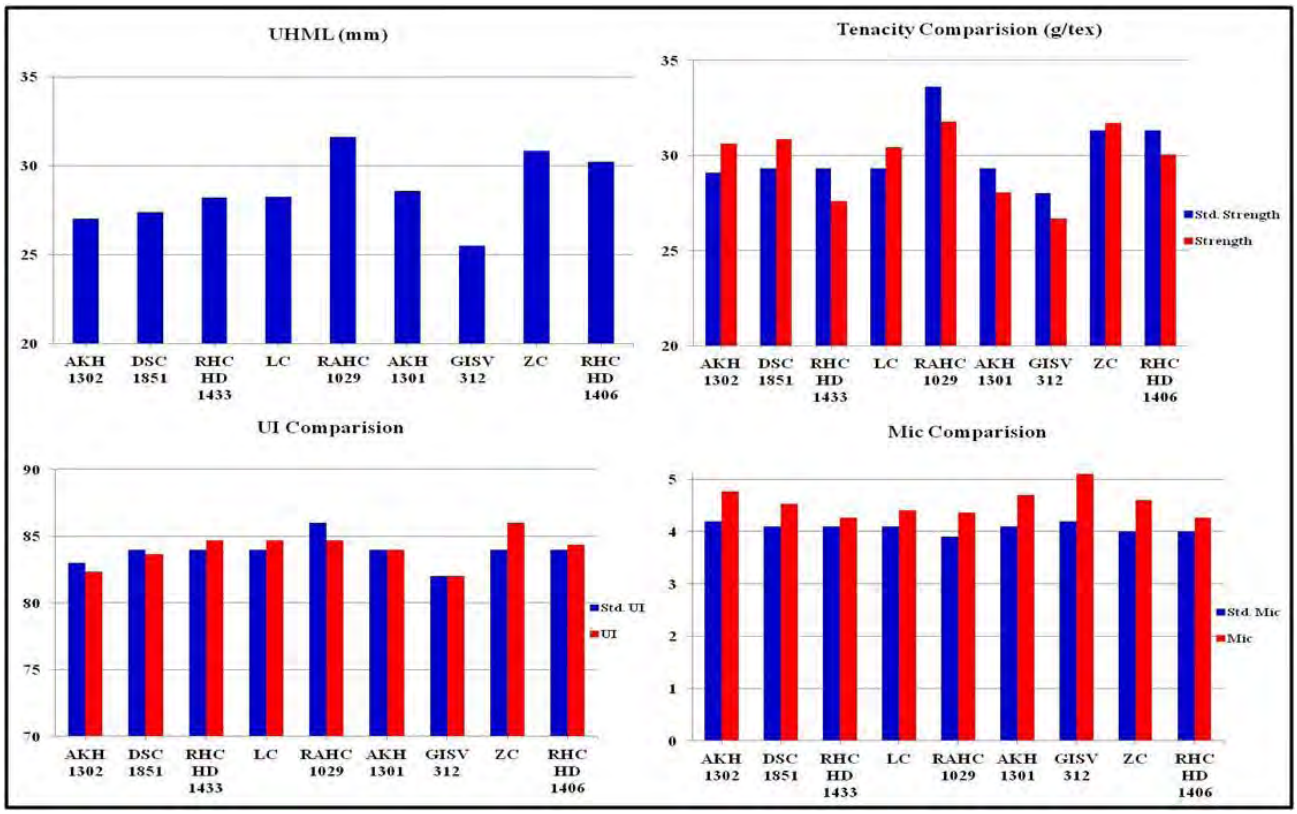
Recommendations

- Not recommended.

Br-06b trial

Observations

- Majority of the samples were in UHML range of 27 mm to 31 mm.
- The UI and micronaire of the samples across the UHML ranges at par compared to minimum requirement.



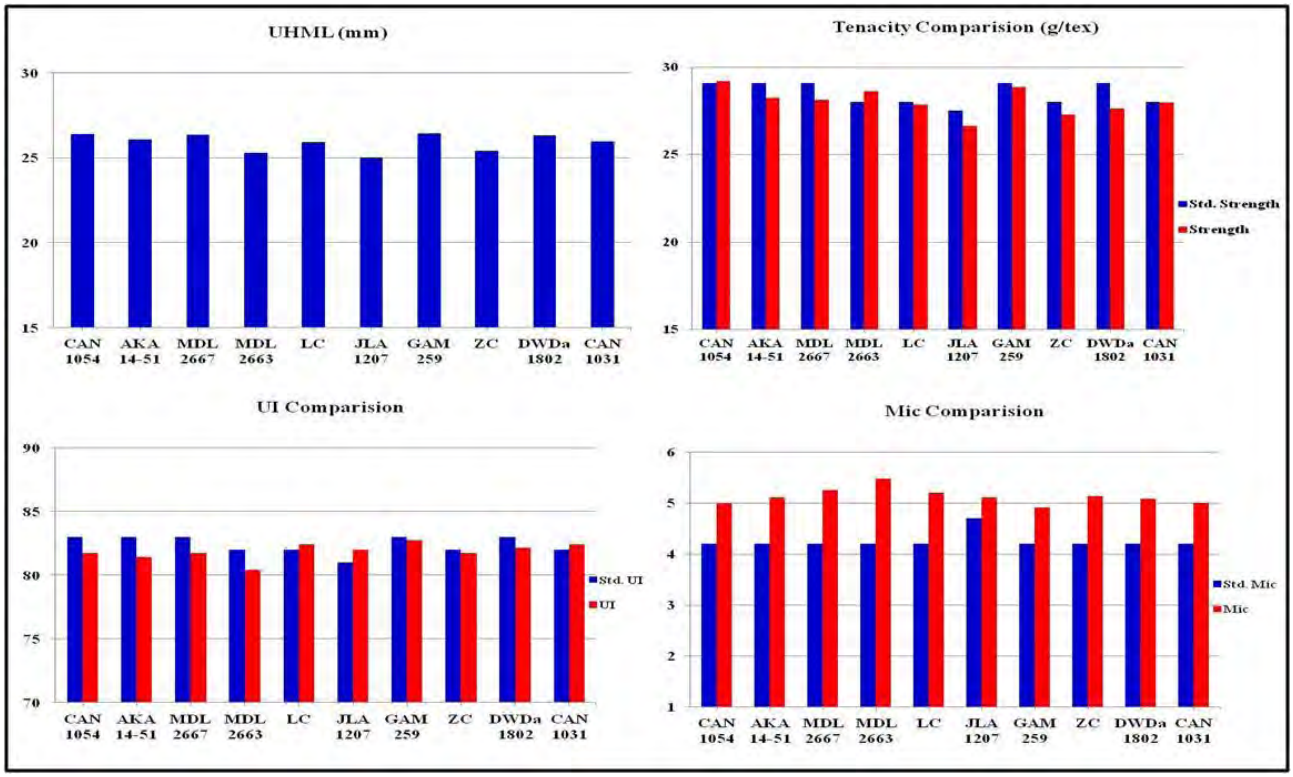
Recommendations

- Entry RAHC 1029 (31.6 mm UHML, Tenacity 31.8 g/tex, Mic 4.4, Uniformity Index 85) has performed well.

Br-24b trial

Observations

- Majority of the samples were in UHML range of 24 mm to 28 mm.
- UI and tenacity of the samples across the UHML ranges at par compared to minimum requirement.
- Micronaire values of the samples were marginally higher than the required values.



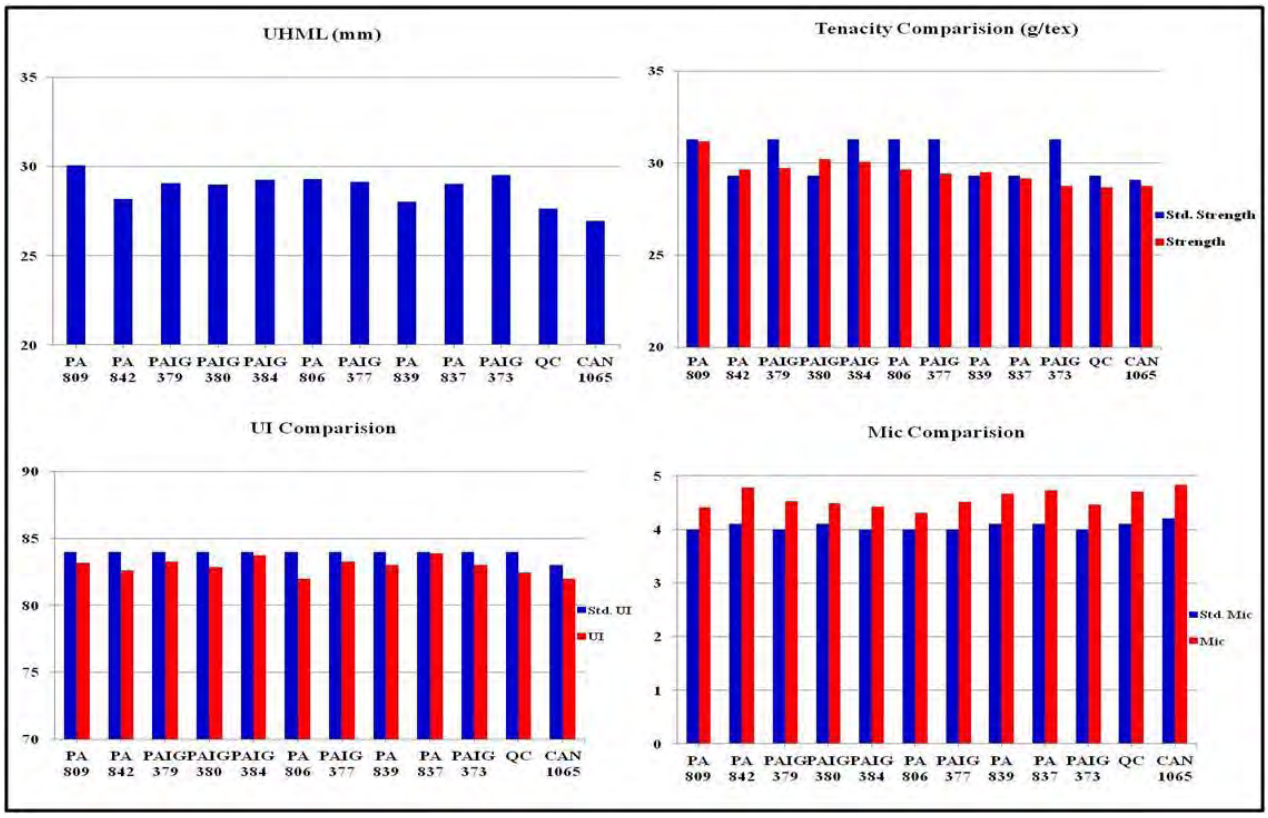
Recommendations

- Entry GAM 259 (26.4 mm UHML, Tenacity 28.9 g/tex, Mic 4.9, Uniformity Index 83) has performed well.

Br-24LL trial

Observations

- Majority of the samples were in UHML range of 27 mm to 29 mm.
- The UI, micronaire and tenacity of the samples across the UHML ranges at par compared to minimum requirement.



Recommendations

- Entry PA 809 (30.1 mm UHML, Tenacity 31.2 g/tex, Mic 4.4, Uniformity Index 83) has performed well.

Br-25b trial

Observations

- The UI was at par with the minimum requirement for most of the samples.
- The tenacity values were marginally lower the minimum required.
- The micronaire values were little higher than the maximum required for most of the samples

Recommendations

- Entry AJHC 102 (25.2 mm UHML, Tenacity 28.5 g/tex, Mic 6.0, Uniformity Index 83) has performed well.

Fibre Quality Data

Br.02a – IET – G.hirsutum (Irrigated)

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	201	CPD 1902	Central	Banswara	26.3	81	3.9	25.8	6.0
2				Bhawanipatna	29.1	85	5.3	28.7	5.9
3				Junagadh	29.0	82	5.0	30.5	6.2
4				Khandwa	27.3	79	3.2	27.4	5.6
5				Surat	28.6	83	4.9	26.2	5.9
6				Rahuri	25.9	80	4.5	28.3	6.1
7				Talod	29.1	83	5.0	27.0	6.9
8			South	Coimbatore	27.7	85	5.1	30.6	6.0
9				Dharwad	29.4	83	4.9	27.2	6.7
10				Guntur	30.9	86	4.8	30.4	5.9
11				Raichur	29.5	83	5.0	27.7	6.2
12				Srivilliputhur	27.0	82	5.0	28.1	6.4
13				**Average**	**28.3**	**83**	**4.7**	**28.2**	**6.1**
14	202	GISV 319	Central	Banswara	28.2	82	3.8	29.4	6.5
15				Bhawanipatna	27.9	86	5	27.6	5.9
16				Junagadh	26.1	81	5.2	28.5	6.4
17				Khandwa	24.3	81	3.1	23.8	5.4
18				Surat	28.0	83	4.6	30.2	5.9
19				Rahuri	26.7	81	4.0	25.4	6.4
20				Talod	26.9	82	5.0	26.5	6.9
21			South	Coimbatore	27.8	85	4.9	26.7	5.8
22				Dharwad	27.9	83	4.4	28.8	6.0
23				Guntur	26.9	84	4.7	28.2	5.7
24				Raichur	29.6	83	4.8	28.3	6.9
25				Srivilliputhur	28.1	83	4.2	31.8	5.7
26				**Average**	**27.4**	**83**	**4.5**	**27.9**	**6.1**
27	203	RAH 1047	Central	Banswara	28.7	82	3.7	27.6	6.1
28				Bhawanipatna	33.5	86	4.4	29.2	6.1
29				Junagadh	28.5	82	4.9	33.0	6.6
30				Khandwa	26.5	80	3	29	5.7
31				Surat	31.1	84	4.4	30.8	6.0
32				Rahuri	31.2	84	3.8	28.5	6.2
33				Talod	30.6	84	4.8	27.8	6.8
34			South	Coimbatore	29.2	84	4.0	30.7	6
35				Dharwad	31.5	84	4.4	30.5	5.9

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
36				Guntur	30.6	86	4.7	29.9	5.9
37				Raichur	32.7	84	4.4	30.4	6.9
38				Srivilliputhur	30.7	84	4.4	34.1	5.8
39				**Average**	**30.4**	**84**	**4.2**	**30.1**	**6.2**
40	204	CCH 19-2	Central	Banswara	30.2	83	3.5	29.7	6.3
41				Bhawanipatna	32.7	88	4.5	27.7	6.0
42				Junagadh	30.4	83	4.4	34.1	6.2
43				Khandwa	26.8	82	2.6	24.7	5.6
44				Surat	31.1	84	4.5	31.8	6.8
45				Rahuri	34.1	84	3.9	33.0	6.5
46				Talod	28.9	83	4.6	29.8	6.9
47			South	Coimbatore	31.8	88	4.4	27.7	6.1
48				Dharwad	32.5	84	4.0	30.2	6.4
49				Guntur	30.3	85	4.1	30.9	5.9
50				Raichur	34.0	84	4.0	30.1	6.4
51				Srivilliputhur	33.6	84	3.7	32.8	5.6
52				**Average**	**31.4**	**84**	**4.0**	**30.2**	**6.2**
53	205	BS 8-19	Central	Banswara	29.5	83	3.4	27.2	6.0
54				Bhawanipatna	33.5	85	3.4	30.1	6.0
55				Junagadh	27.6	82	4.6	33.2	6.3
56				Khandwa	28.1	83	2.9	26.7	5.8
57				Surat	31.9	84	4.3	29.7	6.1
58				Rahuri	29.6	83	3.6	27.9	5.9
59				Talod	25.7	81	5.1	25.7	6.0
60			South	Coimbatore	32.1	85	4.6	29.3	6.1
61				Dharwad	31.8	84	4.2	29.6	6.2
62				Guntur	31.1	84	4.0	30.3	5.9
63				Raichur	32.0	84	4.6	28.1	6.8
64				Srivilliputhur	29.1	83	4.6	30.2	6.2
65				**Average**	**30.2**	**83**	**4.1**	**29.0**	**6.1**
66	206	CPD 1901	Central	Banswara	26.6	81	4.0	28.0	6.1
67				Bhawanipatna	26.1	85	4.8	27.5	6.1
68				Junagadh	25.1	80	4.6	29.6	6.5
69				Khandwa	24.2	82	2.9	25.2	5.5
70				Surat	26.1	82	4.8	27.4	6.9
71				Rahuri	25.8	80	3.7	26.2	6.1
72				Talod	30.4	84	4.6	30.2	6.1
73			South	Coimbatore	26.5	86	4.8	28.9	5.8
74				Dharwad	26.7	82	4.8	27.7	6.9
75				Guntur	27.0	82	4.8	28.5	5.9
76				Raichur	27.3	82	4.7	29.9	6.2

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
77				Srivilliputhur	26.5	82	4.6	29.0	6.0
78				**Average**	**26.5**	**82**	**4.4**	**28.2**	**6.2**
79	207	GJHV 557	Central	Banswara	28.5	82	3.8	30.4	6.3
80				Bhawanipatna	28.4	86	4.5	31.7	6.2
81				Junagadh	25.9	80	5.0	27.8	6.4
82				Khandwa	23.9	80	2.9	25.0	5.7
83				Surat	27.6	82	4.8	26.3	6.9
84				Rahuri	28.0	82	4.5	31.1	6.4
85				Talod	28.2	83	4.5	30.8	6.3
86			South	Coimbatore	28.5	86	5.1	28.3	6.1
87				Dharwad	28.0	83	4.6	29.7	6.1
88				Guntur	28.5	83	4.8	29.9	5.9
89				Raichur	29.9	83	4.6	30.4	6.2
90				Srivilliputhur	27.2	82	4.8	28.5	6.8
91				**Average**	**27.7**	**83**	**4.5**	**29.1**	**6.3**
92	208	ZC	Central	Banswara	29.1	83	3.4	30.3	6.2
93				Bhawanipatna	28.3	87	4.1	28	5.9
94				Junagadh	27.3	81	4.6	34.3	6.5
95				Khandwa	23.8	80	2.9	25.2	5.6
96				Surat	27.1	82	4.4	29.9	6.2
97				Rahuri	27.2	81	4.1	29.4	6.1
98				Talod	27.4	82	4.4	28.6	5.6
99			South	Coimbatore	25.9	85	5.2	27.8	5.8
100				Dharwad	28.4	83	4.8	27.5	6.0
101				Guntur	26.2	83	5.1	28	5.8
102				Raichur	29.2	83	4.9	26.6	6.9
103				Srivilliputhur	27.8	82	4.6	30.1	6.2
104				**Average**	**27.3**	**83**	**4.4**	**28.8**	**6.1**
105	209	TSH 363	Central	Banswara	28.6	82	3.5	28.6	5.9
106				Bhawanipatna	32.1	85	4.0	27.4	6.0
107				Junagadh	29.5	83	4.7	34.5	6.3
108				Khandwa	26.2	82	2.6	24.3	5.4
109				Surat	30.4	84	4.6	29.8	6.3
110				Rahuri	31.0	84	4.0	32.5	6.4
111				Talod	30.1	84	4.3	30.0	6.2
112			South	Coimbatore	28.5	84	4.7	27.4	6
113				Dharwad	30.7	84	4.1	30.8	6.2
114				Guntur	29.7	83	4.0	29.1	5.8
115				Raichur	31.4	84	4.4	30.3	6.8
116				Srivilliputhur	30.5	84	4.4	32.1	6.4
117				**Average**	**29.9**	**83**	**4.1**	**29.7**	**6.1**

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
118	210	RB 614	Central	Banswara	28.6	82	3.9	28.4	6.1
119				Bhawanipatna	31.1	85	4.9	27.4	5.9
120				Junagadh	27.2	81	5.1	30.4	6.3
121				Khandwa	24	82	3.2	24.9	5.6
122				Surat	28.5	83	4.9	27.1	6.1
123				Rahuri	29.9	83	4.7	30.1	6.7
124				Talod	28.1	83	5.0	25.8	6.5
125			South	Coimbatore	27.5	83	4.8	28.9	5.9
126				Dharwad	29.6	83	4.7	30.4	6.3
127				Guntur	27.8	83	4.9	29.2	5.8
128				Raichur	29.3	83	4.9	26.9	6.9
129				Srivilliputhur	28.9	83	4.8	28.2	6.9
130				**Average**	**28.4**	**83**	**4.7**	**28.1**	**6.3**
131	211	GTHV 15/34	Central	Banswara	29.9	83	4.5	31.7	6.3
132				Bhawanipatna	28.2	84	4.1	28.9	5.7
133				Junagadh	26.0	81	4.6	31.4	6.5
134				Khandwa	26.3	81	3.0	28.6	5.6
135				Surat	29.0	83	5.2	27.9	6.5
136				Rahuri	28.0	82	4.0	29.3	6.2
137				Talod	26.9	82	5.0	24.5	6.6
138			South	Coimbatore	30.2	86	4.9	27.9	5.9
139				Dharwad	29.3	83	4.4	29.1	6.8
140				Guntur	27.8	84	4.1	27.2	5.7
141				Raichur	30.9	84	4.3	30.1	6.8
142				Srivilliputhur	29.6	83	4.4	30.3	6.8
143				**Average**	**28.5**	**83**	**4.4**	**28.9**	**6.3**
144	212	RHC 1419	Central	Banswara	26.9	81	4.1	29.2	6.2
145				Bhawanipatna	26.0	83	4.1	28.1	5.9
146				Junagadh	25.6	80	4.5	30.6	6.5
147				Khandwa	24.3	80	3.0	24.6	5.5
148				Surat	26.8	82	4.6	28.3	6.0
149				Rahuri	26.5	81	4.0	26.8	6.4
150				Talod	25.4	81	4.4	27.6	6.0
151			South	Coimbatore	26.3	84	4.5	27.9	5.7
152				Dharwad	26.9	82	4.4	28.2	6.9
153				Guntur	25.2	85	4.8	27.1	5.7
154				Raichur	28.0	83	4.6	30.2	6.9
155				Srivilliputhur	26.5	82	4.3	30.2	6.6
156				**Average**	**26.2**	**82.0**	**4.3**	**28.2**	**6.2**
157	213	GISV 323	Central	Banswara	26.4	81	3.9	26.1	6.1
158				Bhawanipatna	28.3	85	4.1	30.5	5.9

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
159				Junagadh	27.7	82	5.0	30.0	6.4
160				Khandwa	25.1	83	2.8	26.7	5.6
161				Surat	29.5	83	4.7	30.3	6.1
162				Rahuri	28.3	82	4.3	29.5	6.3
163				Talod	29.9	83	4.5	29.1	6.8
164				Coimbatore	29.0	85	4.5	29.8	6
165				Dharwad	28.3	83	4.4	28.4	6.8
166			South	Guntur	28.3	83	4.5	29.5	5.8
167				Raichur	28.5	83	4.7	28.0	6.6
168				Srivilliputhur	27.3	82	3.9	30.5	6.4
169				**Average**	**28.0**	**82.9**	**4.3**	**29.0**	**6.2**
170				Banswara	27.5	81	4.4	29.0	6.3
171				Bhawanipatna	25.6	83	5.3	27.5	6.0
172				Junagadh	24.0	79	5.1	27.6	6.3
173			Central	Khandwa	23.1	78	3.4	24.1	5.7
174				Surat	27.2	82	5.4	25.8	6.9
175	214	ARBH 1901		Rahuri	26.2	81	4.0	26.5	6.6
176				Talod	24.4	81	4.9	25.2	5.9
177				Coimbatore	25.9	85	5.7	27.3	5.9
178				Dharwad	25.1	81	5.2	24.9	6.8
179			South	Guntur	26.3	82	5.6	27.7	5.8
180				Raichur	27.1	82	5.4	26.0	6.1
181				Srivilliputhur	25.4	81	4.5	28.3	6.1
182				**Average**	**25.6**	**81**	**4.9**	**26.6**	**6.2**
183				Banswara	28.4	82	4.1	28.8	5.9
184				Bhawanipatna	31.9	88	4.8	30.6	6.1
185				Junagadh	31.1	84	4.9	32.1	6.3
186			Central	Khandwa	28.4	83	3	28.8	5.8
187				Surat	32.2	84	4.4	30.9	6.1
188	215	QC		Rahuri	32.2	84	4.4	28.8	6.5
189				Talod	30.5	84	4.8	30.0	6.2
190				Coimbatore	31	87	4.9	30.4	6.1
191				Dharwad	33.1	84	4.6	30.8	6.4
192			South	Guntur	30.9	86	4.8	30.4	5.9
193				Raichur	32.3	84	5.1	28.5	6.2
194				Srivilliputhur	31.8	84	4.3	31.6	6.4
195				**Average**	**31.1**	**85**	**4.5**	**30.2**	**6.2**
196				Banswara	28.5	82	4.2	31.0	6.4
197	216	RAH 1046	Central	Bhawanipatna	30.8	86	4.7	27.8	5.9
198				Junagadh	26.5	81	5.0	28.1	6.2
199				Khandwa	25.8	81	2.9	27.2	5.6

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
200				Surat	28.1	83	5.0	26.5	6.8
201				Rahuri	31.5	84	4.6	29.1	6.3
202				Talod	28.4	83	5.2	27.5	6.3
203				Coimbatore	29.3	85	5.3	29.5	6
204				Dharwad	28.3	83	4.8	26.7	6.9
205			South	Guntur	28.6	85	5.2	29.5	6
206				Raichur	29.5	83	5.0	27.1	6.9
207				Srivilliputhur	29.3	83	4.4	31.7	6.6
208				**Average**	**28.7**	**83**	**4.7**	**28.5**	**6.3**
209				Banswara	28.8	82	4.3	30.1	6.2
210				Bhawanipatna	27.6	86	3.7	26.8	5.7
211				Junagadh	27.0	81	4.6	30.3	6.5
212			Central	Khandwa	25.1	80	2.7	24.9	5.5
213				Surat	28.6	83	4.3	29.5	6.1
214	217	BGDS 1047		Rahuri	26.0	81	3.7	24.8	5.9
215				Talod	29.3	83	4.6	29.4	5.2
216				Coimbatore	27.7	82	4.4	25.8	5.8
217				Dharwad	27.3	82	4.3	27.6	6.6
218			South	Guntur	27.2	84	3.8	29.5	5.8
219				Raichur	29.5	83	4.4	28.5	6.8
220				Srivilliputhur	27.6	82	4.2	29.4	6.1
221				**Average**	**27.6**	**82**	**4.1**	**28.1**	**6.0**
222				Banswara	29.8	83	3.4	30.0	6.1
223				Bhawanipatna	28.5	82	4.4	29.5	6
224				Junagadh	28.5	82	4.9	29.6	6.1
225			Central	Khandwa	24.3	78	3.1	25.8	5.7
226				Surat	27.8	82	5.0	26.9	6.3
227				Rahuri	27.5	82	4.4	29.4	6.3
228	218	RB 615		Talod	25.8	81	5.5	25.5	6.5
229				Coimbatore	27.4	84	5.2	27.2	5.9
230				Dharwad	28.5	83	4.9	27.7	6.0
231			South	Guntur	27.1	82	4.8	28.7	5.8
232				Raichur	28.6	83	4.9	28.1	6.2
233				Srivilliputhur	27.0	82	4.4	28.8	6.2
234				**Average**	**27.5**	**82**	**4.6**	**28.1**	**6.1**
235				Banswara	32.6	84	3.9	28.5	6.1
236				Bhawanipatna	31.6	86	5.2	28.4	6.2
237				Junagadh	27.5	82	5.3	28.9	6.3
238	219	L 1527	Central	Khandwa	27.2	81	2.8	28.8	5.8
239				Surat	30.9	84	5.0	29.0	6.2
240				Rahuri	28.6	82	4.1	31.0	6.3

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
241				Talod	26.5	82	4.9	25.1	6.7
242			South	Coimbatore	30.9	86	4.9	29.6	6.2
243				Dharwad	31.0	84	4.5	29.8	6.9
244				Guntur	30.0	84	4.9	31.9	6.1
245				Raichur	30.4	84	4.9	28.6	6.9
246				Srivilliputhur	27.8	82	4.2	30.3	6.1
247				**Average**	**29.6**	**83**	**4.6**	**29.2**	**6.3**
248	220	BS 7-19	Central	Banswara	31.3	84	3.7	30.1	6.1
249				Bhawanipatna	32.1	87	3.8	30.5	6.0
250				Junagadh	29.6	83	4.9	31.2	6.2
251				Khandwa	25.3	81	2.7	26.7	5.7
252				Surat	31.8	84	4.2	30.9	6.3
253				Rahuri	29.9	83	3.2	30.3	6.4
254				Talod	27.6	82	4.9	26.5	6.0
255			South	Coimbatore	31.1	87	4.3	31.3	6.2
256				Dharwad	31.5	84	4.2	30.9	6.9
257				Guntur	33.2	86	3.9	31.6	6.0
258				Raichur	32.0	84	4.3	30.3	6.1
259				Srivilliputhur	31.9	84	3.9	30.6	6.1
260				**Average**	**30.6**	**84**	**4.0**	**30.1**	**6.2**
261	221	SHS 234	Central	Banswara	28.1	82	4.0	32.2	6.1
262				Bhawanipatna	32.9	86	4.2	29.0	6.0
263				Junagadh	31.4	84	4.2	31.6	6.1
264				Khandwa	27.7	78	2.3	25.4	5.4
265				Surat	34.5	84	4.3	29.1	6.9
266				Rahuri	32.4	84	3.7	29.4	6.3
267				Talod	26.6	82	5.1	26.5	6.9
268			South	Coimbatore	34.1	86	4	28.6	6
269				Dharwad	31.7	84	4.0	29.0	6.9
270				Guntur	30.6	83	4.6	29.5	5.9
271				Raichur	33.3	84	4.0	28.3	6.9
272				Srivilliputhur	31.1	84	4.0	30.9	6.0
273				**Average**	**31.2**	**83**	**4.0**	**29.1**	**6.3**
274	222	CCH 19-1	Central	Banswara	27.0	81	4.4	29.6	6.1
275				Bhawanipatna	32.8	86	4.3	30.9	6.1
276				Junagadh	30.2	83	4.5	34.0	6.1
277				Khandwa	26.6	81	2.8	26.4	5.4
278				Surat	32.5	84	4.0	29.2	6.9
279				Rahuri	30.5	83	3.8	31.5	6.9
280				Talod	28.6	83	5.2	26.2	6.7
281			South	Coimbatore	30.7	87	4.1	31.3	6.1

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
282				Dharwad	32.5	84	4.4	29.9	6.9
283				Guntur	32.5	84	4	31.5	6
284				Raichur	33.4	84	4.5	29.4	6.2
285				Srivilliputhur	31.5	84	3.9	28.7	6.8
286				**Average**	**30.7**	**84**	**4.2**	**29.9**	**6.3**
287	223	LC	Central	Banswara	28.6	82	3.6	27.7	6.0
288				Bhawanipatna	34.9	89	3.5	30.9	6.2
289				Junagadh	32.5	84	4.4	30.6	5.8
290				Khandwa	26.6	81	3.2	28	5.6
291				Surat	30.4	84	5.1	27.9	6.9
292				Rahuri	26.4	81	4.3	29.2	6.7
293				Talod	32.3	84	4.3	30.6	6.9
294			South	Coimbatore	34.7	86	4.6	30.1	6.2
295				Dharwad	27.9	83	4.9	25.7	6.6
296				Guntur	29.2	82	5.2	27.4	5.8
297				Raichur	29.6	83	4.7	29.3	6.1
298				Srivilliputhur	30.1	84	3.5	30.4	6.0
299				**Average**	**30.3**	**83**	**4.3**	**29.0**	**6.2**
300	224	TSH 383	Central	Banswara	28.7	82	3.7	28.0	6.2
301				Bhawanipatna	27.5	87	4.6	27.3	5.9
302				Junagadh	25.3	80	5.3	28.2	6.1
303				Khandwa	24.8	82	3.2	26.4	5.6
304				Surat	26.8	82	5.3	26.5	6.0
305				Rahuri	25.6	80	4.3	28.3	6.3
306				Talod	30.9	84	4.5	29.5	6.9
307			South	Coimbatore	26.6	86	6.0	26.2	5.9
308				Dharwad	27.7	82	4.7	29.1	6.9
309				Guntur	26.7	85	4.8	27.5	5.7
310				Raichur	28.3	83	5.2	28.2	6.3
311				Srivilliputhur	26.0	82	4.8	27.7	6.9
312				**Average**	**27.1**	**83**	**4.7**	**27.7**	**6.2**
313	225	RHC 1409	Central	Banswara	25.7	80	4.7	27.8	5.8
314				Bhawanipatna	29.7	87	5.2	28.8	6.2
315				Junagadh	25.3	80	5.3	29.5	6.3
316				Khandwa	24.3	78	3.1	25.6	5.7
317				Surat	29.2	83	4.8	27.4	5.9
318				Rahuri	27.3	81	4.4	30.2	6.3
319				Talod	30.8	84	4.3	30.5	6.9
320			South	Coimbatore	27.4	84	5.9	25.4	6
321				Dharwad	26.8	82	5.0	26.7	6.9
322				Guntur	27.7	86	5.0	27.4	5.8

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
323				Raichur	27.7	82	5.1	27.5	6.3
324				Srivilliputhur	29.3	83	4.7	30.4	6.2
325				**Average**	**27.6**	**83**	**4.8**	**28.1**	**6.2**
326	226	GJHV 566	Central	Banswara	23.8	79	4.3	26.4	6.0
327				Bhawanipatna	26.8	83	4.2	27.7	5.8
328				Junagadh	22.4	77	5.2	25.5	6.2
329				Khandwa	23.2	78	3.0	24.7	5.4
330				Surat	26.7	82	4.5	29.3	5.9
331				Rahuri	24.4	79	4.7	28.4	6.5
332				Talod	29.5	83	4.9	28.7	6.8
333			South	Coimbatore	27.6	81	5.4	27.4	5.9
334				Dharwad	25.9	81	4.6	27.0	6.8
335				Guntur	27.4	81	4.6	27.6	5.7
336				Raichur	27.0	82	4.6	29.4	6.0
337				Srivilliputhur	27.4	82	4.5	29.7	6.3
338				**Average**	**26.0**	**81**	**4.5**	**27.7**	**6.1**

Br02b-IET-G.hirsutum (Rainfed)

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	231	TSH 375	Central	Akola	27.1	84	3.8	25.6	7.4
2				Banswara	26.9	81	4.0	25.4	6.1
3				Bharuch	28.8	83	4.3	29.6	6.9
4				Nagpur	27.2	84	4.4	26.2	5.7
5				Nanded	28.9	86	3.6	28.3	5.9
6			South	Dharwad	29.0	83	4.3	29.6	7.2
7				Nandyal	26.9	83	5.1	27.5	
8				Veppanthattai	27.0	84	4.1	27.9	
9				**Average**	**27.7**	**84**	**4.2**	**27.5**	**6.5**
10	232	GBHV 206	Central	Akola	28.2	82	4.0	25.5	5.9
11				Banswara	24.8	80	4.0	24.4	5.7
12				Bharuch	27.3	82	4.6	27.4	6.6
13				Nagpur	26.7	83	4.1	25.8	5.6
14				Nanded	26	83	4.0	27.6	5.8
15			South	Dharwad	29.0	83	4.9	27.7	7.2
16				Nandyal	26.2	85	4.8	25.2	
17				Veppanthattai	26.4	82	5.0	25.8	
18				**Average**	**26.8**	**82**	**4.4**	**26.2**	**6.1**
19	233	NH 702	Central	Akola	25.1	83	4.2	24.0	7.2

20				Banswara	24.7	79	4.0	26.2	6.1
21				Bharuch	26.7	82	4.9	26.3	6.7
22				Nagpur	26.6	84	4.4	25.4	6.2
23				Nanded	23.4	80	4.7	24.8	5.6
25			South	Dharwad	26.5	82	4.9	26.0	7.2
26				Nandyal	24.3	82	4.8	24.3	
27				Veppanthattai	23.8	80	5.2	22.7	
				Average	**25.1**	**82**	**4.6**	**25.0**	**6.5**
28	234	ARBH 1951	Central	Akola	26.4	82	4.2	27.1	8.9
29				Banswara	25.4	80	4.4	27.5	6.1
30				Bharuch	26.5	82	5.1	25.1	6.8
31				Nagpur	24.1	82	4.8	25.7	5.8
32				Nanded	26.1	85	5.3	27.1	5.8
33			South	Dharwad	28.7	83	5.4	27.1	7.6
34				Nandyal	25.4	82	5.4	24.8	
35				Veppanthattai	23.7	81	5.9	23.8	
				Average	**25.8**	**82**	**5.1**	**26.0**	**6.8**
36	235	ZC	Central	Akola	26.9	83	4.0	24.9	7.2
37				Banswara	28.4	82	3.8	26.0	5.9
38				Bharuch	29.5	83	4.0	28.1	6.7
39				Nagpur	30.0	86	4.2	27.8	6.8
40				Nanded	30.3	84	4.2	26.9	5.8
41			South	Dharwad	29.3	83	4.7	29.5	7.0
42				Nandyal	28.6	85	4.8	29.9	
44				Veppanthattai	28.0	84	5.0	27.8	
				Average	**28.9**	**84**	**4.3**	**27.6**	**6.6**
45	236	NDLH 2051-3	Central	Akola	27.9	85	4.3	25.3	4.7
46				Banswara	28.1	82	4.0	25.5	5.8
47				Bharuch	30.8	84	4.4	29.2	6.6
48				Nagpur	29.7	84	4.5	27.9	4.0
49				Nanded	30.2	83	4.0	28.8	5.8
50			South	Dharwad	32.2	84	4.4	27.7	6.7
51				Nandyal	28.4	85	4.5	28.0	
52				Veppanthattai	27.8	81	4.5	25.4	
53				**Average**	**29.4**	**84**	**4.3**	**27.2**	**5.6**
54	237	BS 8-19	Central	Akola	30.8	83	3.8	28.3	5.2
55				Banswara	31.0	83	3.9	26.3	5.7
56				Bharuch	31.3	84	4.2	28.7	6.7
57				Nagpur	31.4	83	4.1	30.6	6.2
58				Nanded	31.2	83	3.9	29.1	5.8
59			South	Dharwad	31.8	84	4.3	29.0	7.2
60				Nandyal	30.0	85	4.4	28.5	

61				Veppanthattai	30.5	82	4.4	30.2	
62				**Average**	**31.0**	**83**	**4.1**	**28.8**	**6.1**
63	238	RHC 1419	Central	Akola	26.7	83	4.1	28	8.0
64				Banswara	26.0	81	3.8	24.9	6.4
65				Bharuch	26.8	82	4.4	29.8	7.3
66				Nagpur	26.6	85	4.5	27.2	7.9
67				Nanded	25.9	85	3.7	27	5.7
68			South	Dharwad	29.8	83	4.4	29.6	7.1
69				Nandyal	25.2	82	4.2	25.1	
70				Veppanthattai	26.6	86	4.3	25.8	
				Average	**26.7**	**83**	**4.2**	**27.2**	**7.1**
71	239	THV 007	Central	Akola	27.9	84	4.7	26.1	5.4
72				Banswara	28.8	82	4.0	28.8	5.9
73				Bharuch	30.0	84	5.2	26.8	6.6
74				Nagpur	28.2	85	4.4	28.5	5.8
75				Nanded	29.6	86	5.2	28.5	5.9
76			South	Dharwad	29.9	83	5.1	25.4	6.7
77				Nandyal	28.2	85	5.5	27.4	
78				Veppanthattai	28.4	85	5.7	27.7	
79				**Average**	**28.9**	**84**	**5.0**	**27.4**	**6.0**
80	240	CNDTS	Central	Akola	26.7	82	4.7	26.6	5.0
81				Banswara	25.1	80	3.9	25.1	6.1
82				Bharuch	27.7	82	4.8	27.5	6.9
83				Nagpur	29.6	87	4.7	30.3	6.0
84				Nanded	27.1	84	4.5	28.1	5.9
85			South	Dharwad	28.7	83	4.9	27.4	6.9
86				Nandyal	27.4	84	4.8	28.6	
87				Veppanthattai	27.2	85	5.1	28.8	
88				**Average**	**27.4**	**83**	**4.7**	**27.8**	**6.1**
89	241	RB 610	Central	Akola	25.9	81	4.3	28.3	6.2
90				Banswara	26.7	81	3.8	25.3	5.8
91				Bharuch	28.2	83	4.6	28.9	6.7
92				Nagpur	31	88	4	31.1	6.1
93				Nanded	25.9	82	4.4	27.0	5.7
94			South	Dharwad	27.0	82	5.1	26.4	7.2
95				Nandyal	28.4	82	4.9	27.6	
96				Veppanthattai	26.4	83	5.1	25.4	
97				**Average**	**27.4**	**83**	**4.5**	**27.5**	**6.3**
98	242	CCH 19-3	Central	Akola	29.5	84	3.9	26.7	6.7
99				Banswara	28.3	82	3.7	27.8	6.2
100				Bharuch	31.8	84	3.8	31.9	7.3
101				Nagpur	31.2	89	4.0	31.3	6.1

102				Nanded	30.9	84	3.4	28.7	5.9
103			South	Dharwad	33.8	84	4.0	30.4	7.5
104				Nandyal	31.7	87	4.1	33.8	
105				Veppanthattai	30.7	84	4.3	32.3	
106				**Average**	**31.0**	**85**	**3.9**	**30.4**	**6.6**
107	243	RAH 1046	Central	Akola	27.3	83	3.8	26.1	6.4
108				Banswara	28.1	82	4.2	30.9	6.3
109				Bharuch	29.6	83	4.2	28.9	6.6
110				Nagpur	29.9	86	4.0	26.3	5.8
111				Nanded	28.6	85	3.8	28.2	5.8
112			South	Dharwad	31.6	84	4.4	30.3	6.2
113				Nandyal	27.9	83	4.7	27.3	
114				Veppanthattai	28.7	82	4.6	26.8	
115				**Average**	**29.0**	**84**	**4.2**	**28.1**	**6.2**
116	244	NH 703	Central	Akola	25.3	82	4.0	23.9	6.3
117				Banswara	29.5	83	4.3	28.9	5.9
118				Bharuch	27.1	82	4.5	27.6	6.8
119				Nagpur	26.5	82	4.5	24.1	5.5
120				Nanded	24.6	81	4.1	26.0	5.7
121			South	Dharwad	26.4	82	4.8	26.7	6.0
122				Nandyal	23.9	81	4.8	23.7	
123				Veppanthattai	24.5	81	5.0	23.5	
				Average	**26.0**	**82**	**4.5**	**25.5**	**6.0**
124	245	AKH 2013-2	Central	Akola	27.3	84	3.5	23.1	8.1
125				Banswara	31.0	84	4.0	29.7	6.1
126				Bharuch	30.1	84	4.3	30.5	7.1
127				Nagpur	29.2	82	4.1	29	6.0
128				Nanded	29.1	85	4.1	26.9	5.8
129			South	Dharwad	29.8	83	4.4	28.2	5.8
130				Nandyal	28.4	85	4.5	26.6	
131				Veppanthattai	29.7	83	4.8	27.8	
132				**Average**	**29.3**	**84**	**4.2**	**27.7**	**6.5**
133	246	CPD 1951	Central	Akola	27.2	83	3.8	27.7	5.8
134				Banswara	30.1	83	4.1	30.7	6.1
135				Bharuch	27.5	82	4.7	27.5	6.9
136				Nagpur	26.3	82	4.4	27.5	5.8
137				Nanded	25.8	84	4.3	27.8	5.9
138			South	Dharwad	27.1	82	4.9	27.2	6.3
139				Nandyal	25.7	83	4.2	25.6	
140				Veppanthattai	25.2	82	5.0	26.5	
141				**Average**	**26.9**	**83**	**4.4**	**27.6**	**6.1**
142	247		Central	Akola	27.7	84	3.8	26.3	6.2

143		CNH 09-119		Banswara	27.8	82	3.8	27.6	6.1
144				Bharuch	30.0	84	4.4	30.7	7.0
145				Nagpur	29.0	86	4.3	26.7	6.2
146				Nanded	27.8	85	4.0	28.6	5.8
147			South	Dharwad	28.0	83	4.4	27.3	6.6
148				Nandyal	27.4	86	4.8	29.3	
149				Veppanthattai	26.2	80	4.2	25.9	
150				**Average**	**28.0**	**84**	**4.2**	**27.8**	**6.3**
151	248	BGDS 1047	Central	Akola	28.4	84	4.1	27.2	4.6
152				Banswara	28.8	82	3.7	26.2	6.1
153				Bharuch	30.2	84	4.4	30.5	7.1
154				Nagpur	29	85	4.4	27.2	5.9
155				Nanded	27.6	85	4.5	27.8	5.8
156			South	Dharwad	30.5	84	4.6	29.2	6.0
157				Nandyal	27.9	84	4.9	28.7	
158				Veppanthattai	28.7	83	4.9	29.1	
159				**Average**	**28.9**	**84**	**4.4**	**28.2**	**5.9**
160	249	CNH 2077	Central	Akola	29.0	84	4.1	25.4	5.5
161				Banswara	28.3	82	4.3	27.1	5.7
162				Bharuch	29.0	83	4.4	28.0	6.4
163				Nagpur	27.7	83	4.3	28.1	5.7
164				Nanded	29.8	84	4.1	28.8	5.8
165			South	Dharwad	30.5	84	4.7	28.3	6.1
166				Nandyal	27.1	80	3.9	24.7	
167				Veppanthattai	28.7	83	4.7	27.3	
168				**Average**	**28.8**	**83**	**4.3**	**27.2**	**5.9**
169	250	RB 603	Central	Akola	25.3	84	4.7	25.5	7.4
170				Banswara	28.5	82	3.8	26.0	5.5
171				Bharuch	27.5	82	4.8	27.5	6.8
172				Nagpur	26.6	84	4.4	26.4	6.1
173				Nanded	26.9	82	4.8	28.4	5.8
174			South	Dharwad	28.5	83	4.7	29.5	6.1
175				Nandyal	26.2	79	4.5	28.1	
176				Veppanthattai	27.6	79	5.6	27	
177				**Average**	**27.1**	**82**	**4.6**	**27.3**	**6.3**
178	251	CPD 1952	Central	Akola	30.3	86	4.3	28.9	5.0
179				Banswara	24.5	79	4.0	23.7	5.6
180				Bharuch	30.7	84	4.6	31.0	7.1
181				Nagpur	29.8	85	4.5	28.4	6.0
182				Nanded	28.8	84	3.0	27.8	5.7
183			South	Dharwad	29.2	83	4.5	28.9	6.9
184				Nandyal	28.8	85	4.8	28.5	

185				Veppanthattai	30.2	84	4.5	30.1	
186				**Average**	**29.0**	**84**	**4.3**	**28.4**	**6.0**
187	252	GTHV 15/36	Central	Akola	25.9	83	4.4	25.4	7.5
188				Banswara	30.1	83	4.0	25.8	5.5
189				Bharuch	30.4	84	4.4	30.9	7.4
190				Nagpur	28.5	85	4.5	28.0	6.0
191				Nanded	27.7	83	4.1	27.8	5.9
192			South	Dharwad	27.8	82	4.3	28.1	6.0
193				Nandyal	27.1	83	4.8	26.9	
194				Veppanthattai	26.8	82	4.7	26.8	
195				**Average**	**28.0**	**83**	**4.4**	**27.5**	**6.4**
196	253	RHC 1409	Central	Akola	26.7	83	4.2	28.6	7.9
197				Banswara	28.1	82	4.2	30.9	6.3
198				Bharuch	27.7	82	4.9	27.9	7.3
199				Nagpur	29.3	83	4.8	28.5	8.7
200				Nanded	26.9	82	4.6	27.4	5.8
201			South	Dharwad	28.1	83	5.2	26.8	6.3
202				Nandyal	26.1	79	4.6	23.2	
203				Veppanthattai	26.3	80	5.6	25.6	
204				**Average**	**27.4**	**82**	**4.8**	**27.4**	**7.0**
205	255	CNH 17393	Central	Akola	27.2	83	4.7	26.6	6.6
206				Banswara	29.5	83	4.3	28.9	5.9
207				Bharuch	31.6	84	4.3	30.8	7.0
208				Nagpur	30.7	87	4.2	27.3	7.5
209				Nanded	31.1	87	3.4	30.3	6.1
210				Dharwad	33.6	84	3.9	29.9	6.3
211				Nandyal	30.7	88	4.3	32.2	
212				Veppanthattai	28.5	81	5.4	27.6	
213				**Average**	**30.4**	**85**	**4.3**	**29.2**	**6.6**
214	257	LC	Central	Akola	24.3	79	4.4	23.6	7.0
215				Banswara	27.8	82	3.8	27.6	6.1
216				Bharuch	31.0	84	4.5	31.6	7.1
217				Nagpur	291	84	4.2	30	6.0
218				Nanded	30.7	86	4.5	30.9	6.2
219				Dharwad	26.9	82	4.9	25.4	5.8
220				Nandyal	28.2	86	5.3	29.6	
221				Veppanthattai	26.7	85	5.0	27.2	
				Average	**60.8**	**83**	**4.6**	**28.3**	**6.4**
222	258	GBHV 209	Central	Akola	25.5	81	4.0	24.5	8.2
223				Banswara	28.8	82	3.7	26.2	6.1
224				Bharuch	28.7	83	4.4	29.1	6.7
225				Nagpur	29.0	83	4.3	27.6	5.8

226				Nanded	28.0	84	3.8	30.3	5.9
227			South	Dharwad	28.4	83	4.7	27.9	5.6
228				Nandyal	25.1	82	4.5	23.2	
229				Veppanthattai	28.1	83	4.5	26.7	
				Average	**27.7**	**83**	**4.2**	**26.9**	**6.4**
230	259	RAH 1045	Central	Akola	29.2	84	4.5	26.8	6.5
231				Banswara	28.3	82	4.3	27.1	5.7
232				Bharuch	28.7	83	4.7	29.4	7.1
233				Nagpur	28.7	85	4.7	28.2	4.9
234				Nanded	28.8	85	4.6	27.9	5.8
235			South	Dharwad	30.2	84	4.7	29.3	6.0
236				Nandyal	25.7	83	4.9	24.4	
237				Veppanthattai	26.6	83	5.0	25.9	
238				**Average**	**28.3**	**84**	**4.7**	**27.4**	**6.0**
239	260	NDLH 2056-4	Central	Akola	29.9	86	4.1	26.4	4.5
240				Banswara	28.5	82	3.8	26.0	5.5
241				Bharuch	30.4	84	4.9	27.8	7.0
242				Nagpur	30.5	83	4.5	28.2	5.9
243				Nanded	30.6	84	4.1	28.9	5.8
244			South	Dharwad	31.3	84	4.8	29.3	6.3
245				Nandyal	29.5	86	4.8	29.0	
246				Veppanthattai	29.7	82	4.8	27.1	
247				**Average**	**30.0**	**84**	**4.5**	**27.8**	**5.8**
248	261	NH 701	Central	Akola	24.5	81	3.7	22.8	6.9
249				Banswara	24.5	79	4.0	23.7	5.6
250				Bharuch	26.7	82	4.3	27.0	6.5
251				Nagpur	26.0	84	4.2	25.4	6.8
252				Nanded	25.9	81	4.1	26	5.7
253			South	Dharwad	25.6	81	4.6	26.4	6.7
254				Nandyal	24.0	80	4.5	23.1	
255				Veppanthattai	24.9	80	4.9	23.4	
256				**Average**	**25.3**	**81**	**4.3**	**24.7**	**6.4**
257	262	BS 7-19	Central	Akola	29.7	84	3.8	26.4	5.1
258				Banswara	30.1	83	4.0	25.8	5.5
259				Bharuch	32.5	84	4.3	29.0	7.1
260				Nagpur	30.6	87	4.0	29.4	6.0
261				Nanded	30.1	84	3.7	29.6	5.9
262			South	Dharwad	31.0	84	4.4	29.8	6.8
263				Nandyal	30.2	84	4.3	30.9	
264				Veppanthattai	29.4	84	4.3	29.7	
265				**Average**	**30.4**	**84**	**4.1**	**28.8**	**6.1**
266	263	CNH 1134	Central	Akola	28.9	84	4.4	27.1	5.5

267				Banswara	28.3	82	4.0	27.3	5.9
268				Bharuch	29.5	83	4.3	28.5	6.6
269				Nagpur	29.8	85	4.4	28.5	5.4
270				Nanded	26.9	83	5.7	27.6	6
271			South	Dharwad	30.2	84	4.8	28.0	6.0
272				Nandyal	27.9	83	5.0	26.9	
273				Veppanthattai	29.3	83	4.2	27.8	
274				**Average**	**28.8**	**83**	**4.6**	**27.7**	**5.9**
275	264	QC	Central	Akola	30.8	87	3.5	31.0	5.4
276				Banswara	30.9	84	4.2	29.3	6.1
277				Bharuch	32.5	84	4.6	30.4	7.2
278				Nagpur	31.7	87	4.6	30.7	6.3
279				Nanded	31.5	86	4.5	30.0	6.0
280			South	Dharwad	32.5	84	4.5	28.9	6.1
281				Nandyal	31.3	87	4.4	32.3	
282				Veppanthattai	31.2	85	4.8	31.8	
				Average	**31.6**	**85**	**4.4**	**30.6**	**6.2**

Br02 a/b CC - IET -G.hirsutum - Coloured Cotton Trial (Irrigated/Rainfed)

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	271	CCHC 19-2	Central	Khandwa	21.0	75	3.9	16.7	5.4
2				Surat	29.6	83	3.9	27.7	6.7
3				Nagpur	25.3	75	4.1	23.9	5.2
4			South	Dharwad	31.6	84	4.0	28.7	6.9
5				Guntur	30.4	83	4.4	29.5	5.9
6				**Average**	**27.6**	**80**	**4.0**	**25.3**	**6.0**
7	272	CNH 18529	Central	Khandwa	22.9	80	3.9	24.3	5.4
8				Surat	23.8	80	4.8	24.8	6.4
9				Nagpur	21.7	76	4.4	20.6	5.1
10			South	Dharwad	26.5	82	4.6	26.5	6.7
11				Guntur	23.4	82	4.7	24.7	5.3
12				**Average**	**23.7**	**80**	**4.5**	**24.2**	**5.8**
13	273	ZC	Central	Khandwa	26.4	82	2.9	27.7	5.8
14				Surat	26.3	82	4.4	28.7	6.2
15				Nagpur	27.1	83	4.2	29.3	6.0
16			South	Dharwad	33.9	84	4.6	31.5	6.9
17				Guntur	31.2	86	4.8	30.3	6.0
18				**Average**	**29.0**	**83**	**4.2**	**29.5**	**6.2**
19	274	DHCC 1901	Central	Khandwa	21.0	75	3.9	16.7	5.4
20				Surat	23.4	80	5.4	23.3	6.3

21				Nagpur	23.6	81	5	23.9	5.5
22			South	Guntur	21.7	81	4.3	19.8	4.9
23				Dharwad	23.6	80	4.1	26.0	6.4
24				**Average**	**22.7**	**79**	**4.5**	**21.9**	**5.7**
25	275	CCHC 19-1	Central	Khandwa	26.4	82	2.9	27.7	5.8
26				Surat	27.8	82	3.5	25.6	6.4
27				Nagpur	23.7	75	3.3	23	5.1
28			South	Dharwad	29.4	83	3.7	27.5	6.9
29				Guntur	27.3	83	3.9	26.6	5.7
30				**Average**	**26.9**	**81**	**3.5**	**26.1**	**6.0**
31	276	CNH 18528	Central	Khandwa	22.0	79	4.1	20.5	5.4
32				Surat	23.1	80	4.5	25.8	6.3
33				Nagpur	24.6	75	4.6	23.8	5.1
34			South	Dharwad	25.7	81	4.5	27.0	6.9
35				Guntur	23.5	82	5.3	24.5	5.5
36				**Average**	**23.8**	**79**	**4.6**	**24.3**	**5.8**
37	277	LC	Central	Khandwa	23.8	79	3.1	25.6	5.5
38				Surat	28.9	83	4.6	29.5	6.8
39				Nagpur	27.8	80	4.7	25.6	5.7
40			South	Dharwad	28.9	83	4.5	29.7	6.9
41				Guntur	28.9	86	4.9	28.7	5.9
42				**Average**	**27.7**	**82**	**4.4**	**27.8**	**6.2**
43	278	DHCC 1902	Central	Khandwa	20.9	78	4.1	17.4	5.3
44				Surat	21.5	78	4.5	22.7	6.2
45				Nagpur	21.7	80	4.3	20.9	5.2
46			South	Dharwad	22.2	79	4.5	23.8	6.6
47				Guntur	21.3	80	5.0	23.0	6.5
48				**Average**	**21.5**	**79**	**4.5**	**21.6**	**6.0**

Br06a - IET of Compact genotypes under irrigated condition

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	281	CCH 19-4	Central	Bhawanipatna	32.4	86	3.3	30.6	6.1
2				Junagadh	30.4	83	4.3	35.5	6.2
3				Khandwa	27.6	82	2.8	27.8	5.8
4				Rahuri	33.6	84	3.9	34.0	7.0
5				Talod	32.4	84	4.1	29.5	6.1
6			South	Coimbatore	29.3	88	4.4	28.7	6
7				Guntur	31.3	85	4.2	30.0	6.1
8				Raichur	33.7	84	4.2	31.2	6.8
9				**Average**	**31.3**	**85**	**3.9**	**30.9**	**6.3**

10	282	BS 9-19	Central	Bhawanipatna	30.2	86	3.5	32.8	6.0
11				Junagadh	27.8	82	4.2	31.6	6.1
12				Khandwa	28.1	82	3.0	27.1	5.8
13				Rahuri	32.0	84	3.6	31.3	6.3
14				Talod	30.2	84	3.5	29.1	6.9
15			South	Coimbatore	30.0	85	4.0	28.2	5.8
16				Guntur	29.7	87	4.4	30.4	5.9
17				Raichur	29.5	83	4.2	29.6	6.6
18				**Average**	**29.7**	**84**	**3.8**	**30.0**	**6.2**
19	283	RHC-HD 1405	Central	Bhawanipatna	28.8	85	4.4	29.9	5.9
20				Junagadh	28.3	82	5.3	29.9	6.0
21				Khandwa	27.1	79	3.0	29.7	5.8
22				Rahuri	31.1	84	4.0	30.9	6.2
23				Talod	31.1	84	4.5	27.2	6.1
24			South	Coimbatore	30.3	85	4.4	30.1	6.0
25				Guntur	30.4	85	4.4	29.8	5.9
26				Raichur	29.1	83	4.7	27.6	6.7
27				**Average**	**29.5**	**83**	**4.3**	**29.4**	**6.1**
28	284	DSC 1902	Central	Bhawanipatna	29.2	84	3.9	3.1	5.9
29				Junagadh	23.5	78	4.9	25.9	6.4
30				Khandwa	25.2	80	3.2	26.0	5.6
31				Rahuri	26.1	81	3.7	29.1	6.4
32				Talod	26.4	82	4.7	28.4	6.9
33			South	Coimbatore	26.4	85	4.8	29.6	5.8
34				Guntur	25.1	84	4.7	26.0	5.9
35				Raichur	26.3	82	5.0	26.1	6.8
36				**Average**	**26.0**	**82**	**4.4**	**24.3**	**6.2**
37	285	GTHV 18/17	Central	Bhawanipatna	26.0	84	3.9	27.4	5.8
38				Junagadh	28.5	82	5.3	30.0	6.3
39				Khandwa	25.2	82	2.9	27.2	5.6
40				Rahuri	28.9	82	4.1	31.6	6.5
41				Talod	30.0	84	3.9	28.3	6.9
42			South	Coimbatore	28.4	87	5.3	27.3	5.9
43				Guntur	28.9	85	4.9	29.9	6.0
44				Raichur	28.9	83	4.3	29.4	6.1
45				**Average**	**28.1**	**84**	**4.3**	**28.9**	**6.1**
46	286	LC	Central	Bhawanipatna	32.6	86	3.8	30.3	6.0
47				Junagadh	28.2	82	5.2	29.0	6.2
48				Khandwa	29.3	82.7	2.9	31.2	5.9
49				Rahuri	28.0	82	4.2	31.9	6.7
50				Talod	29.4	83	4.6	28.4	6.6
51			South	Coimbatore	33.3	87	5.4	30.8	6.3

52				Guntur	28.4	83	4.9	30.8	5.9
53				Raichur	29.7	83	4.9	26.9	6.6
54				**Average**	**29.9**	**84**	**4.5**	**29.9**	**6.3**
55	287	CCH 15-1	Central	Bhawanipatna	28.9	85	3.8	30.3	6.0
56				Junagadh	27.4	82	4.8	30.9	6.2
57				Khandwa	29.3	83	3.0	29	6.0
58				Rahuri	33.3	84	4.2	34.2	6.9
59				Talod	30.8	84	4.4	29.3	6.9
60			South	Coimbatore	29.6	87	4.7	29.0	6
61				Guntur	28.0	80	4.8	29.0	5.8
62				Raichur	30.6	84	4.4	31.1	6.3
63				**Average**	**29.7**	**84**	**4.3**	**30.3**	**6.3**
64	288	GJHV 584	Central	Bhawanipatna	26.8	81	4.7	28.3	5.7
65				Junagadh	26.2	81	5.2	27.2	6.2
66				Khandwa	26.9	78	3.1	28.9	5.7
67				Rahuri	26.1	81	4.4	27.9	6.1
68				Talod	29.1	83	4.4	27.2	6.3
69			South	Coimbatore	27.2	83	5.4	26.4	5.8
70				Guntur	28.4	81	4.9	30.8	5.9
71				Raichur	27.6	82	5.1	24.8	6.6
72				**Average**	**27.3**	**81**	**4.7**	**27.7**	**6.0**
73	289	RAHC 1902	Central	Bhawanipatna	34.5	86	3.8	28.8	5.9
74				Junagadh	32.2	84	4.7	32.7	6.4
75				Khandwa	27.3	79	3.0	26.4	5.7
76				Rahuri	31.1	84	3.7	30.7	6.5
77				Talod	32.9	84	4.5	28.4	6.8
78			South	Coimbatore	31.7	85	4.3	27.9	6.0
79				Guntur	30.3	85	4.7	29.5	6.1
80				Raichur	30.6	84	4.6	29.9	6.0
81				**Average**	**31.3**	**84**	**4.2**	**29.3**	**6.2**
82	290	CCH 19-2	Central	Bhawanipatna	34.3	87	3.7	29.2	6.0
83				Junagadh	28.1	82	5.0	27.7	6.6
84				Khandwa	26.0	81	2.9	28.4	5.8
85				Rahuri	33.5	84	3.6	31.2	6.6
86				Talod	30.6	84	4.6	28.7	6.7
87			South	Coimbatore	33	86	4.7	28.5	6.1
88				Guntur	31.4	86	4.8	30.3	6.2
89				Raichur	32.3	84	4.3	29.7	6.6
90				**Average**	**31.2**	**84**	**4.2**	**29.2**	**6.3**
91	291	TCH 1875	Central	Bhawanipatna	28.9	86	4.0	28.9	6.0
92				Junagadh	27.8	82	5.0	27.9	5.9
93				Khandwa	29.2	80	3.0	29.5	5.7

94				Rahuri	29.2	83	4.1	31.5	6.8
95				Talod	29.1	83	4.7	28.1	7.0
96			South	Coimbatore	28.8	86	4.7	28.5	6.1
97				Guntur	28.0	83	4.9	28.1	5.8
98				Raichur	30.2	84	4.9	28.3	6.1
99				**Average**	**28.9**	**83**	**4.4**	**28.8**	**6.2**
100	292	CC	Central	Bhawanipatna	30.3	85	4.1	32.2	6
101				Junagadh	29.9	83	5.2	31.9	6.3
102				Khandwa	27.4	83	3.0	29.1	5.8
103				Rahuri	31.1	83	4.3	33.0	6.8
104				Talod	31.9	84	4.4	29.8	6.9
105			South	Coimbatore	31.5	87	5.1	31	6.3
106				Guntur	31.0	87	4.9	31.6	6.2
107				Raichur	32.4	84	4.9	28.4	6.0
108				**Average**	**30.7**	**85**	**4.5**	**30.9**	**6.3**
109	293	CC	Central	Bhawanipatna	29.6	86	3.6	27.1	5.8
110				Junagadh	26.2	81	4.5	29.1	6.2
111				Khandwa	28.8	81	3.2	28.6	5.7
112				Rahuri	29.6	83	3.5	30.0	6.4
113				Talod	30.7	84	4.2	28.5	6.9
114			South	Coimbatore	27.8	81	4.6	29.2	6.0
115				Guntur	29.0	86	4.2	28.9	5.9
116				Raichur	29.1	83	4.2	27.7	6.8
117				**Average**	**28.8**	**83**	**4.0**	**28.6**	**6.2**
118	294	RAHC 1901	Central	Bhawanipatna	30.3	85	4.0	31.7	6.1
119				Junagadh	33.6	84	4.7	33.4	6.6
120				Khandwa	28.2	82	3.0	27.3	5.7
121				Rahuri	31.9	84	4.0	30.8	6.4
122				Talod	34.0	84	4.1	28.3	6.9
123			South	Coimbatore	29.2	82	3.9	29	5.8
124				Guntur	31.6	85	4.4	31.6	6.1
125				Raichur	32.6	84	4.0	27.8	6.5
126				**Average**	**31.4**	**84**	**4.0**	**30.0**	**6.3**
127	295	RHC -HD 1312	Central	Bhawanipatna	30.1	85	3.9	27.8	5.8
128				Junagadh	27.5	81	5.2	30.6	6.4
129				Khandwa	24.3	80	3.0	25.7	5.7
130				Rahuri	30.4	83	4.3	32.5	6.6
131				Talod	29.3	83	5.0	27.4	6.8
132			South	Coimbatore	27.8	83	4.8	29.2	6.0
133				Guntur	27.9	85	5.0	30.2	6.0
134				Raichur	30.1	84	4.7	30.1	6.9
				Average	**28.4**	**83**	**4.5**	**29.2**	**6.3**

Br06b - Initial Evaluation of Compact genotypes under rainfed condition

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	301	RAHC 1901	Central	Akola	28.0	84	4.4	25.2	5.4
2				Bharuch	29.3	83	4.2	28.1	6.6
3				Nagpur	27.4	83	4.5	27.1	6.0
4				Nanded	30.8	87	3.6	31.2	6.1
5			South	Dharwad	28.2	83	4.5	27.5	6.2
6				Nandyal	26.6	80	4.8	25.7	
7				Veppanthattai	28.3	80	4.0	27.0	
8				**Average**	**28.4**	**83**	**4.3**	**27.4**	**6.1**
9	302	TCH 002	Central	Akola	29.5	84	3.9	29.3	5.6
10				Bharuch	29.1	83	3.9	27.5	6.7
11				Nagpur	28.5	85	4.0	29.2	6.0
12				Nanded	29.6	84	3.8	28.5	5.8
13			South	Dharwad	31.3	84	3.7	29.1	6.0
14				Nandyal	26.9	83	4.1	25.3	
15				Veppanthattai	29.9	85	3.9	31.9	
16				**Average**	**29.3**	**84**	**3.9**	**28.7**	**6.0**
17	303	GBHV 187	Central	Akola	25.8	83	4.6	26.1	6.7
18				Bharuch	28.4	83	4.3	30.0	6.9
19				Nagpur	25.9	84	4.7	26.1	6.6
20				Nanded	27.7	84	4.5	27.3	5.9
21			South	Dharwad	27.5	82	4.5	28.5	6.2
22				Nandyal	24.5	83	5.3	24.4	
23				Veppanthattai	24.2	82	3.9	24.1	
24				**Average**	**26.3**	**83**	**4.6**	**26.6**	**6.5**
25	304	CNH 09-77	Central	Akola	27.6	84	3.8	27.4	7.2
26				Bharuch	30.4	84	3.3	29.2	6.7
27				Nagpur	27.8	83	3.8	29.9	5.9
28				Nanded	28.8	84	3.5	30.4	5.9
29			South	Dharwad	31.3	84	3.7	28.9	6.2
30				Nandyal	26.7	84	3.7	28.6	
31				Veppanthattai	26.8	81	3.2	26.3	
32				**Average**	**28.5**	**83**	**3.6**	**28.7**	**6.4**
33	305	RHC-HD 1312	Central	Akola	28.0	85	4.5	25.9	7.8
34				Bharuch	29.9	83	4.3	30.4	7.2
35				Nagpur	28.9	84	4.5	25.7	5.7
36				Nanded	28.6	85	4.6	27.4	5.9
37			South	Dharwad	29.9	83	4.3	29.2	6.3
38				Nandyal	26.0	81	5.0	24.9	
39				Veppanthattai	27.1	82	4.3	25.8	

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
40				**Average**	**28.3**	**83**	**4.5**	**27.0**	**6.6**
41	306	CCH 15-1	Central	Akola	27.6	83	4.0	26.7	7.1
42				Bharuch	31.3	84	3.9	29.4	6.9
43				Nagpur	32.4	86	4.2	31.4	7.7
44				Nanded	30.4	86	4.2	29.2	6.0
45			South	Dharwad	33.1	84	4.4	30.1	6.4
46				Nandyal	30.2	85	4.6	32.2	
47				Veppanthattai	31.1	86	3.9	32	
48				**Average**	**30.9**	**85**	**4.2**	**30.1**	**6.8**
49	307	DSC 1951	Central	Akola	26.1	82	4.9	25.9	3.7
50				Bharuch	26.8	82	4.6	27.7	6.4
51				Nagpur	26.0	85	5.4	32.0	5.1
52				Nanded	25.9	85	4.9	26.2	5.6
53			South	Dharwad	28.3	83	4.9	26.4	6.8
54				Nandyal	24.0	80	5.4	24.0	
55				Veppanthattai	25.5	84	4.9	25.0	
56				**Average**	**26.1**	**83**	**5.0**	**26.7**	**5.5**
57	308	CC	Central	Akola	32.3	88	4.3	30.0	6.2
58				Bharuch	32.3	84	4.3	28.2	6.7
59				Nagpur	31.3	87	4.6	32.4	6.3
60				Nanded	31.6	84	4.6	29.7	6.1
61			South	Dharwad	32.5	84	4.4	28.9	6.2
62				Nandyal	31.0	85	4.7	32.6	
63				Veppanthattai	30.2	85	4.1	31.7	
64				**Average**	**31.6**	**85**	**4.4**	**30.5**	**6.3**
65	309	CNH 1133	Central	Akola	27.0	84	4.6	26.7	5.5
66				Bharuch	27.4	82	4.4	28.3	6.8
67				Nagpur	27.8	84	4.9	29	6.9
68				Nanded	27.3	84	4.7	27.2	5.8
69			South	Dharwad	32.2	84	3.9	30.1	6.1
70				Nandyal	25.3	82	5.0	25.4	
71				Veppanthattai	26.9	82	5.0	25.3	
72				**Average**	**27.7**	**83**	**4.6**	**27.4**	**6.2**
73	310	CCH 19-4	Central	Akola	30.2	85	3.8	31.0	7.7
74				Bharuch	31.3	84	4.0	30.2	6.9
75				Nagpur	31.0	87	4.1	33.1	6.3
76				Nanded	27.5	84	3.9	28.4	5.8
77			South	Dharwad	28.1	83	4.8	28.1	6.0
78				Nandyal	29.4	86	4.3	31.8	
79				Veppanthattai	32.1	86	3.9	32.5	
80				**Average**	**29.9**	**85**	**4.1**	**30.7**	**6.5**

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
81	311	CNH 2046	Central	Akola	26.3	83	4.2	25.3	6.3
82				Bharuch	26.9	82	4.5	27.7	6.7
83				Nagpur	26.5	84	4.8	27.1	5.9
84				Nanded	26.7	83	4.9	27.3	5.7
85			South	Coimbatore	25.5	81	4.6	23.5	
86				Dharwad	28.8	83	4.7	27.9	6.8
87				Nandyal	23.4	80	5.0	23.1	
88				Veppanthattai	25.9	81	4.4	25.4	
				Average	**26.2**	**82**	**4.7**	**26.0**	**6.3**
89	312	RHC-HD 1405	Central	Akola	31.1	83	4.2	28.7	5.1
90				Bharuch	29.7	83	4.2	30.2	6.7
91				Nagpur	28.5	84	4.3	29.5	5.0
92				Nanded	28.8	83	4.1	27.8	5.8
93			South	Dharwad	30.2	84	4.3	28.8	6.8
94				Nandyal	28.3	82	4.8	29.0	
95				Veppanthattai	29.4	83	4.1	29.9	
96				**Average**	**29.4**	**83**	**4.3**	**29.1**	**5.9**
97	313	GTHV 18/19	Central	Akola	26.5	85	4.1	27.0	9.6
98				Bharuch	29.2	83	4.1	30.3	6.2
99				Nagpur	29.0	86	4.4	28.0	6.0
100				Nanded	27.9	84	3.9	26.6	5.7
101			South	Dharwad	28.5	83	4.4	29.1	6.9
102				Nandyal	26.6	85	4.8	26.1	
103				Veppanthattai	27.4	80	4.1	25.7	
104				**Average**	**27.9**	**84**	**4.3**	**27.5**	**6.9**
105	314	CNH 1132	Central	Akola	27.5	82	3.8	26.3	5.7
106				Bharuch	29.8	83	4.1	29.0	6.9
107				Nagpur	27.8	85	4.1	28.2	5.2
108				Nanded	27.7	83	4.1	27.6	5.7
109			South	Dharwad	29.9	83	4.2	29.2	6.1
110				Nandyal	28.2	84	4.5	27.0	
111				Veppanthattai	27.1	83	4.1	26.5	
112				**Average**	**28.3**	**83**	**4.1**	**27.7**	**5.9**
113	315	LC	Central	Akola	26.0	82	4.5	24.4	8.9
114				Bharuch	28.8	83	4.1	28.6	6.8
115				Nagpur	27.3	83	4.8	29.0	6.0
116				Nanded	29.5	84	3.9	28.0	5.9
117			South	Dharwad	28.2	83	4.5	27.6	6.2
118				Nandyal	28.5	85	4.4	30.8	
119				Veppanthattai	25.9	81	4.4	25.4	
120				**Average**	**27.7**	**83**	**4.4**	**27.7**	**6.8**

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
121	316	CNDTS 44	Central	Akola	27.4	82	3.8	27.0	5.8
122				Bharuch	26.9	82	4.3	27.9	6.8
123				Nagpur	28.2	85	4.3	29.7	6.0
124				Nanded	26.9	85	3.9	27.9	5.7
125			South	Dharwad	31.4	84	4.4	31.6	6.6
126				Nandyal	27.0	81	4.6	29.1	
127				Veppanthattai	27.2	82	3.8	26.7	
128				**Average**	**27.9**	**83**	**4.2**	**28.6**	**6.2**
129	317	DSC 1952	Central	Akola	27.3	83	4.0	28.0	5.5
130				Bharuch	27.7	82	4.4	29.6	6.0
131				Nagpur	25.5	85	4.9	28.3	6.0
132				Nanded	27.0	83	4.5	25.5	5.7
133			South	Dharwad	29.3	83	4.7	29.2	6.0
134				Nandyal	23.9	81	4.8	23.0	
135				Veppanthattai	28.1	81	4.4	26.6	
136				**Average**	**27.0**	**83**	**4.5**	**27.2**	**5.8**
137	318	CNH 09-45	Central	Akola	31.1	87	4.1	29.0	5.3
138				Bharuch	32.5	84	4.4	30.0	6.3
139				Nagpur	29.5	84	4.2	30.7	5.7
140				Nanded	29.1	84	3.7	28.4	5.8
141			South	Dharwad	30.9	84	4.2	30.2	6.9
142				Nandyal	28.7	85	4.4	29.1	
143				Veppanthattai	28.7	81	3.6	25.9	
144				**Average**	**30.1**	**84**	**4.1**	**29.0**	**6.0**
145	319	RAHC 1902	Central	Akola	27.9	83	4.2	25.8	4.3
146				Bharuch	32.3	84	4.6	30.6	6.1
147				Nagpur	30.4	86	4.6	29.7	6.0
148				Nanded	31.3	84	3.6	28.5	5.9
149			South	Dharwad	33.1	84	4.4	29.7	7.0
150				Nandyal	32.5	87	4.3	34.5	
151				Veppanthattai	29.7	85	3.6	31.1	
152				**Average**	**31.0**	**85**	**4.2**	**30.0**	**5.9**
153	320	CCH 19-5	Central	Akola	28.8	86	4.0	27.5	6.4
154				Bharuch	31.2	84	4.2	29.4	6.7
155				Nagpur	30.3	84	4.6	28.6	6.1
156				Nanded	28.0	85	4.0	29.3	5.8
157			South	Dharwad	30.5	84	4.5	30.8	6.9
159				Nandyal	28.3	84	4.5	25.6	
160				Veppanthattai	30.3	83	4.2	27.7	
161				**Average**	**29.6**	**84**	**4.3**	**28.4**	**6.4**

Br12a. IET of G.barbadense

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	321	SBSD 5-6	Central	Rahuri	38.1	84	3.4	37.1	7.0
2			South	Coimbatore	37.2	87	4.3	32.5	6.7
3				Dharwad	37.9	84	4.1	33.8	7.0
4				**Average**	**37.7**	**85**	**3.9**	**34.5**	**6.9**
5	322	CCB 64B	Central	Rahuri	37.7	84	2.9	39.4	6.7
6			South	Coimbatore	37.1	85	4.5	31.5	6.6
7				Dharwad	38.1	84	3.8	33.8	7.0
8				**Average**	**37.7**	**84**	**3.7**	**34.9**	**6.8**
9	323	DB 1901	Central	Rahuri	33.9	84	3.9	36.3	7.1
10			South	Coimbatore	33.9	87	4.4	28.7	6.4
11				Dharwad	32.8	84	4.1	32.0	7.0
12				**Average**	**33.5**	**85**	**4.1**	**32.4**	**6.8**
13	324	ZC	Central	Rahuri	32.9	84	3.9	33.5	7.3
14			South	Coimbatore	37.6	87	3.9	33.7	6.7
15				Dharwad	38.9	84	4.0	32.8	7.0
16				**Average**	**36.5**	**85**	**3.9**	**33.4**	**7.0**
17	325	CCB 142	Central	Rahuri	38.7	84	3.2	37.7	7.0
18			South	Coimbatore	36	85	4.6	32.5	6.6
19				Dharwad	37.1	84	4.3	32.7	7.0
20				**Average**	**37.3**	**84**	**4.0**	**34.3**	**6.9**
21	326	CCB 142	Central	Rahuri	38.0	84	3.2	36.3	7.1
22			South	Coimbatore	36.7	87	4.5	32	6.5
23				Dharwad	35.2	84	4.1	33.6	7.0
24				**Average**	**36.6**	**85.0**	**3.9**	**34.0**	**6.9**

Br15a - PHT - Interspecific - Hybrid (hir x barb)

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	331	DHB 1902	Central	Anand	36.1	84	4.0	32.9	6.6
2				Banswara	34.4	84	3.5	31.8	6.6
3				Rahuri	35.9	84	2.8	37.4	6.6
4			South	Coimbatore	36.7	86	3.6	32.0	6.4
5				Dharwad	34.5	84	3.9	30.0	7.0
6				Guntur	34.2	84	3.7	31.8	6.2
7				**Average**	**35.3**	**84**	**3.6**	**32.6**	**6.6**
8	332	RHB 1401	Central	Anand	35.6	84	4.3	32.2	6.9
9				Banswara	35.8	84	3.3	32.1	7.2
10				Rahuri	34.0	84	2.9	35.2	6.6
11			South	Coimbatore	36.9	89	4.0	33.5	6.7

12				Dharwad	34.6	84	3.6	32.4	7.5
13				Guntur	34.8	85	4.0	32.4	6.3
14				**Average**	**35.3**	**85**	**3.7**	**33.0**	**6.9**
15	333	LC	Central	Anand	35.7	84	3.8	32.1	6.9
16				Banswara	36.2	84	3.6	31.0	6.9
17				Rahuri	35.0	84	3.5	34.8	7.1
18			South	Coimbatore	37.6	88	3.5	32.6	6.7
19				Dharwad	34.8	84	4.1	32.8	7.5
20				Guntur	35.3	85	3.8	31.0	6.2
21				**Average**	**35.7**	**85**	**3.7**	**32.4**	**6.9**
22	334	DHB 1901	Central	Anand	36.0	84	3.6	32.5	6.9
23				Banswara	36.6	84	3.2	31.5	6.6
24				Rahuri	37.0	84	3.1	36.8	6.8
25			South	Coimbatore	38.4	87	3.2	33.6	6.6
26				Dharwad	38.2	84	3.5	33.6	7.0
27				Guntur	36.1	87	3.8	32.7	6.3
28				**Average**	**37.1**	**85**	**3.4**	**33.5**	**6.7**
29	335	Phule Dhara	Central	Anand	34.8	84	3.6	30.6	6.9
30				Banswara	36.1	84	3.5	31.3	6.8
31				Rahuri	35.7	84	3.3	37.8	6.9
32			South	Coimbatore	36.4	86	4.0	33	6.5
33				Dharwad	35.5	84	3.5	31.5	7.0
34				Guntur	34.0	84	4.0	31.6	6.2
35				**Average**	**35.4**	**84**	**3.7**	**32.6**	**6.7**
36	336	LAHB 2	Central	Anand	37.1	84	3.6	34.3	6.9
37				Banswara	36.4	84	2.8	34.2	6.8
38				Rahuri	37.6	84	2.8	38.5	7.2
39			South	Coimbatore	35.8	82	3.4	31.8	6.3
40				Dharwad	37.4	84	3.7	32.9	7.1
41				Guntur	32.6	85	3.6	33.2	6.3
42				**Average**	**36.2**	**84**	**3.3**	**34.1**	**6.8**

Br.22 a/b IET-G.arboreum

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	341	DWDA 1902	Central	Akola	23.6	80	6.4	25.3	6.6
2				Amreli	25.9	81	5.7	24.7	5.9
3				Jalgaon	26.0	80	6.6	28.3	6.6
4				Khandwa	23.7	78	3.0	25.4	5.6
5				Nagpur	25.0	81	6.1	26.5	5.8
6				Parbhani	23.1	77	6.3	25.8	6.4

7			South	Dharwad	23.7	80	6.0	23.8	6.8
8				Nandyal	23.3	80	6.0	22.6	
9				**Average**	**24.3**	**79.7**	**5.8**	**25.3**	**6.2**
10	342	CAN 2036	Central	Akola	26.6	83	5.8	30.6	5.7
11				Amreli	26.8	82	5.7	25.3	6.4
12				Jalgaon	26.6	81	6.0	27.9	6.4
13				Khandwa	23.1	79	3.5	23.2	5.6
14				Nagpur	27.3	83	5.1	29.0	5.9
15				Parbhani	27.3	83	6.0	28.7	5.4
16			South	Dharwad	25.1	81	5.8	24.1	6.4
17				Nandyal	24.1	80	5.7	24.3	
18				**Average**	**25.9**	**81**	**5.5**	**26.6**	**6.0**
19	343	CAN 2037	Central	Akola	28.4	83	5.6	30.1	4.8
20				Amreli	22.5	79	6.0	22.7	6.5
21				Jalgaon	29.3	82	5.4	31.0	6.4
22				Khandwa	24.5	76	3.2	23.1	5.2
23				Nagpur	27.2	81	5.3	26.4	5.8
24				Parbhani	28.6	82	5.7	28.2	4.3
25			South	Dharwad	26.4	82	5.7	25.6	6.4
26				Nandyal	26.5	83	5.0	26.7	
27				**Average**	**26.7**	**81**	**5.2**	**26.7**	**5.6**
28	344	NDLA 3116-3	Central	Akola	25.9	77	7.1	25.2	6.9
29				Amreli	22.6	79	6.8	22.9	6.6
30				Jalgaon	22.0	77	7.0	24.3	6.4
31				Khandwa	21.9	76	4.3	21.3	5.1
32				Nagpur	21.3	79	6.5	20.3	5.5
33				Parbhani	26.4	84	5.6	28.8	4
34			South	Dharwad	21.6	79	6.5	22.5	6.8
35				Nandyal	20.0	80	6.5	20.2	
36				**Average**	**22.7**	**79**	**6.3**	**23.2**	**5.9**
37	345	JLA 1102	Central	Akola	26.2	83	5.3	28.0	5.5
38				Amreli	27.8	82	5.3	26.8	6.9
39				Jalgaon	28.0	82	5.4	32.5	6.2
40				Khandwa	25.5	80	3.3	27.5	5.7
41				Nagpur	27.3	82	5.1	28.5	6.2
42				Parbhani	28.6	82	5.7	28.2	4.3
43			South	Dharwad	25.8	81	5.5	24.9	6.7
44				Nandyal	26.4	82	4.7	28.8	
45				**Average**	**27.0**	**82**	**5.0**	**28.2**	**5.9**
46	346	ZC	Central	Akola	25.5	81	5.8	27.7	6.2
47				Amreli	26.8	82	5.7	24.7	6.6
48				Jalgaon	25.0	80	5.7	27.2	6.0

49				Khandwa	23.2	78	3.1	23.8	5.4
50				Nagpur	25.0	83	5.5	26.4	5.8
51				Parbhani	24.3	82	5.9	24.3	7.0
52			South	Dharwad	28.7	83	5.4	25.9	6.9
53				Nandyal	26.3	82	4.8	24.5	
54				**Average**	**25.6**	**81**	**5.2**	**25.6**	**6.3**
55	347	PA 863	Central	Akola	28.8	81	5.3	27.8	6.0
56				Amreli	29.0	83	5.6	26.3	6.8
57				Jalgaon	29.5	81	5.0	31.3	6.0
58				Khandwa	23.8	82	3.5	24.9	5.7
59				Nagpur	29.5	81	5.0	30.1	6.1
60				Parbhani	27.8	83	5.3	26.4	4.6
61			South	Dharwad	29.0	83	5.3	26.6	6.9
62				Nandyal	29.7	85	4.8	29.1	
63				**Average**	**28.4**	**82**	**5.0**	**27.8**	**6.0**
64	348	MDL 2689	Central	Akola	25.5	79	6.3	23.9	6.6
65				Amreli	24.0	80	6.1	24.1	6.8
66				Jalgaon	23.9	79	6.6	25.4	6.1
67				Khandwa	23.0	80	3.6	24.1	5.6
68				Nagpur	23.9	80	6.4	25.5	5.7
69				Parbhani	25.1	79	6.2	25.6	5.7
70			South	Dharwad	22.4	79	6.2	23.0	6.7
71				Nandyal	23.6	82	5.9	22.0	
72				**Average**	**23.9**	**80**	**5.9**	**24.2**	**6.2**
73	349	GAM 267	Central	Akola	27.4	82	5.3	28.7	5.4
74				Amreli	27.6	82	5.6	25.6	6.9
75				Jalgaon	27.8	82	5.2	28.7	6.0
76				Khandwa	23.6	79	3.2	24.3	5.6
77				Nagpur	27.6	81	5.2	27.5	5.8
78				Parbhani	28.2	83	5.8	27.2	5.7
79			South	Dharwad	26.7	82	5.4	24.7	6.7
80				Nandyal	26.1	83	5.0	27.1	
81				**Average**	**26.9**	**82**	**5.1**	**26.7**	**6.0**
82	350	CAN 1042	Central	Akola	27.0	82	5.6	28.6	5.3
83				Amreli	26.7	82	5.6	25.7	6.8
84				Jalgaon	26.7	81	5.7	28.5	6.5
85				Khandwa	23.0	80	3.6	24.1	5.6
86				Nagpur	26.5	82	5.3	28.3	6.0
87				Parbhani	25.6	84	6.0	28.4	5.3
88			South	Dharwad	25.0	81	5.8	25.7	6.8
89				Nandyal	23.7	82	5.4	24.6	
90				**Average**	**25.5**	**82**	**5.4**	**26.7**	**6.0**

91	351	NDLA 3104-4	Central	Akola	21.5	79	6.4	23.9	8.2
92				Amreli	25.9	81	6.2	23.5	6.7
93				Jalgaon	22.7	78	6.4	24.9	6.5
94				Khandwa	24.9	80	3.5	26.0	5.7
95				Nagpur	21.5	79	6.1	22.4	5.5
96				Parbhani	23.8	78	6.7	26.5	5.6
97			South	Dharwad	22.2	79	6.4	22.5	5.8
98				Nandyal	22.2	79	6.3	22.2	
99				**Average**	**23.1**	**79**	**6.0**	**24.0**	**6.3**
100	352	LC	Central	Akola	27.3	82	5.5	27	6.8
101				Amreli	26.3	82	5.3	26.1	6.3
102				Jalgaon	27.6	82	6.0	31.8	6.6
103				Khandwa	23.8	80	3.6	25.5	5.4
104				Nagpur	27.6	82	5.3	29.6	6.1
105				Parbhani	27.8	83	5.7	31.1	6.1
106			South	Dharwad	25.0	81	5.8	24.3	6.8
107				Nandyal	25.8	84	5.7	25.8	
108				**Average**	**26.4**	**82**	**5.4**	**27.7**	**6.3**
109	353	JLA 1313	Central	Akola	26.7	83	5.8	28.2	4.7
110				Amreli	26.4	82	5.7	25.6	6.8
111				Jalgaon	26.4	81	5.6	27.4	6.4
112				Khandwa	24.5	80	3.6	25	5.4
113				Nagpur	25.7	82	5.8	26.1	5.8
114				Parbhani	27.5	81	5.9	29.4	5.0
115			South	Dharwad	26.1	82	5.7	24.9	6.6
116				Nandyal	24.1	80	5.7	24.3	
117				**Average**	**25.9**	**81**	**5.5**	**26.4**	**5.8**
118	354	GAM 273	Central	Akola	27.7	81	5.7	27.3	6.0
119				Amreli	27.0	82	5.6	25.2	5.9
120				Jalgaon	30.0	83	5.7	28.6	7.0
121				Khandwa	25.2	80	3.1	25.1	5.5
122				Nagpur	27.6	84	5.3	30.0	6.1
123				Parbhani	28.9	84	5.8	28.5	4.5
124			South	Dharwad	27.6	82	5.6	25.5	6.2
125				Nandyal	26.9	82	5.5	26.3	
126				**Average**	**27.6**	**82**	**5.3**	**27.1**	**5.9**
127	355	PA 860	Central	Akola	28.8	84	5.8	27.3	4.8
128				Amreli	28.8	83	5.1	27.2	6.2
129				Jalgaon	30.0	83	5.5	31.0	6.6
130				Khandwa	25.3	80	3.2	27	5.6
131				Nagpur	29.3	83	4.9	29.9	6.0
132				Parbhani	28.0	81	5.5	26.9	5.4

133			South	Dharwad	29.5	83	5.4	26.6	6.3
134				Nandyal	26.8	81	5.0	27.4	
135				**Average**	**28.3**	**82**	**5.1**	**27.9**	**5.8**
136	356	MDL 2679	Central	Akola	22.2	80	6.6	23.7	6.4
137				Amreli	23.4	80	6.3	23.9	6.1
138				Jalgaon	23.4	78	6.6	24.6	6.0
139				Khandwa	21.9	75	4.8	21.4	5.3
140				Nagpur	24.2	81	6.8	24.3	5.7
141				Parbhani	21.9	78	6.9	22.5	6.1
142			South	Dharwad	22.8	79	6.4	22.8	6.5
143				Nandyal	21.9	80	6.6	22	
144				**Average**	**22.7**	**79**	**6.4**	**23.1**	**6.0**
145	357	AKA 2013-8	Central	Akola	26.1	82	5.5	27.0	5.9
146				Amreli	26.3	82	5.4	24.7	6.6
147				Jalgaon	26.2	81	5.9	26.2	6.5
148				Khandwa	24.1	81	3	24.4	5.7
149				Nagpur	25.8	84	5.5	26.8	5.8
150				Parbhani	26.2	82	5.9	27.0	6.8
151			South	Dharwad	25.0	81	5.8	24.2	6.6
152				Nandyal	26.0	80	5.8	26.0	
153				**Average**	**25.7**	**82**	**5.4**	**25.8**	**6.3**
154	358	CAN 2035	Central	Akola	26.5	80	5.8	27.7	4.7
155				Amreli	26.2	82	5.6	25.7	6.0
156				Jalgaon	26.0	80	5.5	26.3	6.5
157				Khandwa	25.2	81	3.6	26.9	5.7
158				Nagpur	25.4	82	5.5	26.8	5.8
159				Parbhani	26.2	81	6.2	27.1	3.9
160			South	Dharwad	24.6	81	5.8	24.4	6.9
161				Nandyal	24.9	80	5.6	24.5	
162				**Average**	**25.6**	**81**	**5.5**	**26.2**	**5.6**
163	359	DWDA 1901	Central	Akola	27.2	81	5.3	26.3	4.8
164				Amreli	27.3	82	5.6	25.7	6.8
165				Jalgaon	27.7	82	5.3	28.6	6.5
166				Khandwa	24.3	77	3.7	24.5	5.4
167				Nagpur	27.8	83	5.2	27.0	5.9
168				Parbhani	26.1	82	5.7	26.7	6.2
169			South	Dharwad	28.1	83	5.6	24.9	6.4
170				Nandyal	23.7	80	5.6	22.2	
171				**Average**	**26.5**	**81**	**5.2**	**25.7**	**6.0**

Br.22 a/b IET Long Linted G.arboreum

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	361	PAID 396	Central	Akola	27.9	83	5.3	26.8	4.7
2				Amreli	28.1	83	4.9	26.0	6.5
3				Bharuch	28.0	83	4.8	26.0	5.9
4				Nagpur	29.5	85	5.2	31.3	6.3
5				Parbhani	29.8	84	5.3	28.3	5.2
6			South	Nandyal	28.0	81	5.0	27.5	
7				**Average**	**28.5**	**83**	**5.1**	**27.6**	**5.7**
8	362	PA 880	Central	Akola	27.7	84	4.6	25.3	5.3
9				Amreli	30.6	84	4.7	29.9	6.8
10				Bharuch	28.2	83	4.5	28.4	6.9
11				Nagpur	29.5	84	4.6	31.1	6.2
12				Parbhani	30.1	83	5.2	27.9	4.3
13			South	Nandyal	26.8	82	4.7	25.6	
14				**Average**	**28.8**	**83**	**4.7**	**28.0**	**5.9**
15	363	CINA 1067	Central	Akola	26.4	81	6.0	27.7	5.8
16				Amreli	27.1	82	5.7	26.4	6.9
17				Bharuch	26.9	82	5.7	25.6	6.8
18				Nagpur	25.9	83	6.2	27.8	6.1
19				Parbhani	24.7	81	6.3	25.5	4.9
20			South	Nandyal	24.9	81	6.1	25.7	
21				**Average**	**26.0**	**82**	**6.0**	**26.4**	**6.1**
22	364	PA 869	Central	Akola	28.8	84	5.3	26.0	3.9
23				Amreli	28.3	83	5.2	25.5	6.4
24				Bharuch	29.3	83	5.1	26.1	6.8
25				Nagpur	28.8	82	5.3	27.3	5.9
26				Parbhani	31.0	80	5.7	26.7	5.2
27			South	Nandyal	27.3	82	5.5	25.9	
28				**Average**	**28.9**	**82.3**	**5.4**	**26.3**	**5.6**
29	365	PA 873	Central	Akola	29.3	83	5.1	26.9	4.1
30				Amreli	29.6	83	5.2	26.7	6.8
31				Bharuch	29.0	83	4.6	28.3	6.6
32				Nagpur	30.9	83	5.2	30.5	4.7
33				Parbhani	29.7	83	5.8	25.4	4.0
34			South	Nandyal	29.4	83	5.0	29.7	
35				**Average**	**29.7**	**83**	**5.1**	**27.9**	**5.2**
36	366	CINA 1068	Central	Akola	25.6	81	6.0	28.1	6.7
37				Amreli	27.3	82	5.4	26.5	6.9
38				Bharuch	25.1	81	5.4	24.4	6.7
39				Nagpur	27.1	84	5.3	33.3	5.0
40				Parbhani	25.6	82	5.9	29.4	5.0
41			South	Nandyal	24.1	80	5.5	25.9	

42				**Average**	**25.8**	**82**	**5.6**	**27.9**	**6.1**
43	367	QC	Central	Akola	27.7	84	5.6	27.2	5.3
44				Amreli	28.9	83	5.2	26.1	6.9
45				Bharuch	27.4	82	4.9	25.6	6.6
46				Nagpur	27.7	84	4.7	29.4	5.9
47				Parbhani	27.6	82	5.7	30.2	5.4
48			South	Nandyal	26.9	81	5.3	26.9	
49				**Average**	**27.7**	**83**	**5.2**	**27.6**	**6.0**
50	368	PA 864	Central	Akola	29.9	83	5.1	27.5	4.9
51				Amreli	28.4	83	4.9	26.9	6.9
52				Bharuch	29.5	83	4.6	28.3	6.5
53				Nagpur	26.9	82	4.7	32.5	4.1
54				Parbhani	32.8	77	6.3	25.8	6.4
55			South	Nandyal	29.8	84	5.2	30.5	
56				**Average**	**29.6**	**82**	**5.1**	**28.6**	**5.8**
57	369	PAIG 394	Central	Akola	27.8	84	5.0	29.1	4.5
58				Amreli	28.0	83	5.3	25.2	6.6
59				Bharuch	28.1	83	4.7	27.5	6.6
60				Nagpur	30.0	81	4.7	31.5	5.4
61				Parbhani	28.3	83	5.4	28.1	4.8
62			South	Nandyal	28.7	83	5.0	31.1	
63				**Average**	**28.5**	**83**	**5.0**	**28.7**	**5.6**
64	370	CINA 1069	Central	Akola	26.8	80	5.8	27.5	5.8
65				Amreli	26.9	82	5.5	26.3	6.8
66				Bharuch	25.8	81	5.1	25.1	6.8
67				Nagpur	27.3	83	5.4	29.7	6.2
68				Parbhani	26.3	80	6.0	26.4	5.8
69			South	Nagpur	26.1	83	5.7	27.2	
70				**Average**	**26.5**	**82**	**5.6**	**27.0**	**6.3**

Br.22 a/b IET-G.arboreum

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	381	DDCC 1902	Central	Khandwa	20.7	79	4.3	26.9	6.4
2				Nagpur	23.6	82	5.4	27.6	5.7
3				Nanded	20.7	79	5.5	22.0	5.3
4				Surat	23.9	80	5.1	23.8	6.9
5			South	Dharwad	21.5	78	5.8	22.7	6.4
6				Nandyal	24.1	79	4.8	19.0	
7				**Average**	**22.4**	**79.6**	**5.2**	**23.7**	**6.1**
8	382	ZC	Central	Khandwa	24.7	80	4.1	25.6	6.5
9				Nagpur	26.3	83	5.6	28.0	6.0
10				Nanded	24.6	83	5.5	26.4	5.8

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
11				Surat	26.3	82	5.1	25.1	6.9
12			South	Dharwad	25.8	81	5.5	24.6	6.7
13				Nandyal	29.0	83	5.1	24.2	
14				**Average**	**26.1**	**82.0**	**5.1**	**25.7**	**6.4**
15	383	CAN 18562	Central	Khandwa	24.0	80	4.1	23.2	4.4
16				Nagpur	25.5	82	5.6	27.6	6.0
17				Nanded	22.3	79	4.4	23.1	5.4
18				Surat	25.7	81	5.6	23.4	6.5
19			South	Dharwad	21.8	79	5.8	22.7	6.9
20				Nandyal	23.1	77	5.7	17.9	
21				**Average**	**23.7**	**79.7**	**5.2**	**23.0**	**5.8**
22	384	DDCC 1902	Central	Khandwa	22.4	76	4.7	22.8	4.5
23				Nagpur	24.6	76	5.1	23.7	5.1
24				Nanded	21.3	79	5.6	22.6	5.3
25				Surat	23.8	80	5.4	23.5	6.3
26			South	Dharwad	20.8	78	5.7	22.3	6.2
27				Nandyal	23.1	79	5.2	18.2	
28				**Average**	**22.7**	**78.0**	**5.3**	**22.2**	**5.5**
29	385	DDCC 1901	Central	Khandwa	23.1	78	4.4	23.7	5.6
30				Nagpur	23.1	80	5.6	28.7	5.7
31				Nanded	21.3	79	4.6	22.6	5.3
32				Surat	23.3	80	5.7	23.3	6.6
33			South	Dharwad	19.9	77	5.7	22.1	6.7
34				Nandyal	23.2	81	5.5	18.7	
35				**Average**	**22.3**	**79.1**	**5.3**	**23.2**	**6.0**
36	386	LC	Central	Khandwa	24.7	81	3.8	29.4	5.0
37				Nagpur	27.5	83	5.4	27.1	6.1
38				Nanded	27.6	84	5.1	28.7	5.9
39				Surat	26.6	82	5.2	25.5	6.8
40			South	Dharwad	28.3	83	5.4	26.9	6.1
41				Nandyal	25.8	83	5.5	21.4	
42				**Average**	**26.7**	**82.6**	**5.1**	**26.5**	**6.0**
43	387	CAN 18563	Central	Khandwa	23.1	79	4.3	22.5	5.1
44				Nagpur	25.4	77	6.1	24.3	5.4
45				Nanded	23.3	81	4.7	24.8	5.6
46				Surat	25.2	81	5.6	23.9	6.7
47			South	Dharwad	22.3	79	5.9	22.8	6.4
48				Nandyal	23.6	79	6.3	17.1	
49				**Average**	**23.8**	**79.4**	**5.5**	**22.6**	**5.8**

Br.22 a/b PHT - Desi Hybrid

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	401	KR 147	Central	Amreli	19.7	77	6.4	22.0	6.9
2				Akola	19.3	75	7.1	22.3	9.8
3				Jalgaon	19.7	78	7.2	20.5	5.3
4				Parbhani	18.7	76	7.3	22.3	10.5
5				**Average**	**19.4**	**76**	**7.0**	**21.8**	**8.1**
6	402	ZC	Central	Amreli	24.4	81	5.9	23.9	6.4
7				Akola	22.6	79	6.3	23.2	6.0
8				Jalgaon	24.3	83	6.7	25.4	5.8
9				Parbhani	24.4	80	6.4	23.6	6.5
10				**Average**	**23.9**	**81**	**6.3**	**24.0**	**6.2**
11	403	KR 155	Central	Amreli	19.1	76	6.8	21.9	6.4
12				Akola	20.5	76	7.0	25.1	10.1
13				Jalgaon	19.1	81	7.6	19.2	5.4
14				Parbhani	19.2	77	7.3	22.8	8.9
15				**Average**	**19.5**	**78**	**7.2**	**22.2**	**7.7**
16	404	AJAH 103	Central	Amreli	30.3	84	5.0	25.1	6.1
17				Akola	28.3	82	5.8	25.5	3.2
18				Jalgaon	24.3	82	5.7	25.5	5.7
19				Parbhani	30.0	84	5.4	26.0	3.9
20				**Average**	**28.2**	**83**	**5.5**	**25.5**	**4.7**
21	405	LC	Central	Amreli	23.8	80	6.0	23.5	6.0
22				Akola	23.9	82	5.6	26.6	6.9
23				Jalgaon	24.5	83	5.8	25.8	5.7
24				Parbhani	25.8	81	5.6	27.7	5.4
25				**Average**	**24.5**	**82**	**5.8**	**25.9**	**6.0**
26	406	KR 144	Central	Amreli	19.9	77	6.8	22.0	6.8
27				Akola	20.1	75	7.2	22.7	9.7
28				Jalgaon	19.9	82	7.6	20.1	5.1
29				Parbhani	20.5	78	7.4	21.3	9.6
30				**Average**	**20.1**	**78**	**7.2**	**21.5**	**7.8**
31	407	AKDH 103	Central	Amreli	25.1	81	5.9	24.5	6.7
32				Akola	26.0	82	5.8	26.9	6.3
33				Jalgaon	24.4	83	6.1	25.9	5.7
34				Parbhani	25.8	82	6.0	26.2	5.7
35				**Average**	**25.3**	**82**	**5.9**	**25.9**	**6.1**

Br.32 b IET-G.herbaceum

Sr. No.	Code No.	Entry Name	Zone	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	421	GBhv 312	Central	Bharuch	24.8	80	4.1	22.9	4.8
2				Surat	25.4	78	2.7	25.2	5.5
3				Viramgam	27.0	82	4.2	29.3	5.9
4				**Average**	**25.7**	**80**	**3.7**	**25.8**	**5.4**
5	422	DDhc 1901	Central	Bharuch	24.0	81	5.1	23.7	5.8
6				Surat	24.3	81	3.5	24.6	5.4
7				Viramgam	24.7	81	3.6	26.1	5.6
8				**Average**	**24.3**	**81**	**4.1**	**24.8**	**5.6**
9	423	ZC	Central	Bharuch	25.8	81	4.1	23.5	6.4
10				Surat	22.9	79	3.0	21.6	5.2
11				Viramgam	26.7	80	3.6	29.2	5.7
12				**Average**	**25.1**	**80**	**3.6**	**24.8**	**5.8**
13	424	GShv 780/16	Central	Bharuch	25.5	83	3.8	24.2	4.9
14				Surat	25.6	80	3.6	25.3	5.4
15				Viramgam	25.8	82	4.0	27.6	5.7
16				**Average**	**25.6**	**82**	**3.8**	**25.7**	**5.3**
17	425	GShv 797/16	Central	Bharuch	24.7	82	3.5	23.9	5.8
18				Surat	24.2	78	2.9	23.8	5.3
19				Viramgam	25.4	80	3.4	26.5	5.6
20				**Average**	**24.8**	**80**	**3.3**	**24.7**	**5.6**
21	426	GShv 845	Central	Bharuch	26.5	82	4.6	23.8	5.1
22				Surat	26.4	80	3.4	27.5	5.6
23				Viramgam	25.1	77	2.9	25.9	5.5
24				**Average**	**26.0**	**80**	**3.6**	**25.7**	**5.4**
25	427	GShv 829/16	Central	Bharuch	25.2	83	5	25.1	6.1
26				Surat	24.3	79	3.6	25.2	5.5
27				Viramgam	25.7	80	4.1	27.5	5.7
28				**Average**	**25.1**	**81**	**4.2**	**25.9**	**5.8**
29	428	GBhv 313	Central	Bharuch	24.3	80	3.7	23.2	5.9
30				Surat	25.5	81	3.6	26.3	5.5
31				Viramgam	26.0	80	4.3	28.1	5.8
32				**Average**	**25.3**	**80**	**3.9**	**25.9**	**5.7**
33	429	GShv 329/15	Central	Bharuch	23.9	80	3.9	24.3	4.9
34				Surat	25.5	81	3.2	26.7	5.5
35				Viramgam	28.2	83	4.1	31.0	6
36				**Average**	**25.9**	**81**	**3.7**	**27.3**	**5.5**
37	430	LC	Central	Bharuch	24	80	4.3	22.8	6.8
38				Surat	23.9	79	2.4	21.6	5.1
39				Viramgam	26.4	78	3.6	28.8	5.7

40				**Average**	**24.8**	**79**	**3.4**	**24.4**	**5.9**
41	431	GVhv 936	Central	Bharuch	30.7	83	4.8	28.7	3.5
42				Surat	29.1	81	5.8	27.1	5.7
43				Viramgam	28	80	4.1	29.6	5.8
44				**Average**	**29.3**	**81**	**4.9**	**28.5**	**5.0**

Br25a

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	9031	KR 139	Bathinda	19.4	74	22.0	6.8	6.6
2			Faridkot	18.4	73	21.9	6.7	6.7
3			Hisar	21.1	76	22.4	6.0	6.6
4			Hisar (Shakti Vardak)	19.5	74	22.6	6.4	7.0
5			SGNR	18.8	74	22.2	6.1	6.8
6			Sirsa	21.2	76	22.6	6.5	7.0
8	9032	ZC	Bathinda	18.5	74	22.0	6.8	7.0
9			Faridkot	18.5	74	22.0	6.9	7.3
10			Hisar	20.6	76	22.0	6.4	6.7
11			Hisar (Shakti Vardak)	19.0	74	22.0	6.4	6.9
12			SGNR	18.7	74	22.2	6.2	7.0
13			Sirsa	19.0	74	21.7	6.3	7.2
15	9033	KR 133	Bathinda	20.3	75	22.5	6.3	6.4
16			Faridkot	19.5	75	22.4	6.2	7.3
17			Hisar	21.4	76	23.1	6.3	7.2
18			Hisar (Shakti Vardak)	19.2	74	22.2	6.3	6.8
19			SGNR	19.0	74	22.1	6.1	6.6
20			Sirsa	21.0	76	22.3	6.4	6.8
22	9034	CISAA 18-1	Bathinda	25.2	79	25.5	6.0	6.7
23			Faridkot	23.0	78	24.8	5.8	7.0
24			Hisar	25.7	79	26.3	5.8	6.8
25			Hisar (Shakti Vardak)	24.8	79	26.2	5.7	7.2
26			SGNR	23.2	78	24.8	5.8	6.9
27			Sirsa	24.5	79	25.2	5.7	6.8
29	9035	LC	Bathinda	21.5	76	23.5	6.2	7.2
30			Faridkot	21.6	76	23.1	6.4	6.8
31			Hisar	21.1	76	22.6	6.1	6.5
32			Hisar (Shakti Vardak)	18.6	74	22.1	6.0	6.7
33			SGNR	19.7	75	23.0	6.2	6.7
34			Sirsa	21.8	77	22.9	6.4	6.9
36	9036	KR 136	Bathinda	20.1	75	22.5	6.8	6.7
37			Faridkot	19.6	75	22.3	6.7	6.9
38			Hisar	21.1	76	23.0	6.6	6.6
39			Hisar (Shakti Vardak)	19.4	74	22.3	6.4	6.8

40			SGNR	19.5	75	22.5	6.3	7.1
41			Sirsa	20.3	75	22.2	6.5	7.3

Central Zone Trials

Br03a

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	9101	TSH 367	Bhawanipatna	28.4	87	4.5	28.0	6.1
2			Junagadh	26.8	85	4.9	29.3	5.6
3			Khandwa	26.5	82	3.4	24	8.5
4			Rahuri	27.8	80	4.6	25.3	4.6
5			Surat	28.7	84	4.7	31.4	5.7
6			Talod	29.1	85	4.9	28.5	6.2
7			**Mean**	**27.9**	**84**	**4.5**	**27.8**	**6.1**
8	9102	SHS 113	Bhawanipatna	29.9	86	4.8	29.5	6.2
9			Junagadh	29.0	86	5.0	34.3	5.7
10			Khandwa	26.9	81	3	26.1	8.4
11			Rahuri	31.1	84	3.7	27.1	5.3
12			Surat	32.4	85	4.7	37.8	5.9
13			Talod	31.5	86	5.0	29.2	6.1
14			**Mean**	**30.1**	**85**	**4.4**	**30.7**	**6.3**
15	9103	ZC	Bhawanipatna	28.0	86	4.6	29.5	6.2
16			Junagadh	26.4	86	4.9	31.4	5.6
17			Khandwa	22.5	80	3.1	24.2	7.5
18			Rahuri	26.3	84	3.5	26.4	7.5
19			Surat	26.2	86	4.2	34.4	5.7
20			Talod	28.2	86	4.0	30.5	6.1
21			**Mean**	**26.3**	**85**	**4.1**	**29.4**	**6.4**
22	9104	GJHV 522	Bhawanipatna	27.1	84	6.1	27.6	5.9
23			Junagadh	25.2	85	5.8	28.4	5.4
24			Khandwa	23.2	80	3.7	23.8	7.3
25			Rahuri	26.8	83	3.8	27.4	4.5
26			Surat	27.1	84	5.6	30.1	5.6
27			Talod	26.8	84	5.5	27.7	5.9
28			**Mean**	**26.0**	**83**	**5.1**	**27.5**	**5.8**
29	9105	LC	Bhawanipatna	33.6	85	4.2	30.8	6.1
30			Junagadh	27.0	84	5.7	32.2	5.7
31			Khandwa	23.1	80	3.2	23.5	6.7
32			Rahuri	26.6	85	3.5	26.6	6.7
33			Surat	29.8	86	5.3	35.6	5.8
34			Talod	28.2	85	5.0	28.3	5.9
35			**Mean**	**28.1**	**84**	**4.5**	**29.5**	**6.2**
36	9106	F 2662	Bhawanipatna	28.7	86	3.8	29.4	6.1
37			Junagadh	27.9	86	4.5	30.9	5.6

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
38			Khandwa	24.4	80	3.0	25.6	6.5
39			Rahuri	27.2	81	3.5	27.6	5.7
40			Surat	29.7	86	4.2	33.7	5.7
41			Talod	28.3	86	5.2	28.8	6.0
42			**Mean**	**27.7**	**84**	**4.0**	**29.3**	**5.9**
43	9107	RAH 1076	Bhawanipatna	28.7	84	3.9	28.1	5.9
44			Junagadh	27.8	84	4.5	31.0	5.6
45			Khandwa	26.2	81	2.9	24.3	6.3
46			Rahuri	27.2	83	3.5	26.6	6.3
47			Surat	29.3	85	4.2	33.6	5.8
48			Talod	27.8	84	4.1	28.7	6.0
49			**Mean**	**27.8**	**84**	**3.9**	**28.7**	**6.0**
50	9108	GJHV 554	Bhawanipatna	28.7	84	4.6	29.1	6.1
51			Junagadh	25.6	86	5.5	29.4	5.7
52			Khandwa	24.5	81	3.5	27.4	9.4
53			Rahuri	26.5	83	4.3	25.9	7.7
54			Surat	28.2	86	4.7	32.8	5.8
55			Talod	29.2	85	4.7	28.8	6.0
56			**Mean**	**27.1**	**84**	**4.6**	**28.9**	**6.8**
57	9109	QC	Bhawanipatna	32.7	89	5.1	31.2	6.3
58			Junagadh	31.3	87	5.0	37.4	5.8
59			Khandwa	27.8	82	2.9	27.8	5.8
60			Rahuri	29.5	85	3.6	28.8	4.4
61			Surat	34.0	85	4.1	41.2	6.0
62			Talod	31.2	88	4.8	31.5	6.2
63			**Mean**	**31.1**	**86**	**4.3**	**33.0**	**5.8**

Br04a

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	9111	TCH 1828	Bhawanipatna	32.3	86	4.2	29.3	6.0
2			Junagadh	32.0	84	3.6	32.8	5.5
3			Rahuri	32.8	84	3.3	28.9	3.8
4			Surat	33.6	84	3.8	39.2	5.8
5		**Mean**		**32.7**	**85**	**3.7**	**32.6**	**5.3**
6	9112	QC	Bhawanipatna	31.9	87	5.1	31.1	6.2
7			Junagadh	30.6	87	4.7	38.4	5.8
8			Rahuri	30.6	86	3.5	29.3	5.6
9			Surat	32.8	87	4.2	39.9	5.8

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
10		**Mean**		**31.5**	**87**	**4.4**	**34.7**	**5.9**
11	9113	RAH 1071	Bhawanipatna	30.3	87	5.2	29.6	6.1
12			Junagadh	27.9	85	5.4	32.4	5.7
13			Rahuri	27.0	81	3.5	27.9	5.0
14			Surat	30.4	86	4.6	39.1	5.9
15		**Mean**		**28.9**	**85**	**4.7**	**32.3**	**5.7**
16	9114	ZC	Bhawanipatna	27.2	85	4.3	29.1	6.0
17			Junagadh	26.7	85	4.4	35.6	5.7
18			Rahuri	26.4	83	3.6	26.8	7.3
19			Surat	27.3	86	4.8	34.9	5.8
20		**Mean**		**26.9**	**85**	**4.3**	**31.6**	**6.2**
21	9115	CPD 1501	Bhawanipatna	27.8	85	4.9	29.0	6.0
22			Junagadh	26.1	83	4.4	29.8	5.4
23			Rahuri	27.2	83	3.4	27.0	6.0
24			Surat	25.2	84	4.6	32.1	5.6
25		**Mean**		**26.6**	**84**	**4.3**	**29.5**	**5.8**
26	9116	LC	Bhawanipatna	33.5	86	4.5	31.1	6.2
27			Junagadh	28.2	86	5.5	31.8	5.8
28			Rahuri	27.0	81	3.6	27.8	5.6
29			Surat	28.2	87	5.8	30.5	5.7
30		**Mean**		**29.2**	**85**	**4.9**	**30.3**	**5.8**
31	9117	SIMA 5	Bhawanipatna	33.9	87	4.3	31.8	6.1
32			Junagadh	32.2	84	4.6	32.5	5.7
33			Rahuri	29.4	86	3.0	26.0	4.7
34			Surat	33.4	86	4.5	38.9	5.9
35		**Mean**		**32.2**	**86**	**4.1**	**32.3**	**5.6**

Br05a

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	9121	ZC	Banswara	29.9	83	3.6	30.1	6.3
2			Junagadh	29.9	86	4.7	33.8	5.7
3			Rahuri	28.9	83	3.9	28.1	6.1
4			Talod	30.7	84	4.4	28.2	5.9
5		**Mean**		**29.8**	**84**	**4.1**	**30.1**	**6.0**
6	9122	GSHH 15032	Banswara	29.4	83	4.1	28.8	5.8
7			Junagadh	27.8	85	5.0	31.4	5.6
8			Rahuri	29.0	83	3.9	25.4	4.4
9			Talod	27.4	82	5.3	27.2	5.8
10		**Mean**		**28.4**	**83**	**4.6**	**28.2**	**5.4**

11	9123	LC	Banswara	29.5	83	4.1	31.2	6.9
12			Junagadh	30.4	86	4.9	37.5	5.8
13			Rahuri	29.1	86	4.3	27.5	5.7
14			Talod	33.6	88	4.4	30.8	6.2
15		**Mean**		**30.6**	**86**	**4.4**	**31.7**	**6.1**
16	9124	GJHH 13	Banswara	30.3	83	4.4	30.5	6.7
17			Junagadh	28.7	87	5.3	36.9	5.8
18			Rahuri	31.4	86	4.7	31.2	5.0
19			Talod	31.5	87	5.1	31.3	6.1
		Mean		**30.5**	**86**	**4.9**	**32.5**	**5.9**

Br06a

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	9131	GJHV 534	Banswara	27.7	82	4.1	27.7	6.6
2			Bhawanipatna	28.6	86	4.3	28.1	6.1
3			Junagadh	27.1	86	5.3	32.6	5.6
4			Khandwa	25.3	81	3.3	25.2	9.7
5			Rahuri	28.4	86	3.9	28.1	8.1
			Talod	29.1	86	4.0	28.2	6.0
7		**Mean**		**27.7**	**84**	**4.1**	**28.3**	**7.0**
8	9132	RHC HD 1420	Banswara	28.6	82	3.8	28.4	6.7
9			Bhawanipatna	30.4	86	5.1	28.8	6.1
10			Junagadh	28.4	84	5.4	35.3	5.7
11			Khandwa	25.6	83	3.7	25.2	6.8
12			Rahuri	29.8	85	4.4	28.4	5.1
			Talod	29.0	84	4.6	28.5	5.9
14		**Mean**		**28.6**	**84**	**4.5**	**29.1**	**6.1**
15	9133	LC	Banswara	28.2	82	4.4	29.9	6.4
16			Bhawanipatna	33.1	87	4.4	30.3	6.3
17			Junagadh	28.5	84	5.1	33.2	5.8
18			Khandwa	26.2	81	3.0	26.0	7.2
19			Rahuri	27.7	85	3.9	29.5	6.5
20			Talod	27.9	86	4.6	27.6	5.9
21		**Mean**		**28.6**	**84**	**4.2**	**29.4**	**6.3**
22	9134	SHC 374	Banswara	29.6	83	3.8	30.4	6.8
23			Bhawanipatna	29.9	86	4.6	29.0	6.1
24			Junagadh	29.6	85	4.6	34.8	5.7
25			Khandwa	27.0	84	3.2	26.2	7.0
26			Rahuri	29.6	85	4.4	29.8	5.6
27			Talod	31.1	86	3.9	29.6	6.0
28		**Mean**		**29.5**	**85**	**4.1**	**30.0**	**6.2**
29	9135	DS C 1801	Banswara	26.4	81	4.4	27.8	6.5

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
30			Bhawanipatna	28.1	84	4.9	29.1	6.0
31			Junagadh	25.6	85	4.7	31.0	5.6
32			Khandwa	25.6	82	3.8	26.6	6.1
33			Rahuri	26.7	83	3.8	27.4	5.5
34			Talod	26.9	84	4.6	28.3	5.9
35		**Mean**		**26.5**	**83**	**4.4**	**28.4**	**5.9**
36	9136	RHC HD 1420	Banswara	25.7	80	4.3	28.5	6.1
37			Bhawanipatna	27.4	85	4.2	26.0	5.9
38			Junagadh	24.6	84	4.9	24.8	5.3
39			Khandwa	23.4	78	3.2	22.8	7.4
40			Rahuri	26.8	83	4.0	26.0	5.2
41			Talod	27.2	84	3.8	27.0	5.8
42		**Mean**		**25.9**	**82**	**4.1**	**25.8**	**5.9**
43	9137	ZC	Banswara	31.5	84	3.9	31.4	6.6
44			Bhawanipatna	31.1	86	4.8	30.1	6.1
45			Junagadh	31.6	86	4.9	37.9	5.8
46			Khandwa	29.5	84	3.3	29.3	6.0
47			Rahuri	32.6	87	3.8	32.7	6.9
48			Talod	31.6	88	4.4	32.2	6.2
49		**Mean**		**31.3**	**86**	**4.2**	**32.3**	**6.3**
50	9138	RHC HD 1406	Banswara	29.4	83	4.2	29.4	6.2
51			Bhawanipatna	30.8	86	4.0	28.2	5.9
52			Junagadh	28.6	86	4.6	32.3	5.6
53			Khandwa	26.2	79	3.0	23.8	7.3
54			Rahuri	29.5	84	4.0	28.0	5.1
55			Talod	30.5	85	4.2	28.0	5.9
56		**Mean**		**29.2**	**84**	**4.0**	**28.3**	**6.0**
57	9139	TCH 1897	Banswara	28.1	82	3.6	27.1	5.9
58			Bhawanipatna	28.6	86	4.3	27.7	6.0
59			Junagadh	28.7	87	4.6	32.0	5.7
60			Khandwa	24.7	81	3.3	25.7	7.2
61			Rahuri	27.9	84	3.6	26.5	6.3
62			Talod	30.9	85	4.3	28.0	5.9
63		**Mean**		**28.2**	**84**	**3.9**	**27.8**	**6.2**

Br13a

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	9151	CCB 64	Anand	34.5	86	3.6	41.5	6.3
2			Rahuri	37.4	88	3.2	34.3	5.2
3		**Mean**		**36.0**	**87**	**3.4**	**37.9**	**5.8**
4	9152	DB 1701	Anand	33.7	87	3.9	40.1	6.4
5			Rahuri	33.5	87	3.7	32.7	6.9
6		**Mean**		**33.6**	**87**	**3.8**	**36.4**	**6.7**
7	9153	CCB 26	Anand	36.6	86	3.5	43.6	6.4
8			Rahuri	36.6	87	2.9	36.5	5.6
9		**Mean**		**36.6**	**87**	**3.2**	**40.1**	**6.0**
10	9154	DB 1801	Anand	33.7	87	3.7	40.4	6.6
11			Rahuri	32.4	85	3.8	31.3	6.1
12		**Mean**		**33.1**	**86**	**3.8**	**35.9**	**6.4**
13	9155	ZC	Anand	30.6	86	3.7	39.6	6.3
14			Rahuri	32.7	86	3.8	32.3	6.0
15		**Mean**		**31.7**	**86**	**3.8**	**36.0**	**6.2**
16	9156	DB 1601	Anand	36.4	86	3.7	42.3	6.4
17			Rahuri	32.5	85	3.8	32.0	6
18		**Mean**		**34.5**	**86**	**3.8**	**37.2**	**6.2**
19	9157	CCB 143B	Anand	38.6	87	3.9	45.3	6.5
20			Rahuri	36.3	86	3.2	33.8	5.9
21		**Mean**		**37.5**	**87**	**3.6**	**39.6**	**6.2**
22	9158	CCB 51-2	Anand	36.8	87	3.9	43.9	6.4
23			Rahuri	35.5	85	3.6	33.4	6.2
24		**Mean**		**36.2**	**86**	**3.8**	**38.7**	**6.3**

Br15a

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	9161	RHB 1002	Anand	37.2	86	2.9	39.4	6.1
2			Banswara	37.7	84	2.6	31.4	7.1
3			Rahuri	36.5	86	2.6	30.6	6.5
4		**Mean**		**37.1**	**85**	**2.7**	**33.8**	**6.6**
5	9162	ZC	Anand	35.7	87	3.7	40.5	6.3
6			Banswara	35.6	84	3.8	29.5	7.3
7			Rahuri	33.7	83	3.2	30.3	7.7
8		**Mean**		**35.0**	**85**	**3.6**	**33.4**	**7.1**
9	9163	RHB 1623	Anand	36.3	87	3.9	40.6	6.3
10			Banswara	36.3	84	3.8	29.6	6.4
11			Rahuri	34.9	85	3.2	31.4	6.8
12		**Mean**		**35.8**	**85**	**3.6**	**33.9**	**6.5**
13	9164	LC	Anand	35.6	87	3.9	40.3	6.4
14			Banswara	37.2	84	3.1	34.9	6.8
15			Rahuri	34.4	86	3.1	32.9	8.6
16		**Mean**		**35.7**	**86**	**3.4**	**36.0**	**7.3**
17	9165	LC	Anand	36.2	86	3.6	40.3	6.2
18			Banswara	37.8	84	3.2	33.9	6.9
19			Rahuri	34.6	85	2.8	33.0	7.8
		Mean		**36.2**	**85.0**	**3.2**	**35.7**	**7.0**

Br03a

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	9171	NDLH 20511	Akola	28.6	83	4.1	25.6	5.3
2			Banswara	25.5	80	4.4	28.4	6.5
3			Bharuch	26.9	84	4.9	27.2	5.5
5			Nagpur	26.7	85.0	4.5	27.2	5.8
6			Nanded	28.2	82	3.9	27.0	5.7
7		**Mean**		**27.2**	**83**	**4.4**	**27.1**	**5.8**
8	9172	CNH 09-70	Akola	29.1	84	4.3	29.7	5.5
9			Banswara	25.5	80	4.4	29.0	6.4
10			Bharuch	29.4	86	4.7	30.2	5.6
12			Nagpur	30.9	85.0	4.4	28.5	6.0
13			Nanded	30.7	84	4.0	28.0	5.9
14		**Mean**		**29.1**	**84**	**4.4**	**29.1**	**5.9**
15	9173	LC	Akola	26.9	84	4.3	27.4	6.8
16			Banswara	26.5	81	3.9	26.9	6.4
17			Bharuch	28.4	87	4.2	32.2	5.6
19			Nagpur	27.0	84.0	4.3	27.1	5.9
20			Nanded	28.5	85	4.3	28.0	5.9
21		**Mean**		**27.5**	**84**	**4.2**	**28.3**	**6.1**
22	9174	CPD 1751	Akola	26.1	81	4.8	25.2	7.2
23			Banswara	28.4	82	3.8	26.5	6.1
24			Bharuch	27.5	84	4.4	30.4	5.7
26			Nagpur	26.2	81	4.9	29.0	6.3
27			Nanded	27.0	83	4.0	27.3	5.7
28		**Mean**		**27.0**	**82**	**4.4**	**27.7**	**6.2**
29	9175	ZC	Akola	26.0	83	4.7	27.5	5.7
30			Banswara	24.4	79	3.6	24.7	5.9
31			Bharuch	26.2	84	4.7	26.8	5.3
33			Nagpur	28.0	82.0	4.5	28.1	5.2
34			Nanded	26.0	83	4.5	24.2	5.5
35		**Mean**		**26.1**	**82**	**4.4**	**26.3**	**5.5**
36	9176	CNH 11-11	Akola	29.8	87	4.3	27.3	5.1
37			Banswara	28.7	82	3.3	28.2	6.1
38			Bharuch	30.6	86	4.2	32.3	5.6
40			Nagpur	29.9	83	4.3	27.2	4.4
41			Nanded	30.2	85	3.7	27.1	5.8
42		**Mean**		**29.8**	**85**	**4.0**	**28.4**	**5.4**

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
43	9177	TKH 0250/2	Akola	28.1	83	4.0	24.4	5.7
44			Banswara	28.0	82	3.8	25.4	5.8
45			Bharuch	28.7	85	4.3	30.0	5.4
47			Nagpur	29.3	84.0	3.7	30.2	5.8
48			Nanded	29.1	84	4.0	26.9	5.8
49		**Mean**		**28.6**	**84**	**4.0**	**27.4**	**5.7**
50	9178	QC	Akola	30	86	4.1	28.7	6.4
51			Banswara	30.0	83	3.7	28.2	6.2
52			Bharuch	31.6	87	4.7	36.1	5.9
54			Nagpur	29.1	83	4.0	30.1	5.9
55			Nanded	32.0	86	4.1	29.8	6.2
56		**Mean**		**30.5**	**85**	**4.1**	**30.6**	**6.1**
57	9179	BS 3-17	Akola	26.7	84	4.2	26.3	5.8
58			Banswara	28.5	82	4.2	29.0	5.9
59			Bharuch	29.4	85	4.6	32.3	5.5
61			Nagpur	30.1	84	4.3	30.5	6.0
62			Nanded	31.1	84	4.2	28.0	5.9
63		**Mean**		**29.2**	**84**	**4.3**	**29.2**	**5.8**
64	9180	CPD 1752	Akola	29.0	86	4.2	30.0	4.2
65			Banswara	27.8	82	3.7	25.8	5.7
66			Bharuch	29.7	86	4.5	32.0	5.5
68			Nagpur	27.4	84	4.1	29.7	4.4
69			Nanded	31.2	84	4.0	27.2	5.8
70		**Mean**		**29.0**	**84**	**4.1**	**28.9**	**5.1**
71	9181	CPD 1752	Akola	28.6	84	4.3	26.8	5.6
72			Banswara	27.9	82	3.4	27.3	6.0
73			Bharuch	29.1	84	4.0	32.2	5.5
75			Nagpur	29.1	84	4.2	26.9	5.8
76			Nanded	30.0	83	4.3	27.4	5.8
77		**Mean**		**28.9**	**83**	**4.0**	**28.1**	**5.7**
78	9182	CPD 1752	Akola	28.1	85	4.2	28.4	5.8
79			Banswara	27.1	81	4.2	26.5	6.0
80			Bharuch	29.9	86	4.4	33.1	5.6
82			Nagpur	29.1	84	4.6	27.3	6.7
83			Nanded	29.6	86	4.0	28.4	5.8
84		**Mean**		**28.8**	**84**	**4.3**	**28.7**	**6.0**

Br04b

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	9191	ZC	Akola	26.1	83	3.9	24.2	6.4
2			Banswara	29.2	83	3.5	25.9	6.0
3			Bharuch	29.7	84	4.1	30.7	5.6
4			Nanded	29.7	84	4.1	26.7	5.7
5		**Mean**		**28.7**	**83**	**3.9**	**26.9**	**5.9**
6	9192	NDLH 20511	Akola	28.3	84	4.3	24.6	4.3
7			Banswara	27.4	81	4.3	28.3	6.0
8			Bharuch	28.4	84	4.8	29.8	5.6
9			Nanded	29.1	84	4.2	27.3	5.8
10		**Mean**		**28.3**	**83**	**4.4**	**27.5**	**5.4**
11	9193	LC	Akola	25.1	80	4.6	23.7	6.4
12			Banswara	27.9	82	4.1	29.1	6.2
13			Bharuch	28.0	85	4.1	31.1	5.6
14			Nanded	28.0	83	4.3	26.4	5.7
15		**Mean**		**27.3**	**82**	**4.3**	**27.6**	**6.0**
16	9194	CNH 11-11	Akola	25.6	81	4.1	27.8	7.2
17			Banswara	26.1	81	4.0	30.0	6.3
18			Bharuch	25.9	84	5.0	30.4	5.6
19			Nanded	31.4	85	4.6	28.0	6.0
20		**Mean**		**27.3**	**83**	**4.4**	**29.1**	**6.3**
21	9195	QC	Akola	31.5	86	4.5	28.6	4.4
22			Banswara	30.3	83	4.3	28.9	5.9
23			Bharuch	31.9	86	4.7	36.6	5.9
24			Nanded	32.4	86	4.4	30.5	6.2
25		**Mean**		**31.5**	**85**	**4.5**	**31.2**	**5.6**

Br06b

11			Surat	29.3	85	4.7	32.5	5.8
12		**Mean**		**28.2**	**85**	**4.3**	**27.6**	**5.9**
13	9204	LC	Akola	27.2	84	4.7	25.1	6.6
14			Nanded	28.7	84	4.2	26.7	5.7
15			Surat	28.8	86	4.3	39.5	5.8
16		**Mean**		**28.2**	**85**	**4.4**	**30.4**	**6.0**
17	9205	RAHC 1029	Akola	31.4	85	4.3	29.2	4.0
18			Nanded	30.5	84	4.2	27.8	5.8
19			Surat	32.9	85	4.6	38.3	5.9
20		**Mean**		**31.6**	**85**	**4.4**	**31.8**	**5.2**
21	9206	AKH 1301	Akola	27.1	83	4.7	24.9	6.9
22			Nanded	28.0	84	4.6	25.8	5.7
23			Surat	30.6	85	4.8	33.5	5.8
24		**Mean**		**28.6**	**84**	**4.7**	**28.1**	**6.1**
25	9207	GISV 312	Akola	24.7	81	5.2	24.4	7.9
26			Nanded	25.6	82	5.1	25.8	5.7
27			Surat	26.2	83	5.1	29.8	5.6
28		**Mean**		**25.5**	**82**	**5.1**	**26.7**	**6.4**
29	9208	ZC	Akola	31.5	88	4.7	30.9	5.8
30			Nanded	30.8	85	4.4	29.1	6.0
31			Surat	30.2	85	4.7	35.1	5.7
32		**Mean**		**30.8**	**86**	**4.6**	**31.7**	**5.8**
33	9209	RHC HD 1406	Akola	29.1	84	4.1	25.8	5.5
34			Nanded	28.9	83	4.1	27.1	5.7
35			Surat	32.7	86	4.6	37.2	5.9
36		**Mean**		**30.2**	**84.0**	**4.3**	**30.0**	**5.7**

Br24b CVT

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	9221	CAN 1054	Akola	25.6	80	5.8	26.7	6.4
2			Amreli	26.9	85	5.7	34.1	5.8
3			Jalgaon	27.4	84	5.9	28.6	5.9
5			Khandwa	24.3	82	3.2	28.0	5.9
6			Nagpur	25.9	80	5.6	27.3	5.8
7			Parbhani	28.2	83	5.7	31.0	4.9
9			Viramgam	26.5	78	3.0	28.6	5.7
10		**Mean**		**26.4**	**82**	**5.0**	**29.2**	**5.8**
11	9222	AKA 14-51	Akola	25.8	81	5.8	26.8	6.9
12			Amreli	27.1	84	5.5	33.2	5.7
13			Jalgaon	27.4	84	6.2	29.5	6.0
15			Khandwa	25.1	80	3.3	27.0	6.2
16			Nagpur	26.1	82	5.4	26.9	6.0
17			Parbhani	26.6	80	5.8	28.5	5.8
19			Viramgam	24.5	79.0	3.8	25.8	5.6
20		**Mean**		**26.1**	**81**	**5.1**	**28.2**	**6.0**
21	9223	MDL 2667	Akola	25.8	81	6.1	26.6	5.7
22			Amreli	27.4	81	6.1	33.0	5.8
23			Jalgaon	28.2	83	6.0	28.2	5.9
25			Khandwa	24.7	81	3.2	26.7	7.2
26			Nagpur	26.1	83	6.1	26.8	5.9
27			Parbhani	26.4	82	6.1	27.5	5.8
29			Viramgam	25.8	81	3.2	28.0	5.7
30		**Mean**		**26.3**	**82**	**5.3**	**28.1**	**6.0**
31	9224	MDL 2663	Akola	25.6	77	6.3	28.7	5.9
32			Amreli	26.2	84	6.2	34.1	5.8
33			Jalgaon	26.9	83	6.2	28.8	6.1
35			Khandwa	23.2	80	3.0	27.4	5.2
36			Nagpur	24.4	81	6.8	26.3	5.8
37			Parbhani	26.7	79	6.3	29.1	4.4
39			Viramgam	24.0	79	3.5	25.9	5.5
40		**Mean**		**25.3**	**80**	**5.5**	**28.6**	**5.5**
41	9225	LC	Akola	26.5	84	5.4	26.0	7.0
42			Amreli	26.2	84	5.6	32.9	5.7
43			Jalgaon	27.1	84	6.4	28.1	5.9
45			Khandwa	25.4	82	3.5	28.5	6.3
46			Nagpur	27.3	82	6.0	27.8	6.0
47			Parbhani	25.2	82	5.7	26.7	5.8
49			Viramgam	23.8	79	3.8	25.0	5.8
50		**Mean**		**25.9**	**82**	**5.2**	**27.9**	**6.1**

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
51	9226	JLA 1207	Akola	25.0	80	5.9	23.9	7.3
52			Amreli	25.4	84	5.9	30.9	5.7
53			Jalgaon	26.5	84	6.0	27.5	5.9
55			Khandwa	23.5	81	3.3	25.1	6.4
56			Nagpur	26.1	83	5.5	28.3	6.0
57			Parbhani	24.5	82	5.8	25.5	5.8
59			Viramgam	24.1	80	3.4	25.2	5.6
60		**Mean**		**25.0**	**82**	**5.1**	**26.6**	**6.1**
61	9227	GAM 259	Akola	26.4	82	5.6	27.1	5.5
62			Amreli	26.9	84	5.6	33.5	5.7
63			Jalgaon	27.8	84	5.7	30.1	6.0
65			Khandwa	24.8	81	3.1	27.5	5.8
66			Nagpur	27.1	84	5.3	29.5	6.0
67			Parbhani	27.4	84	5.7	28.5	4.5
69			Viramgam	24.6	80	3.4	25.8	5.7
70		**Mean**		**26.4**	**83**	**4.9**	**28.9**	**5.6**
71	9228	ZC	Akola	25.2	79	5.9	24.5	8.2
72			Amreli	26.5	84	5.8	31.7	5.7
73			Jalgaon	27.2	85	6.0	29.5	6.0
75			Khandwa	24.1	81.0	3.2	26.1	6.2
76			Nagpur	26.8	83	5.6	29.3	6.1
77			Parbhani	23.9	81	5.9	25.5	5.6
79			Viramgam	24.0	79	3.5	24.4	5.4
80		**Mean**		**25.4**	**82**	**5.1**	**27.3**	**6.2**
81	9229	DWDa 1802	Akola	26.4	83	5.8	26.6	5.8
82			Amreli	27.1	83	5.8	32.1	5.7
83			Jalgaon	27.9	85	5.9	27.6	5.8
85			Khandwa	25.7	80	3.5	26.6	4.9
86			Nagpur	26.0	83	5.5	25.3	5.6
87			Parbhani	25.9	82	5.4	27.9	5.8
89			Viramgam	25.2	79	3.7	27.2	5.6
90		**Mean**		**26.3**	**82**	**5.1**	**27.6**	**5.6**
91	9230	CAN 1031	Akola	25.7	80	5.7	25.6	8.1
92			Amreli	27.1	85	5.9	33.7	5.8
93			Jalgaon	26.7	84	5.7	28.8	6.0
95			Khandwa	26.0	82	3.2	27.7	6.4
96			Nagpur	25.3	83	5.4	26.2	6.0
97			Parbhani	26.1	81	5.7	27.7	5.4
99			Viramgam	24.7	82	3.4	26.1	5.5
100		**Mean**		**25.9**	**82**	**5.0**	**28.0**	**6.2**

Zonal Trials Central: Br-24b CVT - Long linted G.arboreum

37			Nagpur	28.9	82	4.8	30.2	6
39			Viramgam	27.3	81	3.1	29.6	5.7
40		**Mean**		**29.0**	**83**	**4.5**	**30.2**	**5.4**
41			Akola	28.1	83	5.1	25.7	5.8
42			Amreli	30.0	84	5.0	33.9	5.7
43			Jalgaon	30.9	85	5.1	29.7	6.1
45	9235	PAIG 384	Khandwa	27.3	84	2.8	31.2	5.4
46			Parbhani	31.3	85	5.4	29.2	4.2
47			Nagpur	28.4	84	4.5	30.8	6.1
49			Viramgam	28.7	81	3.1	30	5.8
50		**Mean**		**29.2**	**84**	**4.4**	**30.1**	**5.6**
51			Akola	28.2	83	4.7	27.3	5.7
52			Amreli	30.6	84	5.1	35.5	5.8
53			Jalgaon	31.5	85	5.0	30.3	6.0
55	9236	PA 806	Khandwa	29.7	81	3.1	29	5.8
56			Parbhani	28.4	80	5.1	27.3	5.2
57			Nagpur	30.7	81	4.2	30	5.8
59			Viramgam	25.9	80	3.0	28.3	5.6
60		**Mean**		**29.3**	**82**	**4.3**	**29.7**	**5.7**
61			Akola	28.8	84	5.3	25.9	4.7
62			Amreli	30.5	83	5.1	32.7	5.7
63			Jalgaon	30.6	85	5.3	31.3	6.1
65	9237	PAIG 377	Khandwa	26.5	82	3.0	27	7.4
66			Parbhani	30.2	85	5.3	29.6	4.5
67			Nagpur	29.4	82	4.6	31.2	6.0
69			Viramgam	28.0	82	3.0	28.3	5.7
70		**Mean**		**29.1**	**83.0**	**4.5**	**29.4**	**5.7**
71			Akola	26.5	84	5.7	28.5	6.0
72			Amreli	28.8	84	5.6	34.0	5.8
73			Jalgaon	28.8	84	5.2	29.3	5.9
75	9238	PA 839	Khandwa	25.4	82	3.0	25.3	6.6
76			Parbhani	29.2	83	5.3	30.1	4.7
77			Nagpur	31.1	84	4.5	32.4	6.3
79			Viramgam	26.4	80	3.4	27	5.6
80		**Mean**		**28.0**	**83**	**4.7**	**29.5**	**5.8**
81			Akola	28.7	85	5.6	28.3	5.9
82			Amreli	30.0	86	5.3	32.6	5.7
83			Jalgaon	30.2	86	5.5	30.1	6.1
85	9239	PA 837	Khandwa	28.0	84	2.9	27.3	5.0
86			Parbhani	29.5	83	5.3	27.7	4.0
87			Nagpur	29.3	83	5.1	28.3	5.9

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
51	9236	PA 806	Akola	28.2	83	4.7	27.3	5.7
52			Amreli	30.6	84	5.1	35.5	5.8
53			Jalgaon	31.5	85	5.0	30.3	6.0
55			Khandwa	29.7	81	3.1	29	5.8
56			Parbhani	28.4	80	5.1	27.3	5.2
57			Nagpur	30.7	81	4.2	30	5.8
59			Viramgam	25.9	80	3.0	28.3	5.6
60		**Mean**		**29.3**	**82**	**4.3**	**29.7**	**5.7**
61	9237	PAIG 377	Akola	28.8	84	5.3	25.9	4.7
62			Amreli	30.5	83	5.1	32.7	5.7
63			Jalgaon	30.6	85	5.3	31.3	6.1
65			Khandwa	26.5	82	3.0	27	7.4
66			Parbhani	30.2	85	5.3	29.6	4.5
67			Nagpur	29.4	82	4.6	31.2	6.0
69			Viramgam	28.0	82	3.0	28.3	5.7
70		**Mean**		**29.1**	**83.0**	**4.5**	**29.4**	**5.7**
71	9238	PA 839	Akola	26.5	84	5.7	28.5	6.0
72			Amreli	28.8	84	5.6	34.0	5.8
73			Jalgaon	28.8	84	5.2	29.3	5.9
75			Khandwa	25.4	82	3.0	25.3	6.6
76			Parbhani	29.2	83	5.3	30.1	4.7
77			Nagpur	31.1	84	4.5	32.4	6.3
79			Viramgam	26.4	80	3.4	27	5.6
80		**Mean**		**28.0**	**83**	**4.7**	**29.5**	**5.8**
81	9239	PA 837	Akola	28.7	85	5.6	28.3	5.9
82			Amreli	30.0	86	5.3	32.6	5.7
83			Jalgaon	30.2	86	5.5	30.1	6.1
85			Khandwa	28.0	84	2.9	27.3	5.0
86			Parbhani	29.5	83	5.3	27.7	4.0
87			Nagpur	29.3	83	5.1	28.3	5.9
89			Viramgam	27.5	80	3.4	30	5.8
90		**Mean**		**29.0**	**84**	**4.7**	**29.2**	**5.5**
91	9240	PAIG 373	Akola	29.1	83	4.9	24.3	4.6
92			Amreli	30.6	84	5.2	35.5	5.8
93			Jalgaon	30.7	86	5.2	29.8	6.0
95			Khandwa	27.1	81	3	26	5
96			Parbhani	30.3	83	5.2	28	4.2
97			Nagpur	30.2	84	4.7	30.9	6
99			Viramgam	28.5	80	3	26.7	5.7
100		**Mean**		**29.5**	**83**	**4.5**	**28.7**	**5.3**

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
101	9241	QC	Akola	26.6	83	5.4	27.6	5.1
102			Amreli	29.0	84	5.2	34.0	5.7
103			Jalgaon	28.6	84	5.5	29.6	6.1
105			Khandwa	26.2	82	3.2	28.4	5.0
106			Parbhani	30.6	82	5.3	26.2	4.4
107			Nagpur	26.9	83	5.0	29.3	6.0
109			Viramgam	25.5	79	3.3	25.6	5.7
110		**Mean**		**27.6**	**82**	**4.7**	**28.7**	**5.4**
111	9242	CAN 1065	Akola	26.8	81	5.6	26.0	7.1
112			Amreli	26.4	84	5.3	32.5	5.7
113			Jalgaon	28.2	83	5.5	29.9	6.0
115			Khandwa	27.1	82	3.2	27.8	7.1
116			Parbhani	27.0	81	5.7	28.9	4.4
117			Nagpur	26.6	83	4.8	27.7	6
119			Viramgam	26.4	80	3.7	28.6	5.8
120		**Mean**		**26.9**	**82**	**4.8**	**28.8**	**6.0**

Br25b

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	UI	Mic	Str (g/tex)	E%
1	9251	AJHC 102	Akola	25.3	83	6.1	29.1	6.1
2			Amreli	26.6	85	6.1	33.0	5.7
3			Aurangabad	23.4	81	5.4	24.9	5.6
4			Jalgaon	25.3	82	6.4	27.1	5.8
8		**Mean**		**25.2**	**83**	**6.0**	**28.5**	**5.8**
9	9252	NACH 560	Akola	24.3	79	5.9	25.3	7.2
10			Amreli	23.5	83	6.6	29.4	5.5
11			Aurangabad	20.9	78	6.0	20.7	5.3
12			Jalgaon	21.4	80	6.4	22.5	5.4
16		**Mean**		**22.5**	**80**	**6**	**24**	**6**
17	9253	LC	Akola	24.3	79	5.8	25.4	7.3
18			Amreli	25.1	83	6.2	28.6	5.6
19			Aurangabad	22.0	79	5.7	23.1	5.6
20			Jalgaon	24.7	82	5.7	26.0	5.7
24		**Mean**		**24.0**	**81**	**5.9**	**25.8**	**6.1**
25	9254	NACH 556	Akola	23.1	78	7.4	26.4	6.2
26			Amreli	24.0	84	6.7	31.6	5.7
27			Aurangabad	20.5	80	6.5	21.0	5.4
28			Jalgaon	24.0	81	5.8	25.8	5.6
32		**Mean**		**22.9**	**81**	**6.6**	**26.2**	**5.7**
33	9255	PKV DH1 (ZC)	Akola	25.4	84	5.9	30.4	5.9
34			Amreli	26.3	84	5.8	32.5	5.7
35			Aurangabad	24.0	80	5.3	24.7	5.6
36			Jalgaon	25.3	84	5.8	27.2	5.8
40		**Mean**		**25.3**	**83**	**5.7**	**28.7**	**5.8**

South Zone Trials

Br03a

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML	UI	Mic	Str (g/tex)
1	9501	RAH 1075	Dharwad	27.5	23.2	84	4.5	26.6
2			Guntur	27.7	23.2	84	4.8	28.3
3			UAS Raichur	29.8	24.9	84	4.9	32.3
4			Srivilliputhur	27.5	23.1	84	4.5	28.7
5		**Mean**		**28.1**	**23.6**	**84**	**4.7**	**29.0**
6	9502	BS 4-18	Dharwad	32.1	28.1	88	4.2	32.5
7			Guntur	31.1	26.3	85	4.4	31.1
8			UAS Raichur	32.3	27.7	86	4.4	28.1
9			Srivilliputhur	33.1	28.4	86	3.8	32.7
10		**Mean**		**32.2**	**27.6**	**86**	**4.2**	**31.1**
11	9503	GSHV 208	Dharwad	29.4	24.7	84	4.5	31
12			Guntur	29.5	24.2	82	4.9	30.7
13			UAS Raichur	29.1	24.5	84	4.6	30.4
14			Srivilliputhur	28.0	23.2	83	4.4	30.4
15		**Mean**		**29.0**	**24.2**	**83**	**4.6**	**30.6**
16	9504	CPD 1701	Dharwad	27.2	22.5	83	4.9	26.8
17			Guntur	26.9	22	82	5.2	26.9
18			UAS Raichur	28.6	24.2	85	4.7	25.9
19			Srivilliputhur	28.5	23.7	83	4.4	30.0
20		**Mean**		**27.8**	**23.1**	**83**	**4.8**	**27.4**
21	9505	ZC	Dharwad	30.6	26.3	86	5.4	28.1
22			Guntur	29.8	25.4	85	5	31
23			UAS Raichur	31.5	26.9	85	4.9	30
24			Srivilliputhur	29.1	24.9	86	4.3	29.3
25		**Mean**		**30.3**	**25.9**	**86**	**4.9**	**29.6**
26	9506	GISV 332	Dharwad	27.3	22.8	84	4.9	28.5
27			Guntur	27.3	23.1	85	5	28.6
28			UAS Raichur	26.9	21.7	81	4.4	26.4
29			Srivilliputhur	26.1	21.7	83	4.5	25.4
30		**Mean**		**26.9**	**22.3**	**83**	**4.7**	**27.2**
31	9507	GJHV 554	Dharwad	27.4	23.4	85	4.6	28.6
32			Guntur	27.6	23.4	85	4.9	26.9

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML	UI	Mic	Str (g/tex)
33			UAS Raichur	29	25	86	4.9	28
34			Srivilliputhur	25.9	21.7	84	4.6	28.0
35		**Mean**		**27.5**	**23.4**	**85**	**4.8**	**27.9**
36	9508	LC	Dharwad	28.7	24.6	86	4.9	30.2
37			Guntur	30.8	26.1	85	5.1	30.3
38			UAS Raichur	29.4	25.1	86	4.7	25.9
39			Srivilliputhur	31.2	26.6	85	3.1	31.0
40		**Mean**		**30.0**	**25.6**	**86**	**4.5**	**29.4**
41	9509	RAH 1076	Dharwad	29.2	24.8	85	4.8	30.3
42			Guntur	29.6	24.9	84	5.1	30.7
43			UAS Raichur	28.8	24.4	85	4.8	25.6
44			Srivilliputhur	28.7	24.1	84	4.7	28.0
45		**Mean**		**29.1**	**24.6**	**85**	**4.9**	**28.7**
46	9510	TSH 357	Dharwad	28.2	23.7	84	4.5	28.2
47			Guntur	27.3	23.1	84	5.1	28.6
48			UAS Raichur	28.1	23.4	83	4.4	26.4
49			Srivilliputhur	29.5	25.7	87	4.5	27.7
50		**Mean**		**28.3**	**24.0**	**85**	**4.6**	**27.7**
51	9511	TCH 1837	Dharwad	32.5	27.7	85	4.2	27.6
52			Guntur	30.5	25.6	84	4.8	30.4
53			UAS Raichur	31.7	26.7	84	4.6	28.6
54			Srivilliputhur	30.5	26.2	85	3.7	30.7
55		**Mean**		**31.3**	**26.6**	**85**	**4.3**	**29.3**
56	9512	QC	Dharwad	31.9	27.9	88	4.7	33.5
57			Guntur	31	26.4	85	4.9	32.1
58			UAS Raichur	33.3	28.2	85	4.9	30
59			Srivilliputhur	31.0	27.2	88	4.2	34.0
60		**Mean**		**31.8**	**27.4**	**87**	**4.7**	**32.4**

Br04a

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML (mm)	UI	Mic	St (g/tex)
1	9521	RHC 1217	Dharwad	26.3	22.1	84	4.9	26.6
2			Guntur	27.8	23.6	85	5.5	30.1

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML (mm)	UI	Mic	St (g/tex)
3			UAS Raichur	25.1	21.1	84	5.7	23.4
4			Srivilliputhur	28.0	23.1	82	4.8	27.2
5		**Mean**		**26.8**	**22.5**	**84**	**5.2**	**26.8**
6	9522	GSHV 185	Dharwad	26.5	22.0	83	4.7	28.0
7			Guntur	27.7	23.1	83	5.0	30.5
8			UAS Raichur	27.7	23.3	84	5.6	25.2
9			Srivilliputhur	32.7	29.5	90	3.4	33.5
10		**Mean**		**28.7**	**24.5**	**85**	**4.7**	**29.3**
11	9523	LC	Dharwad	26.8	22.4	84	4.8	26.3
12			Guntur	28.5	24.1	85	5.0	28.8
13			UAS Raichur	28.3	24.2	85	5.2	26.0
14			Srivilliputhur	28.2	24.2	86	5.0	30.2
15		**Mean**		**28.0**	**23.7**	**85**	**5.0**	**27.8**
16	9524	SIMA-5	Dharwad	33.6	29.5	88	4.0	31.9
17			Guntur	31.6	27.4	87	4.9	32.1
18			UAS Raichur	33.9	29.0	85	4.7	31.1
19			Srivilliputhur	27.5	23.3	85	5.2	28.9
20		**Mean**		**31.7**	**27.3**	**86**	**4.7**	**31.0**
21	9525	QC	Dharwad	31.7	27.5	87	4.8	33.6
22			Guntur	31.9	27.3	86	5.3	32.4
23			UAS Raichur	31.5	26.9	85	4.9	28.8
24			Srivilliputhur	26.7	22.2	83	4.4	27.0
25		**Mean**		**30.5**	**26.0**	**85**	**4.9**	**30.5**
26	9526	CPD 1702	Dharwad	26.2	21.6	83	5.2	25.9
27			Guntur	26.2	22	84	5.0	25.6
28			UAS Raichur	27.2	22.6	83	5.0	24.6
29			Srivilliputhur	30.5	26.7	88	4.4	32.6
30		**Mean**		**27.5**	**23.2**	**85**	**4.9**	**27.2**
31	9527	TSH 325	Dharwad	27.2	23.2	85	5.0	27.2
32			Guntur	27.1	22.7	84	5.4	26.1
33			UAS Raichur	27.8	22.9	83	5.8	26.0
34			Srivilliputhur	32.3	29.1	90	4.1	37.0
35		**Mean**		**28.6**	**24.5**	**86**	**5.1**	**29.1**
36	9528	ZC	Dharwad	29.6	25.5	86	5.0	30.9
37			Guntur	30.8	25.9	84	32	4.8

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML (mm)	UI	Mic	St (g/tex)
38			UAS Raichur	28.4	24.1	85	5.4	26.4
39			Srivilliputhur	31.0	27.0	87	3.5	30.8
40		**Mean**		**30.0**	**25.6**	**86**	**11.5**	**23.2**
41	9529	BS1	Dharwad	32.3	28.8	89	3.8	31.9
42			Guntur	27.2	22.7	83	5.2	26.5
43			UAS Raichur	31.9	27.4	86	4.5	29.0
44			Srivilliputhur	26.4	22.4	85	4.5	28.2
45		**Mean**		**29.5**	**25.3**	**86**	**4.5**	**28.9**
46	9530	HS 298	Dharwad	26.0	22.0	85	4.5	25.1
47			Guntur	31.6	27.4	87	4.1	33.2
48			UAS Raichur	27.7	23.3	84	5.4	24.9
49			Srivilliputhur	24.4	20.3	83	5.0	23.6
50		**Mean**		**27.4**	**23.3**	**85**	**4.8**	**26.7**

Br05a

Sr.No.	Code No.	Entry Name	Location	UHML (mm)	ML (mm)	UI	Mic	Str (g/tex)
1	9531	DHH 1902	KSSC Dharwad	27.8	24.0	86	5.3	24.1
2			Guntur	27.8	23.8	86	5.0	30.0
3			UAS Raichur	28.1	24.0	86	4.3	25.5
4			UAS Raichur	27.0	22.2	82	4.1	23.3
5			Srivilliputhur	27.9	23.8	85	4.7	29.9
6		**Mean**		**27.7**	**23.6**	**85**	**4.7**	**26.6**
7	9532	BGDHH 697	KSSC Dharwad	31.2	26.9	86	5.0	26.4
8			Guntur	30.4	25.8	85	4.5	28.5
9			UAS Raichur	29.4	24.8	85	4.7	28.8
10			UAS Raichur	24.5	19.8	81	2.8	23.1
11			Srivilliputhur	29.9	25.7	86	4.4	30.4
12		**Mean**		**29.1**	**24.6**	**85**	**4.3**	**27.4**
13	9533	ARBHH 1901	KSSC Dharwad	31.4	26.9	86	5.0	26.4
14			Guntur	29.2	24.1	83	4.7	27.7
15			UAS Raichur	31.6	26.7	85	4.1	29.5
16			UAS Raichur	26.2	20.6	79	3.7	21.6
17			Srivilliputhur	31.0	25.7	83	4.5	27.5
18		**Mean**		**29.9**	**24.8**	**83**	**4.4**	**26.5**
19	9534	ZC	KSSC Dharwad	29	24.8	85	5.5	25.1
20			Guntur	28.9	24.5	85	5.2	27.6

Sr.No.	Code No.	Entry Name	Location	UHML (mm)	ML (mm)	UI	Mic	Str (g/tex)
21			UAS Raichur	28.7	23.9	83	5.4	26.8
22			UAS Raichur	26.6	22.3	84	4.2	23.5
23			Srivilliputhur	29.8	25.7	86	4.3	30.0
24		**Mean**		**28.6**	**24.2**	**85**	**4.9**	**26.6**
25	9535	LAHH 36	KSSC Dharwad	28.9	25	86	5.4	25.6
26			Guntur	28.9	24.7	85	5.2	29.0
27			UAS Raichur	29.2	24.4	84	4.9	27.0
28			UAS Raichur	26.8	22.3	83	4.6	22.7
29			Srivilliputhur	28.0	23.9	85	4.5	28.5
30		**Mean**		**28.4**	**24.1**	**85**	**4.9**	**26.6**
31	9536	ARBHH 1902	KSSC Dharwad	29.3	25.1	86	5.5	24.1
32			Guntur	28.8	23.9	83	4.8	28.6
33			UAS Raichur	29.4	24.2	82	4.6	26.1
34			UAS Raichur	26.1	21.3	82	3.8	21.5
35			Srivilliputhur	28.0	23.4	84	4.0	25.9
36		**Mean**		**28.3**	**23.6**	**83**	**4.5**	**25.2**
37	9537	LC	KSSC Dharwad	30.4	25.5	84	5.1	24.6
38			Guntur	28.3	23.8	84	5.1	29.0
39			UAS Raichur	28.9	24.5	85	5.2	26.3
40			UAS Raichur	25.2	21.2	84	4.9	20.8
41			Srivilliputhur	28.8	24.6	86	4.9	29.7
42		**Mean**		**28.3**	**23.9**	**85**	**5.0**	**26.1**
43	9538	DHH 1901	KSSC Dharwad	28.6	23.9	83	5.2	23.6
44			Guntur	26.8	22.6	84	5.7	25.6
45			UAS Raichur	27.4	22.9	87	5.2	24.9
46			UAS Raichur	23.8	19.2	81	4.3	21.6
47			Srivilliputhur	25.8	21.3	83	4.9	27.8
48		**Mean**		**26.5**	**22.0**	**84**	**5.1**	**24.7**
49	9539	RAHH 1952	KSSC Dharwad	29.4	25.4	87	4.8	27.5
50			Guntur	28.4	24.2	85	5.0	29.5
51			UAS Raichur	26.4	22.3	84	5.0	25.1
52			UAS Raichur	26.1	21.7	83	4.2	22.4
53			Srivilliputhur	28.6	24.5	86	4.9	30.7
54		**Mean**		**27.8**	**23.6**	**85**	**4.8**	**27.0**
55	9540	RAHH 1951	KSSC Dharwad	30.4	26.2	86	4.8	28.3
56			Guntur	29.2	24.6	84	4.8	29.4
57			UAS Raichur	29.9	25.3	85	4.6	26.8
58			UAS Raichur	27.4	23.2	85	3.9	26.3
59			Srivilliputhur	30.2	26.7	88	4.3	30.6
60		**Mean**		**29.4**	**25.2**	**86**	**4.5**	**28.3**

Br06a

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML (mm)	UI	Mic	Str (g/tex)
1	9551	PBH 174	Dharwad	27.9	23.7	85	4.3	25.6
2			Guntur	29.2	25.3	87	5.0	29.4
4			UAS Raichur	28.9	24.4	85	5.0	26.7
5			Srivilliputtur	28.3	24.4	86	3.9	29.3
6		**Mean**		**28.6**	**24.5**	**86**	**4.6**	**27.8**
7	9552	RHC HD1433	Dharwad	25.3	20.9	83	4.8	24.2
8			Guntur	29.1	23.8	82	5.2	27.8
10			UAS Raichur	26.9	23.1	86	4.9	25.8
11			Srivilliputtur	26	21.6	83	4.0	24.2
12		**Mean**		**26.8**	**22.4**	**84**	**4.7**	**25.5**
13	9553	LHDP 5	Dharwad	29.0	23.8	82	3.9	32.0
14			Guntur	31.5	27	86	4.7	30.5
16			UAS Raichur	30.3	25.8	85	4.9	27.7
17			Srivilliputtur	30.3	26.5	87	3.5	31.6
18		**Mean**		**30.3**	**25.8**	**85**	**4.3**	**30.5**
19	9554	DS C 1801	Dharwad	27.3	23.1	84	5.0	28.7
20			Guntur	27.2	22.6	83	5.5	29.5
22			UAS Raichur	29.0	23.5	81	4.9	23.8
23			Srivilliputtur	25.7	21.4	83	4.1	26.9
24		**Mean**		**27.3**	**22.7**	**83**	**4.9**	**27.2**
25	9555	LC	Dharwad	28.6	24.2	85	4.8	29.2
26			Guntur	26.1	21.8	83	5.2	25.7
28			UAS Raichur	29.5	25.7	87	4.9	27.9
29			Srivilliputtur	32.8	29.1	89	4.0	34.6
30		**Mean**		**29.3**	**25.2**	**86**	**4.7**	**29.4**
31	9556	RHC HD 1420	Dharwad	28.2	23.3	83	3.8	26.3
32			Guntur	29.1	24.5	84	4.8	29.8
34			UAS Raichur	26.9	21.9	81	4.2	25.9
35			Srivilliputtur	25.7	21	82	4.0	25.4
36		**Mean**		**27.5**	**22.7**	**83**	**4.2**	**26.9**
37	9557	LHDP 2	Dharwad	25.4	20.7	81	4.6	24.5
38			Guntur	28.0	23.5	84	4.9	27.7
40			UAS Raichur	27.8	22.7	82	4.9	25.5
41			Srivilliputtur	27.8	23.6	85	3.4	27.1
42		**Mean**		**27.3**	**22.6**	**83**	**4.5**	**26.2**
43	9558	ZC	Dharwad	32.3	27.8	86	4.6	32.4
44			Guntur	31.2	26.6	85	4.9	31.1

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML (mm)	UI	Mic	Str (g/tex)
46			UAS Raichur	32.4	28.4	87	5.4	30.6
47			Srivilliputtur	31.9	27.3	86	4	32.8
48		**Mean**		**32.0**	**27.5**	**86**	**4.7**	**31.7**
49	9559	RHC HD 1438	Dharwad	28.8	24.3	85	4.8	27.4
50			Guntur	28.8	24.4	85	5.1	30.5
52			UAS Raichur	29.7	25.2	85	5.2	30.4
53			Srivilliputtur	28.9	24.4	85	4.4	29.5
54		**Mean**		**29.1**	**24.6**	**85**	**4.9**	**29.5**

Br13a

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML (mm)	UI	Mic	Str (g/tex)
1	9571	CCB 26	Coimbatore	38.0	33.4	88	4.3	41.0
2			Dharwad	39.5	34.5	87	3.8	46.3
4		**Mean**		**38.8**	**34.0**	**88**	**4.1**	**43.7**
5	9572	CCB 51	Coimbatore	37.5	32.4	87	4.4	39.6
6			Dharwad	38.8	33.9	87.0	4.1	41.0
8		**Mean**		**38.2**	**33.2**	**87**	**4.3**	**40.3**
9	9573	ZC	Coimbatore	38.8	34.3	88	4.3	41.2
10			Dharwad	39.3	34.2	87	3.9	43.1
12		**Mean**		**39.1**	**34.3**	**88**	**4.1**	**42.2**
13	9574	CCB 28	Coimbatore	37.5	32.3	86	4.4	39.5
14			Dharwad	39.4	35.0	89	4.1	44.2
16		**Mean**		**38.5**	**33.7**	**88**	**4.3**	**41.9**
17	9575	CCB 29	Coimbatore	36.9	31.2	85	39	4.4
18			Dharwad	39.1	33.0	84	3.7	43.1
20		**Mean**		**38.0**	**32.1**	**85**	**21.4**	**23.8**
21	9576	DB 1801	Coimbatore	32.8	28.6	87	4.4	36.2
22			Dharwad	34.2	30.3	89	4.0	37.5
24		**Mean**		**33.5**	**29.5**	**88**	**4.2**	**36.9**
25	9577	CCB 64	Coimbatore	39.3	34.8	89	4.2	39.9
26			Dharwad	39.7	34.5	87.0	3.9	44.1
28		**Mean**		**39.5**	**34.7**	**88**	**4.1**	**42.0**

Br14a

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML (mm)	UI	Mic	Str (g/tex)
1	9581	CCB 51-2	Coimbatore	36.2	30.9	85	4.2	40.1
2			Dharwad	39.6	35.1	89	4.1	43.9
		Mean		**37.9**	**33.0**	**87**	**4.2**	**42.0**
5	9582	DB-1702	Coimbatore	33.9	29.9	88	4	38.6
6			Dharwad	33.4	29.8	89	3.9	37.7
		Mean		**33.7**	**29.9**	**89**	**4.0**	**38.2**
9	9583	SB SG 1-5	Coimbatore	36.9	31.9	87	4.2	38.8
10			Dharwad	40.2	35.0	87	4.0	46.2
		Mean		**38.6**	**33.5**	**87**	**4.1**	**42.5**
13	9584	ZC (Suvin)	Coimbatore	36.6	31.3	86	4.5	38.5
14			Dharwad	39.4	34.5	88	4.1	41.3
		Mean		**38.0**	**32.9**	**87**	**4.3**	**39.9**
17	9585	CCB 143B	Coimbatore	38.2	33.3	87	4.5	40.7
18			Dharwad	37.5	32.4	86	4.3	42.1
		Mean		**37.9**	**32.9**	**87**	**4.4**	**41.4**
21	9586	RHB 1002	Coimbatore	38.3	33.4	87	3.9	42.3
22			Dharwad	39.3	34.0	87	4.1	44.3

Br03b

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML	UI%	Mic	Str (g/tex)
1	9601	BGDS 1033	Dharwad	28.9	24.5	85	4.6	26.7
2			Nandyal	26.4	22.7	86	4.9	27.3
4			Veppanthattai	27.4	22.8	83	4.8	28.2
5		**Mean**		**27.6**	**23.3**	**85**	**4.8**	**27.4**
6	9602	LC	Dharwad	28.2	24.6	87	4.4	28.3
7			Nandyal	26.9	22.6	84	5.0	26.5
9			Veppanthattai	25.6	21	82	5.3	25.2
10		**Mean**		**26.9**	**22.7**	**84**	**4.9**	**26.7**
11	9603	RAH 1075	Dharwad	30.7	27.1	88	5.7	31.2
12			Nandyal	28.8	24.2	84	5.6	27.9
14			Veppanthattai	28.3	23.7	84	5.8	28.3
15		**Mean**		**29.3**	**25.0**	**85**	**5.7**	**29.1**
16	9604	GBHV 193	Dharwad	29.0	25.2	87	4.8	29.3
17			Nandyal	27.5	22.6	82	4.6	27.0

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML	UI%	Mic	Str (g/tex)
19			Veppanthattai	27.8	23	83	4.8	27.7
20		**Mean**		**28.1**	**23.6**	**84**	**4.7**	**28.0**
21	9605	ZC	Dharwad	27.3	22.7	83	4.7	26.1
22			Nandyal	26.1	20.7	79	4.6	23.2
24			Veppanthattai	26.7	22.6	84	4.9	25.1
25		**Mean**		**26.7**	**22.0**	**82**	**4.7**	**24.8**
26	9606	BS 6-19	Dharwad	31.4	26.5	84	4.1	29.5
27			Nandyal	30.2	26.1	86	4.4	31.8
29			Veppanthattai	27.2	21.7	80	4.3	25.8
30		**Mean**		**29.6**	**24.8**	**83**	**4.3**	**29.0**
31	9607	QC	Dharwad	32.5	29.3	90	4.5	32.7
32			Nandyal	31.3	27.2	87	4.8	32.1
34			Veppanthattai	30.8	26.1	85	4.7	32.6
35		**Mean**		**31.5**	**27.5**	**87**	**4.7**	**32.5**
36	9608	NDLH 2035-5	Dharwad	30.0	25.8	86	4.0	29.7
37			Nandyal	27.5	22.5	82	4.3	25.3
39			Veppanthattai	28.2	23.5	83	5.3	26.8
40		**Mean**		**28.6**	**23.9**	**84**	**4.5**	**27.3**

Br04b

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML	UI	Mic	Str (g/tex)
1	9611	RAH 1071	Dharwad	30.6	26.9	88	5.2	29.8
2			Nandyal	28.4	23.8	84	5.1	30.1
3			Veppanthattai	29.8	25.4	85	5.2	28.6
4		**Mean**		**29.6**	**25.4**	**86**	**5.2**	**29.5**
5	9612	LC	Dharwad	28.8	24.8	86	4.6	31.7
6			Nandyal	28	23.9	85	5.0	29.3
7			Veppanthattai	27.5	23.2	85	5.7	28.5
8		**Mean**		**28.1**	**24.0**	**85**	**5.1**	**29.8**
9	9613	BS 1	Dharwad	33.2	30.1	91	3.6	33.0
10			Nandyal	31.4	27.9	89	4.4	32.5
11			Veppanthattai	31.0	27.1	87	4.1	32.1
12		**Mean**		**31.9**	**28.4**	**89**	**4.0**	**32.5**
13	9614		Dharwad	28.6	24.6	86	4.8	28.2

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML	UI	Mic	Str (g/tex)
14		NDLH 20511	Nandyal	28.3	23.7	84	5.1	25.6
15			Veppanthattai	28.1	24.1	86	4.7	27.2
16		**Mean**		**28.3**	**24.1**	**85**	**4.9**	**27.0**
17	9615	ZC	Dharwad	27.5	23.0	84	4.9	27.1
18			Nandyal	25.3	21.2	84	4.8	23.6
19			Veppanthattai	26.7	22.5	84	4.9	25.5
20		**Mean**		**26.5**	**22.2**	**84**	**4.9**	**25.4**
21	9616	BGDS 1072	Dharwad	29.6	25.7	87	4.7	28.6
22			Nandyal	26.1	21.7	83	5.6	27.9
23			Veppanthattai	27.5	23.5	86	5.3	29.6
24		**Mean**		**27.7**	**23.6**	**85**	**5.2**	**28.7**
25	9617	GSHV 191	Dharwad	31.4	27.3	87	4.3	32.6
26			Nandyal	29.2	25.6	88	4.6	31.1
27			Veppanthattai	30.1	25.5	85	4.1	30.7
28		**Mean**		**30.2**	**26.1**	**87**	**4.3**	**31.5**
29	9618	QC	Dharwad	29.2	29.8	89	4.5	33.4
30			Nandyal	32.4	28.2	87	4.9	33.1
31			Veppanthattai	31.4	26.9	86	4.9	32.1
32		**Mean**		**31.0**	**28.3**	**87**	**4.8**	**32.9**

Br05b

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML	UI	Mic	Str (g/tex)
1	9621	ARBHH 1951	Dharwad	31.4	27.4	87	4.6	27.6
2			Nandyal	29.4	24.4	83	4.3	26.3
3			Veppanthattai	27.7	22.3	81	4.5	25.1
5		**Mean**		**29.5**	**24.7**	**84**	**4.5**	**26.3**
6	9622	ZC (DHH 11)	Dharwad	31.2	26.9	86	4.8	30.6
7			Nandyal	28.3	22.8	80	4.1	26.6
8			Veppanthattai	27.9	23.2	83	4.9	25.9
10		**Mean**		**29.1**	**24.3**	**83**	**4.6**	**27.7**
11	9623	ARBHH 1952	Dharwad	30.7	26.7	87	4.9	29.5
12			Nandyal	27.1	22.1	81	4.7	24.6
13			Veppanthattai	27.9	23.5	84	5.6	27.1
15		**Mean**		**28.6**	**24.1**	**84**	**5.1**	**27.1**
16	9624	RAHH 1952	Dharwad	30.0	26.4	88	5.0	32.6
17			Nandyal	28.8	24.4	85	5	28.7
18			Veppanthattai	26	20.5	79	5.2	24.4
20		**Mean**		**28.3**	**23.8**	**84**	**5.1**	**28.6**
21	9625	DHH 1951	Dharwad	28.2	24.5	87	4.9	29.5
22			Nandyal	26	21.4	82	4.8	27.1

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML	UI	Mic	Str (g/tex)
23			Veppanthattai	25.2	20.6	82	24.7	5.3
25		**Mean**		**26.5**	**22.2**	**84**	**11.5**	**20.6**
26	9626	LC	Dharwad	Sample not received				
27			Nandyal	30.4	26.0	85	4.9	32.5
28			Veppanthattai	26.8	22.3	83	4.7	25.9
30		**Mean**		**28.6**	**24.2**	**84**	**4.8**	**29.2**
31	9627	BGDHH 697	Dharwad	30.9	27.8	90	5.3	31.7
32			Nandyal	28.4	25.1	88	6.0	29.5
33			Veppanthattai	28.5	22.9	81	4.7	25.4
35		**Mean**		**29.3**	**25.3**	**86**	**5.3**	**28.9**
36	9628	DHH 1952	Dharwad	28.4	24.1	85	4.9	27.2
37			Nandyal	26.1	21.8	84	5.1	25.3
38			Veppanthattai	27.4	23.0	84	5.1	27.2
40		**Mean**		**27.3**	**23.0**	**84**	**5.0**	**26.6**
41	9629	RAHH 1951	Dharwad	29.7	25.5	86	4.8	28.7
42			Nandyal	27.1	23.2	86	4.9	26.2
43			Veppanthattai	Sample not received				
		Mean		**28.4**	**24.4**	**86**	**4.9**	**27.5**

Br06b

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML	UI	Mic	Str (g/tex)
1	9631	AKH 1302	Dharwad	28.2	23.1	82	4.9	28.6
2			Nandyal	28.3	23.7	84	4.5	25.6
5		**Mean**		**28.3**	**23.4**	**83**	**4.7**	**27.1**
6	9632	DSC 1851	Dharwad	29.8	25.2	85	4.4	28.3
7			Nandyal	25.6	20.4	80	5.2	24.7
10		**Mean**		**27.7**	**22.8**	**83**	**4.8**	**26.5**
11	9633	LC	Dharwad	30.4	26.3	87	4.6	31.6
12			Nandyal	27.2	22.6	83	4.6	27.9
15		**Mean**		**28.8**	**24.5**	**85**	**4.6**	**29.8**
16	9634	RAHC 1029	Dharwad	33.0	28.9	88	4.5	31.0
17			Nandyal	27.2	22.4	82	4.7	27.7
20		**Mean**		**30.1**	**25.7**	**85**	**4.6**	**29.4**
21	9635	GISV 312	Dharwad	27.7	23.1	83	5.1	25.1
22			Nandyal	30.5	26.1	86	4.8	33.1
25		**Mean**		**29.1**	**24.6**	**85**	**5.0**	**29.1**

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML	UI	Mic	Str (g/tex)
26	9636	RHC HD 1420	Dharwad	29.2	23.8	82	3.9	28.1
27			Nandyal	23.9	19.4	82	5.8	23.5
30		**Mean**		**26.6**	**21.6**	**82**	**4.9**	**25.8**
31	9637	AKH 1301	Dharwad	28.3	23.8	84	4.8	27.2
32			Nandyal	25.6	20.6	81	4.3	23.7
35		**Mean**		**27.0**	**22.2**	**83**	**4.6**	**25.5**
36	9638	CNH 1128	Dharwad	27.6	23.6	86	4.8	29.0
38			Nandyal	26.6	22.1	83	5	26.9
40		**Mean**		**27.1**	**22.9**	**85**	**4.9**	**28.0**
41	9639	BRCC 1621 S	Dharwad	26.0	22.0	85	4.5	26.1
42			Nandyal	25.9	21.2	82	5.2	26.5
45		**Mean**		**26.0**	**21.6**	**84**	**4.9**	**26.3**
46	9640	ZC	Dharwad	31.7	27.9	88	4.5	31.5
47			Nandyal	24.2	19.6	81	5.1	24.3
50		**Mean**		**28.0**	**23.8**	**85**	**4.8**	**27.9**

Br24b

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML	UI	Mic	Str (g/tex)
1	9651	GAM 260	Dharwad	23.7	19.1	81	6.2	23.4
2			Nandyal	24.5	19.6	80	5.2	24.0
3		**Mean**		**24.1**	**19.4**	**81**	**5.7**	**23.7**
4	9652	LC	Dharwad	26.6	21.7	82	6.0	25.7
5			Nandyal	23.7	19.4	82	5.4	24.6
6		**Mean**		**25.2**	**20.6**	**82**	**5.7**	**25.2**
7	9653	NDLA 3116-4	Dharwad	21.2	16.9	80	6.7	22.5
8			Nandyal	21.1	16.4	78	6.4	21.9
9		**Mean**		**21.2**	**16.7**	**79**	**6.6**	**22.2**
10	9654	MDL 2667	Dharwad	26.3	21.5	82	6.4	27.5
11			Nandyal	24.8	19.7	80	5.7	23.3
12		**Mean**		**25.6**	**20.6**	**81**	**6.1**	**25.4**
13	9655	ZC	Dharwad	25.5	20.9	82	5.6	27.6
14			Nandyal	25.9	21.2	82	5.1	24.6
15		**Mean**		**25.7**	**21.1**	**82**	**5.4**	**26.1**
16	9656	JLA 1227	Dharwad	23.8	19.7	83	5.9	24.1
17			Nandyal	25.8	21	82	5.2	24.4
18		**Mean**		**24.8**	**20.4**	**83**	**5.6**	**24.3**
19	9657	CAN 1054	Dharwad	26.1	21.5	82	6.4	27.7

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML	UI	Mic	Str (g/tex)
20			Nandyal	26.3	21.5	82	5.5	27.1
21		**Mean**		**26.2**	**21.5**	**82**	**6.0**	**27.4**
22	9658	GAM 259	Dharwad	25.4	20.9	82	6.0	27.6
23			Nandyal	25.7	21.1	82	4.9	27.6
24		**Mean**		**25.6**	**21.0**	**82**	**5.5**	**27.6**
25	9659	DWDa 1801	Dharwad	23.6	18.9	80	5.8	22.9
26			Nandyal	24.2	19.6	81	4.8	24.9
27		**Mean**		**23.9**	**19.3**	**81**	**5.3**	**23.9**
28	9660	DWDa 1802	Dharwad	25.4	21.1	83	5.9	25.9
29			Nandyal	24.3	19.1	79	5.5	22.9
30		**Mean**		**24.9**	**20.1**	**81**	**5.7**	**24.4**
31	9661	CAN 1032	Dharwad	25.0	20.7	83	6.0	25.8
32			Nandyal	22.0	17.1	78	5.3	22.7
33		**Mean**		**23.5**	**18.9**	**81**	**5.7**	**24.3**

Zonal Trials South: Br24b : CVT -Long Linted

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML	UI	Mic	Str (g/tex)
1	9671	PA 837	Dharwad	26.4	21.8	83	5.7	25.8
2			Nandyal	30.3	25.9	85	5.2	30.2
3		**Mean**		**28.4**	**23.9**	**84**	**5.5**	**28.0**
4	9672	PA 833	Dharwad	28.9	24.3	84	5.4	29.4
5			Nandyal	27.1	22.3	82	5.2	28.3
6		**Mean**		**28.0**	**23.3**	**83**	**5.3**	**28.9**
7	9673	PAIG 377	Dharwad	26.5	21.7	82	5.6	26.7
8			Nandyal	27.8	22.7	82	5.3	27.2
9		**Mean**		**27.2**	**22.2**	**82**	**5.5**	**27.0**
10	9674	PA 839	Dharwad	27.5	22.6	82	5.5	28
11			Nandyal	28.5	23.6	83	5.3	28.5
12		**Mean**		**28.0**	**23.1**	**83**	**5.4**	**28.3**
13	9675	PA 778	Dharwad	27.8	23.2	84	5.6	29.1
14			Nandyal	26.9	22.1	82	5.3	27.8
15		**Mean**		**27.4**	**22.7**	**83**	**5.5**	**28.5**
16	9676	PAIG 380	Dharwad	29.2	24.4	84	5.4	29.8
17			Nandyal	28.9	24.5	85	5.2	30.6
18		**Mean**		**29.1**	**24.5**	**85**	**5.3**	**30.2**
19	9677	PAIG 384	Dharwad	27.5	23	84	5.7	26.3
20			Nandyal	25.4	21.1	83	5.7	25.3

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML	UI	Mic	Str (g/tex)
21		**Mean**		**26.5**	**22.1**	**84**	**5.7**	**25.8**
22	9678	PA 806	Dharwad	28.7	23.9	83	5.3	27.9
23			Nandyal	30.6	25.1	82	4.6	31.1
24		**Mean**		**29.7**	**24.5**	**83**	**5.0**	**29.5**
25	9679	ZC	Dharwad	26.1	20.9	80	5.2	25.6
26			Nandyal	27.7	23.1	83	5.1	29.9
27		**Mean**		**26.9**	**22.0**	**82**	**5.2**	**27.8**
28	9680	PA 807	Dharwad	26.0	21.5	83	5.5	27.3
29			Nandyal	26.7	22.1	83	5.1	28.5
30		**Mean**		**26.4**	**21.8**	**83**	**5.3**	**27.9**
31	9681	PA 809	Dharwad	28.8	23.8	83	5.6	31.6
32			Nandyal	30.2	26.1	86	5.0	31.0
33		**Mean**		**29.5**	**25.0**	**85**	**5.3**	**31.3**
34	9682	CAN 1065	Dharwad	25.5	20.6	81	5.8	27.3
35			Nandyal	25.9	20.8	80	5.6	26.0
36		**Mean**		**25.7**	**20.7**	**81**	**5.7**	**26.7**

Zonal Trials South: Coloured Cotton Trial - Hirsutum

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML	UI	Mic	Str (g/tex)
1	9701	LHCC 3	Dharwad	21.9	17.7	81	2.9	25.2
2			Guntur	21.7	17.9	82	3.8	23.1
3			Nandyal	23.6	18.7	79	6.3	17.1
4			UAS Raichur	20.3	16.9	83	3.2	19.2
5		**Mean**		**21.9**	**17.8**	**81**	**4.1**	**21.2**
6	9702	LHCC 4	Dharwad	21.5	17.6	82	3	25.3
7			Guntur	23	18.5	80	3.6	23.1
8			Nandyal	20.5	17.1	84	3.4	17.0
9			UAS Raichur	21.2	17.4	82	3.2	24.9
10		**Mean**		**21.6**	**17.7**	**82**	**3.3**	**22.6**
11	9703	LHCC `	Dharwad	22.8	18.7	82	3.3	24.7
12			Guntur	30.4	26.0	86	5.0	29.0
13			Nandyal	23.1	18.9	82	4.6	19.6
14			UAS Raichur	33.0	28.4	86	4.3	35.8
15		**Mean**		**27.3**	**23.0**	**84**	**4.3**	**27.3**
16	9706	16301 DB	Dharwad	26.0	20.9	80	5.4	26
17			Guntur	23.5	19.1	81	5.0	22.5

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML	UI	Mic	Str (g/tex)
18			Nandyal	24.0	19.6	81	4.5	16.6
19			UAS Raichur	22.7	18.2	80	4.2	22.7
20		**Mean**		**24.1**	**19.5**	**81**	**4.8**	**22.0**
21	9707	DHCC 1801	Dharwad	19.7	16.4	83	4.2	26.5
22			Guntur	21.1	16.8	80	4.7	22.8
23			Nandyal	20.3	16.6	82	4.3	17.5
24			UAS Raichur	19.7	15.9	81	4.7	25.2
25		**Mean**		**20.2**	**16.4**	**82**	**4.5**	**23.0**
26	9708	LHCC 2	Dharwad	22.8	18.7	82	3.3	24.7
27			Guntur	22	18	82	3.8	23.1
28			Nandyal	21.2	17.5	83	3.7	18.8
29			UAS Raichur	21.5	17.6	82	3.4	24.3
30		**Mean**		**21.9**	**18.0**	**82**	**3.6**	**22.7**
31	9709	LC	Dharwad	28.9	24.8	86	4.4	31.7
32			Guntur	30.4	26	86	5.0	29.0
33			Nandyal	23.0	18.8	82	4.5	19.9
34			UAS Raichur	30.3	25.9	86	4.7	28.9
35		**Mean**		**28.2**	**23.9**	**85**	**4.7**	**27.4**
36	9710	16337 LB	Dharwad	22.7	18.2	80	4.5	23.4
37			Guntur	23.4	19.1	82	5.1	22.3
38			Nandyal	24.7	19.9	81	4.0	15.8
39			UAS Raichur	22.4	18.1	81	5.2	21.3
40		**Mean**		**23.3**	**18.8**	**81**	**4.7**	**20.7**
41	9711	16315 LB	Dharwad	24.6	20.6	84	3.8	24
42			Guntur	24.7	19.9	81	4.8	23.8
43			Nandyal	20.2	15.8	78	4.1	17.1
44			UAS Raichur	26.0	21.4	82	4.4	23.3
45		**Mean**		**23.9**	**19.4**	**81**	**4.3**	**22.1**
46	9712	DHCC 1802	Dharwad	21.2	17.6	83	4.6	24.3
47			Guntur	20.6	16.5	80	5.1	22.9
48			Nandyal	23.6	18.7	79	6.3	17.0
49			UAS Raichur	21.6	16.9	79	5.0	22.6
50		**Mean**		**21.8**	**17.4**	**80**	**5.3**	**21.7**

Zonal Trials South: Coloured Cotton Trial - Arboreum

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML	UI	Mic	Str (g/tex)
1	9721	CNA 1091	Dharwad	22.2	18.2	82	5.3	23.1
2			Nandyal	24.9	20.7	83	5.5	20.7

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML	UI	Mic	Str (g/tex)
3			UAS Raichur	24.4	20.3	83	5.8	19.9
4		**Mean**		**23.8**	**19.7**	**83**	**5.5**	**21.2**
5	9722	16377 LB-1	Dharwad	21.3	17.1	80	6	23.3
6			Nandyal	22.8	17.7	78	5.8	17.7
7			UAS Raichur	24.8	19.6	79	6.3	19.4
8		**Mean**		**23.0**	**18.1**	**79**	**6.0**	**20.1**
9	9723	CNA 405	Dharwad	22.7	18.2	80	5.8	23
10			Nandyal	24.5	19.5	80	5.5	19.5
11			UAS Raichur	23.8	19.1	80	6.0	20.2
12		**Mean**		**23.7**	**18.9**	**80**	**5.8**	**20.9**
13	9724	CNA 17522	Dharwad	20.3	16.7	82	6.2	23.6
14			Nandyal	23.4	18.4	79	5.9	18.4
15			UAS Raichur	23.5	19.6	83	5.7	20.2
16		**Mean**		**22.4**	**18.2**	**81**	**5.9**	**20.7**
17	9725	DLSa 17 (ZC)	Dharwad	24.1	19.8	82	4.1	23.3
18			Nandyal	22.8	17.9	79	5.0	17.9
19			UAS Raichur	22.7	18.1	80	6.7	20.1
20		**Mean**		**23.2**	**18.6**	**80**	**5.3**	**20.4**
21	9726	DDCC 1801	Dharwad	20.1	16.6	83	5.9	24
22			Nandyal	23.0	18.4	80	5.6	18.4
23			UAS Raichur	22.4	18.1	81	6.7	20.1
24		**Mean**		**21.8**	**17.7**	**81**	**6.1**	**20.8**
25	9727	DHCC 1802	Dharwad	20.4	16.4	81	5.8	24.1
26			Nandyal	22.5	17.6	78	5.7	17.6
27			UAS Raichur	23.3	19.4	83	6.6	19.6
28		**Mean**		**22.1**	**17.8**	**81**	**6.0**	**20.4**
29	9728	LC	Dharwad	24.3	19.8	81	5.7	23.8
30			Nandyal	25.3	19	75	4.9	19.0
31			UAS Raichur	23.8	19.0	80	5.6	20.3
32		**Mean**		**24.5**	**19.3**	**79**	**5.4**	**21.0**
33	9729	16378 LB-A	Dharwad	21.6	17.4	81	6.1	23.2
34			Nandyal	24.1	19.2	79	5.0	19.2
35			UAS Raichur	22.0	17.7	80	6.7	20.2
36		**Mean**		**22.6**	**18.1**	**80**	**5.9**	**20.9**
37	9730	CNA 407-SLP	Dharwad	21.7	17.3	80	5.3	23.6
38			Nandyal	24.3	19.3	80	5.0	19.3
39			UAS Raichur	22.8	18.2	80	6.3	20.1
40		**Mean**		**22.9**	**18.3**	**80**	**5.5**	**21.0**
41	9731	DDCC 1	Dharwad	19.7	16	81	5.6	24.5
42			Nandyal	24.9	20.7	83	5.5	20.7

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML	UI	Mic	Str (g/tex)
43			UAS Raichur	24.4	20.3	83	5.8	19.9
44		**Mean**		**23.0**	**19.0**	**82**	**5.6**	**21.7**
45	9732	CNA 407	Dharwad	22.4	17.8	80	5.2	23.2
46			Nandyal	22.8	17.7	78	5.8	17.7
47			UAS Raichur	24.8	19.6	79	6.3	19.4
48		**Mean**		**23.3**	**18.4**	**79**	**5.8**	**20.1**

Zonal Trials South: Br-15a G.barbadense

Sr. No.	Code No.	Entry Name	Location	UHML (mm)	ML (mm)	UI	Mic	Str (g/tex)
1	9591	RHB 1623	Coimbatore	36.7	31.2	85	35.1	4.0
2			Dharwad	39.1	33.9	87	37.6	3.8
3			KSSC Dharwad	36.3	31.2	86	37.5	3.6
4			Guntur	37.8	33.1	88	39	3.7
6		**Mean**		**37.5**	**32.4**	**87**	**37.3**	**3.8**
7	9592	ZC	Coimbatore	36.2	31.2	86	35.7	3.9
8			Dharwad	37.0	32.5	88	37.5	3.8
9			KSSC Dharwad	36.9	31.4	85	34.3	3.6
10			Guntur	34.4	29.2	85	35.2	3.7
12		**Mean**		**36.1**	**31.1**	**86**	**35.7**	**3.8**
13	9593	RHB 1624	Coimbatore	36.7	31.4	86	36.1	3.6
14			Dharwad	38.5	33.0	86	36.7	3.6
15			KSSC Dharwad	37.7	33.1	88	39.3	3.6
16			Guntur	35.5	31.0	87	38.1	3.4
18		**Mean**		**37.1**	**32.1**	**87**	**37.6**	**3.6**
19	9594	LC	Coimbatore	35.5	30.6	86	35.7	4.0
20			Dharwad	38.1	33.2	87	36.8	3.9
21			KSSC Dharwad	34.1	29.1	85	34.1	3.7
22			Guntur	35.3	30.6	87	35.9	3.8
24		**Mean**		**35.8**	**30.9**	**86**	**35.6**	**3.9**
25	9595	RHB 1002	Coimbatore	38.3	33.2	87	38.4	3.1
26			Dharwad	40.1	35.1	88	40.2	3.0
27			KSSC Dharwad	36.8	31.3	85	34.8	2.9
28			Guntur	37.0	32.0	87	36.9	3.1
30		**Mean**		**38.0**	**32.8**	**87**	**37.3**	**3.0**

Agronomy IA: Agronomic requirements of promising pre-release/ recently released *hirsutum/arboreum*genotypes/ hybrids of cotton

Agronomy Trials North Zone (Irrigated) - Full Spinning Results

Sr. No.	Entry	Location	UHML (mm)	UI	Mic	Str (g/tex)	E %	Count 1	CSP 1	Count 2	CSP 2
1	RS 2818	Faridkot	26.0	83.1	4.30	28.0	5.8	43.4	2179	34.8	2071
2	RS 2827	Hisar	25.0	81.0	4.2	26.5	5.6	20.2	2276	29.3	2127

Agronomy Trials Central Zone (Irrigated) - Full Spinning Results

Sr.No.	Entry	Location	UHML (mm)	UI	Mic	Str (g/tex)	E %	Count 1	CSP 1	Count 2	CSP 2
1	AJAH 101	Akola	30.0	82	4.6	27.6	-	20.2	1808	30.5	1763
2	CPD 1652	Bhawanipatna	27.8	85	5.1	28.8	5.9	50.4	2051	59.4	1871
3	AKH 09/5	-do-	29.2	83	4.7	29.1	5.8	41.0	2370	49.5	2079
4	RCH 1217	Junagadh	26.3	82	3.3	26.5	6.8	28.8	2244	40.0	2080
5	GISV 310	-do-	27.1	82	3.5	25.8	6.2	29.7	2326	40.3	2100
6	RHB-1008	Rahuri	34.0	84	2.7	28.4	7.6	50.9	2885	81.50	2469
7	ARCB 1601	-do-	27.2	82	3.7	25.5	5.3	29.6	2217	40.2	2203
8	BS	-do-	29.3	83	3.5	27.6	5.7	20.1	2309	30.8	2230
9	RHC 1217	-do-	24.2	79	4.3	24.7	5.8	19.3	2337	30.9	1996
10	GISV 310	-do-	25.8	80	4.2	25.3	6.5	29.6	2516	39.7	2255
11	RHC 0717	-do-	25.7	81	3.7	25.0	6.9	49.8	2375	59.8	2224
12	DB 1602	-do-	30.1	83	3.0	26.9	8.8	58.7	2753	79.8	2697
13	SBSG 1-5	-do-	34.7	83	2.90	30.4	6.0	Insufficient material			
14	RHCB 011	-do-	30.7	83	3.2	29.0	-	81.9	2326	98.5	1980
15	PA 810	Nagpur	28.8	82	5.0	27.3	5.9	29.7	2189	40.1	1640

Agronomy Trials North Zone (Irrigated) - Full Spinning Results											
Sr. No.	**Entry**	**Location**	**UHML (mm)**	**UI**	**Mic**	**Str (g/tex)**	**E %**	**Count 1**	**CSP 1**	**Count 2**	**CSP 2**
16	CNA 1032	-do-	28.7	81	5.7	27.9	4.5	29.9	1821	44.6	1797
17	AKH 09/5	Nanded	27.8	82	4.7	26.34	5.6	19.6	2293	30.0	2181
18	ARBC 1651	-do-	26.2	82	4.5	25.2	7.6	29.1	2107	40.7	1856
19	BS 30	-do-	27.7	82	3.7	28.7	5.8	48.7	2425	59.8	2135
20	CPD 1652	-do-	27.2	83	4.8	25.9	6.0	39.0	2083	-	-
21	PA 810	Parbhani	31.1	82	5.1	29.6	-	40.4	2230	50.4	2021
22	ARBC 1601	Surat	27.2	82	4.2	26.3	4.5	39.7	2120	49.5	1836
23	BS 30	-do-	26.9	81	4.3	25.8	4.9	40.0	1928	49.8	1957

Agronomy Trials South Zone (Irrigated) - Full Spinning Results

Sr. No.	Entry	Location	UHML (mm)	UI	Mic	Str (g/tex)	E %	Count 1	CSP 1	Count 2	CSP 2
1	CCB 51	Coimbatore	34.4	86	3.1	33.3	-	95.7	2565	115.3	2087
2	ARBHB 1601	-do-	33.0	84	3.2	29.6	6.0	102.7	2438	115.4	2089
3	LAHB 1	-do-	35.4	83	2.8	31.3	6.1	81.9	2457	101.8	2351
4	DB 1602	-do-	32.4	85	3.5	32.4	6.3	81.0	2697	99.6	2172
5	GISV 295	-do-	26.2	82	3.9	27.1	5.6	Not spinnable			
6	PA 810	Dharwad	27.9	83	5.2	29.5	5.8	40.4	2230	50.4	2021
7	JLA 1110	-do-	25.6	81	5.9	26.8	5.6	19.6	2123	29.2	1752
8	DSC 1651	-do-	27.2	84	4.3	28.0	5.7	30.4	2277	38.8	2168
9	ARBC 1651	-do-	27.5	85	4.4	25.4	5.7	40.5	2312	49.1	2111
10	ARBHB 1	Guntur	35.2	87	3.7	30.8	5.8	80.9	1505	102.7	2438
11	LAHB 1	-do-	35.7	86	3.2	30.9	6.1	81.9	2457	101.8	2351
12	DB 1601	-do-	32.5	85	3.4	29.4	-	81.0	2697	99.6	2172
13	DB 1602	-do-	32.4	84	3.3	30.1	-	79.4	2453	98.4	2216
14	DSC 1651	Nandyal	27.0	82	4.0	27.6	5.7	29.4	2425	40.7	1827
15	ARBC 1651	-do-	26.5	84	3.9	28.1	5.6	38.9	2330	50.0	2130
16	JLA 1110	-do-	25.9	83	5.2	27.2	5.6	19.9	2129	29.1	1810
17	PA 810	-do-	30.0	82	4.6	31.3	5.9	39.7	2275	50.2	2154
18	SCS 1061	Raichur	28.5	84	4.2	28.6	5.7	39.7	2271	48.6	2095
19	GISV 298	-do-	30.2	85	4.3	28.0	5.8	39.8	2288	49.4	2187
20	CPD 1652	Srivillipittur	27.1	84	4.9	29.0	5.8	39.2	2489	49.2	2234
21	SCS 1061	-do-	28.9	84	4.9	28.8	5.8	39.7	2271	48.6	2095

Yarn CSP Norms

Count	CSP	Count	CSP
16s	1836	60s	2392
20s	2024	70s	2484
30s	2116	80s	2576
40s	2208	100s	2760
50s	2300	120s	2944

Annexure I: Technical programme of ICAR-AICRP on Cotton Trials

Br. 02a - IET- *G. hirsutum* (IRRIGATED)

S. No	Code	Name of Entry	Sponsor
1.	201	CPD 1902	UAS, Dharwad
2.	202	GISV319	NAU, Surat
3.	203	RAH 1047	UAS, Raichur
4.	204	CCH 19-2	CICR, Coimbatore
5.	205	BS 8-19	OUAT, Bhawanipatna
6.	206	CPD 1901	UAS, Dharwad
7.	207	GJHV 557	JAU, Junagadh
8.	208	ZC (Phule Yamuna/BGDS 1063)	
9.	209	TSH 363	TNAU, Srivilliputhur
10.	210	RB 614	MPUAT, Banswara
11.	211	GTHV 15/34	SDAU, Talod
12.	212	RHC 1419	MPKV, Rahuri
13.	213	GISV 323	NAU, Surat
14.	214	ARBH 1901	UAS, Arabhavi
15.	215	Quality Check (Suraj)	
16.	216	RAH 1046	UAS, Raichur
17.	217	BGDS 1047	UAS, B'Gudi
18.	218	RB 615	MPUAT, Banswara
19.	219	L 1527	ANGRAU, Lam
20.	220	BS 7-19	OUAT, Bhawanipatna
21.	221	SHS 234	SIMA-CDRA

22.	222	CCH 19-1	CICR, Coimbatore
23.	223	LC	
24.	224	TSH 383	TNAU, Srivilliputhur
25.	225	RHC 1409	MPKV, Rahuri
26.	226	GJHV 566	JAU, Junagadh

Br. 02 b – IET- *G. hirsutum* (RAINFED)

S. No	Code	Name of Entry	Sponsor
1.	231	TSH 375	TNAU, Srivilliputhur
2.	232	GBHV 206	NAU, Bharuch
3.	233	NH 702	VNMKV, Nanded
4.	234	ARBH 1951	UAS, Arabhavi
5.	235	**ZC (NH 615/ NDLH 1938)**	
6.	236	NDLH 2051-3	ANGRAU, Nandyal
7.	237	BS 8-19	OUAT, Bhawanipatna
8.	238	RHC 1419	MPKV, Rahuri
9.	239	TVH 007	TNAU, Veppanthattai
10.	240	CNDTS 283	CICR, Nagpur
11.	241	RB 610	MPUAT, Banswara
12.	242	CCH 19-3	CICR, Coimbatore
13.	243	RAH 1046	UAS, Raichur
14.	244	NH 703	VNMKV, Nanded
15.	245	AKH 2013-2	PDKV, Akola
16.	246	CPD 1951	UAS, Dharwad
17.	247	CNH 09-119	CICR, Nagpur

18.	248	BGDS 1047	UAS, B'Gudi
19.	249	CNH 2077	CICR, Nagpur
20.	250	RB 603	MPUAT, Banswara
21.	251	TSH 356	TNAU, Srivilliputhur
22.	252	GTHV 15/36	SDAU, Talod
23.	253	RHC 1409	MPKV, Rahuri
24.	254	CPD 1952	UAS, Dharwad
25.	255	CCH 19-2	CICR, Coimbatore
26.	255	CNH 17393	CICR, Nagpur
27.	257	**Local Checks**	
28.	258	GBHV 209	NAU, Bharuch
29.	259	RAH 1045	UAS, Raichur
30.	260	NDLH 2056-4	ANGRAU, Nandyal
31.	261	NH 701	VNMKV, Nanded
32.	262	BS 7-19	OUAT, Bhawanipatna
33.	263	CNH 1134	CICR, Nagpur
34.	264	**Quality Check (Suraj)**	

Br. 02 a/b CC – IET- *G. hirsutum* – Coloured Cotton Trial (IRRIGATED / RAINFED)

S. No.	Code	Entries	Sponsor
1.	271	CCHC 19-2	CICR, Coimbatore
2.	272	CNH 18529	CICR, Nagpur
3.	273	ZC (Phule Yamuna/Suraj)	
4.	274	DHCC 1901	UAS, Dharwad
5.	275	CCHC 19-1	CICR, Coimbatore
6.	276	CNH 18528	CICR, Nagpur
7.	277	Local Check	
8.	278	DHCC 1902	UAS, Dharwad

Br. 06 a – IET of Compact genotypes under irrigated condition

S. No.	Code	Genotype	Sponsor
1.	281	CCH 19-4	CICR, Coimbatore
2.	282	BS 9-19	OUAT, Bhawanipatna
3.	283	RHC-HD 1405	MPKV, Rahuri
4.	284	DSC 1902	UAS, Dharwad
5.	285	GTHV 18/17	SDAU, Talod
6.	286	Local Check	
7.	287	CCH 15-1	CICR, Coimbatore
8.	288	GJHV 584	JAU, Junagadh
9.	289	RAHC 1902	UAS, Raichur
10.	290	CCH 19-2	CICR, Coimbatore

11.	291	TCH 1875	TNAU, Coimbatore
12.	292	Common Check (Suraj)	
13.	293	DSC 1901	UAS, Dharwad
14.	294	RAHC 1901	UAS, Raichur
15.	295	RHC-HD 1312	MPKV, Rahuri

Br. 06 b – Initial Evaluation of Compact genotypes under rainfed condition

S. No.	Code	Genotype	Sponsor
1.	301	RAHC 1901	UAS, Raichur
2.	302	TCH 002	TNAU, Veppanthattai
3.	303	GBHV 187	NAU, Bharuch
4.	304	CNH 09-77	CICR, Nagpur
5.	305	RHC-HD 1312	MPKV, Rahuri
6.	306	CCH 15-1	CICR, Coimbatore
7.	307	DSC 1951	UAS, Dharwad
8.	308	Common Check (Suraj)	
9.	309	CNH 1133	CICR, Nagpur
10.	310	CCH 19-4	CICR, Coimbatore
11.	311	CNH 2046	CICR, Nagpur
12.	312	RHC-HD 1405	MPKV, Rahuri
13.	313	GTHV 18/19	SDAU, Talod
14.	314	CNH 1132	CICR, Nagpur
15. .	315	Local Check	
16.	316	CNDTS 44	CICR, Nagpur
17.	317	DSC 1952	UAS, Dharwad
18.	318	CNH 09-45	CICR, Nagpur

19.	319	RAHC 1902	UAS, Raichur
20.	320	CCH 19-5	CICR, Coimbatore

Br 12 a. IET of *G. barbadense*

S. No	Code	Name of Entry	Sponsor
1.	321	SBSD 5-6	SIMA-CDRA
2.	322	CCB 64B	CICR, Coimbatore
3.	323	DB 1901	UAS Dharwad
4.	324	ZC (Phule Rukhmai-CZ & Suvin-SZ)	
5.	325	CCB 142	CICR, Coimbatore
6.	326	CCB 141	CICR, Coimbatore

Br. 15 a - PHT- Interspecific -Hybrid (hir x barb)

S. No	Code	Name of Entry	Sponsor
1.	331	DHB 1902	UAS Dharwad
2.	332	RHB 1401	MPKV, Rahuri
3.	333	LC	
4.	334	DHB 1901	UAS Dharwad
5.	335	Phule Dhara (CC)	
6.	336	LAHB 2	ANGRAU, Lam

Br. 22 a/b IET-*G. arboreum*

S. No	Code	Entry	Sponsor
1.	341	DWDA 1902	UAS, Dharwad
2.	342	CNA 2036	CICR, Nagpur
3.	343	CNA 2037	CICR, Nagpur
4.	344	NDLA 3116-3	ANGRAU, Nandyal
5.	345	JLA 1102	MPKV, Jalgaon
6.	346	ZC (AKA 7/DLSa 17)	
7.	347	PA 863	MNKV, Parbhani
8.	348	MDL 2689	PJTSAU, Mudhole
9.	349	GAM 267	JAU, Amreli
10.	350	CNA 1042	CICR, Nagpur
11.	351	NDLA 3104-4	ANGRAU, Nandyal
12.	352	LC	
13.	353	JLA 1313	MPKV, Jalgaon
14.	354	GAM 273	JAU, Amreli
15.	355	PA 860	MNKV, Parbhani
16.	356	MDL 2679	PJTSAU, Mudhole
17.	357	AKA 2013-8	PDKV, Akola
18.	358	CNA 2035	CICR, Nagpur
19.	359	DWDA 1901	UAS, Dharwad

Br. 22 a/b IET-Long Linted *G. arboreum*

S. No	Code	Entry	Sponsored by
1.	361	PAIG 396	VNMKV, Parbhani
2.	362	PA 880	VNMKV, Parbhani
3.	363	CINA 1067	CICR, Nagpur
4.	364	PA 869	VNMKV, Parbhani
5.	365	PA 873	VNMKV, Parbhani
6.	366	CINA 1068	CICR, Nagpur
7.	367	QC (PA 255 - CZ; DLSa 17-SZ)	
8.	368	PA 864	VNMKV, Parbhani
9.	369	PAIG 394	VNMKV, Parbhani
10.	370	CINA 1069	CICR, Nagpur

Br. 22 a/b IET-*G. arboreum* - Colour Cotton

S. No.	Code	Entries	Sponsor
1.	381	DDCC 1902	UAS, Dharwad
2.	382	ZC (AKA 7/DLSa 17)	
3.	383	CNA 18562	CICR, Nagpur
4.	384	DDCC 1 (Common Check)	
5.	385	DDCC 1901	UAS, Dharwad
6.	386	Local Check	
7.	387	CNA 18563	CICR, Nagpur

Br. 25 a/b PHT - Desi Hybrid

S. No	Code	Name of Entry	Sponsor
1.	401	KR 147	Shakti Vardhak
2.	402	ZC (KR 64-NZ; NACH 12-CZ)	
3.	403	KR 155	Shakti Vardhak
4.	404	AJAH 103	Ajeet Seeds
5.	405	LC	
6.	406	KR 144	Shakti Vardhak
7.	407	AKDH 103	PDKV, Akola

Br. 32b IET of *G. herbaceum*

S.No	Code	Name of Entry	Sponsor
1.	421	GBhv 312	NAU, Bharuch
2.	422	DDhc 1901	UAS Dharwad
3.	423	ZC (G Cot 23/DDhc 11)	
4.	424	GShv 780/16	NAU, Surat
5.	425	GShv 797/16	NAU, Surat
6.	426	GVhv 845	RCRS, Viramgam
7.	427	GShv 829/16	NAU, Surat
8.	428	GBhv 313	NAU, Bharuch
9.	429	GShv 329/15	NAU, Surat
10.	430	LC	
11.	431	GVhv 936	RCRS, Viramgam

CENTRAL ZONE TRIAL

Br-03 a

Code	Entries
9101	TSH 367
9102	SHS 113
9103	ZC (Phule Yamuna)
9104	GJHV-522
9105	LC
9106	F 2662
9107	RAH 1076
9108	GJHV-554
9109	Quality Check (Suraj)

Br-04 a

Code	Entries
9111	TCH 1828
9112	Quality Check (Suraj)
9113	RAH 1071
9114	ZC (Phule Yamuna)
9115	CPD-1501
9116	LC
9117	SIMA 5

Br-05a

Code	New Entries	Sponsor
9121	ZC (Phule Asmita)	
9122	GSHH 15032	NAU, Surat
9123	LC	
9124	GJHH 13	JAU, Junagadh

Br-06a

Code	Entries
9131	GJHV 534
9132	RHC-HD 1438
9133	Local Check
9134	SHC 374
9135	DS C 1801
9136	RHC HD 1420
9137	Zonal check (Suraj)
9138	RHC HD 1406
9139	TCH 1897

Br – 13 a PVT *G. barbadense*

Code	Entries
9151	CCB 64
9152	DB-1701
9153	CCB 26
9154	DB 1801
9155	ZC (Phule Rukmai)
9156	DB-1601
9157	CCB 143B
9158	CCB 51-2

Br-15 a

Code	Entries
9161	RHB 1002
9162	ZC (Phule Dhara)
9163	RHB 1623
9164	LC
9165	RHB 1624

Br-03 b

Code	Entries
9171	BS 3-17
9172	RAH 1075

9173	CPD-1751
9174	LC
9175	NH 704
9176	NDLH – 2035-5
9177	CPD-1752
9178	Quality Check (Suraj)
9179	AKH 10-3
9180	NDLH – 2057-1
9181	ZC (NH 615)
9182	RHC 1307

Br-04 b

Code	Entries promoted
9191	ZC (NH 615)
9192	NDLH 20511
9193	Local Check
9194	CNH 11-11
9195	Quality Check (Suraj)

Br-06b

Code	Entries
9201	AKH 1302
9202	DSC 1851
9203	RHC HD 1433
9204	Local Check
9205	RAHC 1029
9206	AKH 1301
9207	GISV 312
9208	ZC (Suraj)
9209	RHC HD 1406

Br-24 b CVT – G. arboreum

Code	Entries
9221	CNA 1054
9222	AKA 14-51
9223	MDL 2667
9224	MDL 2663
9225	LC
9226	JLA-1207
9227	GAM 259
9228	ZC (AKA 7)
9229	DWDa 1802
9230	CNA 1031

Br-24 b CVT – Long linted G. arboreum

Code	Entries
9231	PA 809
9232	PA 842
9233	PAIG 379
9234	PAIG 380
9235	PAIG 384
9236	PA 806
9237	PAIG 377
9238	PA 839
9239	PA 837
9240	PAIG 373
9241	QC (PA 255)
9242	CNA 1065

Br-25 b

Code	Entries
9251	AJCH 102
9252	NACH 560
9253	LC
9254	NACH 556
9255	PKV DH 1 (ZC)

Coloured Cotton Trial – Hirsutum

Code	Entries	Sponsor
9261	Phule Yamuna(Zonal Check)	
9262	LHCC 4	ANGRAU, Guntur
9263	Local Check	
9264	DHCC 1801	UAS, Dharwad
9265	CNH 17395	CICR, Nagpur

Coloured Cotton Trial - Arboreum

Code	Entries	Sponsor
9271	CNA 17522	CICR, Nagpur
9272	DDCC 1801	UAS, Dharwad
9273	Local Check	
9274	CNA 1091	CICR, Nagpur
9275	AKA 7 (Zonal Check)	
9276	DDCC 1802	UAS, Dharwad

SOUTH ZONE TRIAL

Br-03 a

Code	Entries
9501	RAH 1075
9502	BS 4-18
9503	GSHV 208
9504	CPD 1701
9505	ZC (BGDS 1063)
9506	GISV 322
9507	GJHV-554
9508	LC
9509	RAH 1076
9510	TSH 357
9511	TCH 1837
9512	QC (Suraj)

Br-04a

Code	Entries
9521	RHC 1217
9522	GSHV 185
9523	LC
9524	SIMA-5
9525	QC (Suraj)
9526	CPD 1702

9527	TSH 325
9528	ZC (BGDS 1063)
9529	BS 1
9530	HS 298

Br-05a

Code	New Entries	Sponsor
9531	DHH 1902	UAS, Dharwad
9532	BGDHH 697	UAS, B'Gudi
9533	ARBHH 1901	UAS, Arabhavi
9534	ZC (RAHH 455)	
9535	LAHH 36	ANGRAU, Guntur
9536	ARBHH 1902	UAS, Arabhavi
9537	LC	
9538	DHH 1901	UAS, Dharwad
9539	RAHH 1952	UAS, Raichur
9540	RAHH 1951	UAS, Raichur

Br-06a

Code	Entries
9551	RHC HD 1433
9552	LHDP 5
9553	RAHC 1028
9554	DS C 1801
9555	Local Check
9556	RHC HD 1420
9557	LHDP 2
9558	Zonal Check (Suraj)
9559	RHC-HD 1438

Br – 13 a PVT *G. barbadense*

Code	Entries
9571	CCB 26
9572	CCB 51
9573	ZC (Suvin)
9574	CCB 28
9575	CCB 29
9576	DB 1801
9577	CCB 64

Br – 14 a CVT *G. barbadense*

Code	Entries
9581	CCB 51-2
9582	DB-1701
9583	SB SG 1-5
9584	ZC (Suvin)
9585	CCB 143B
9586	CCB 129

Br-15 a

Code	Entries
9591	RHB 1623
9592	ZC (DCH 32)
9593	RHB 1624
9594	LC
9595	RHB 1002

Br-03b

Code	Entries
9601	BGDS 1033
9602	LC
9603	RAH 1075
9604	GBHV-193
9605	ZC (Sahana)
9606	BS 6-18
9607	QC (Suraj)
9608	NDLH – 2035-5

Br-04b

Code	Entries
9611	RAH 1071
9612	LC
9613	BS 1
9614	NDLH 20511
9615	ZC (Sahana)
9616	BGDS 1072
9617	GSHV 191
9618	QC (Suraj)

Br-05b

Code	Entries	Sponsor
9621	ARBHH 1951	UAS, Arabhavi
9622	ZC (DHH 11)	
9623	ARBHH 1952	UAS, Arabhavi
9624	RAHH 1952	UAS, Raichur
9625	DHH 1951	UAS, Dharwad
9626	LC	
9627	BGDHH 697	UAS, B'Gudi
9628	DHH 1952	UAS, Dharwad
9629	RAHH 1951	UAS, Raichur

Br-06b

Code	Entries
9631	AKH 1302
9632	DSC 1851
9633	Local Check
9634	RAHC 1029
9635	GISV 312
9636	RHC HD 1420
9637	AKH 1301
9638	CNH 1128
9639	BRCC 1621 S
9640	Zonal Check (Suraj)

Br-24 b: CVT – G. arboreum

Code	Entries
9651	GAM 260
9652	LC
9653	NDLA 3116-4
9654	MDL 2667
9655	ZC (DLSa 17)
9656	JLA-1227
9657	CNA 1054
9658	GAM 259
9659	DWDa 1801
9660	DWDa 1802
9661	CNA 1031

Br-24 b: CVT – Long linted G. arboreum

Code	Entries
9671	PA 837
9672	PA 833
9673	PAIG 377
9674	PA 839
9675	PA 778
9676	PAIG 380
9677	PAIG 384
9678	PA 806

9679	ZC (DLSa 17)
9680	PA 807
9681	PA 809
9682	CNA 1065

Coloured Cotton Trial – Hirsutum

Code	Entries
9701	LHCC 3
9702	LHCC 4
9703	LHCC 1
9704	CNH 17395
9705	Suraj (Zonal Check)
9706	16301 DB
9707	DHCC 1801
9708	LHCC 2
9709	Local Check
9710	16337 LB
9711	16315 LB
9712	DHCC 1802

Coloured Cotton Trial - Arboreum

Code	Entries
9721	CNA 1091
9722	16377 LB-A
9723	CNA 405
9724	CNA 17522
9725	DLSa 17 (Zonal Check)
9726	DDCC 1801
9727	DDCC 1802
9728	Local Check
9729	16378 LB-A
9730	CNA 407-SLP
9731	DDCC 1
9732	CNA 407

Annexure II: Fibre and Yarn Quality Norms

ICAR-CIRCOT Yarn CSP Norms

Count	CSP	Count	CSP
16s	1836	60s	2392
20s	2024	70s	2484
30s	2116	80s	2576
40s	2208	100s	2760
50s	2300	120s	2944

TMC Norms for Trash (%)

Staple Class	**Trash Limit (%)**
Extra Long Staple	2.0
Long and Medium Long	3.0
Medium and Short	3.5
Closed Boll Types	6.0

Staple Length Categories of Indian Cottons Based on UHML*

Category	Range of 2.5% S.L.(mm)
Short	20 mm and below
Medium	20.5 - 24.5
Medium Long	25.0 - 27.0
Long	27.5 - 32.0
Extra long	32.5 mm and above

Ratings of Cotton on The Basis of Length Uniformity*

Category	UI
Poor	Below 76
Fair	76 to 78
Average	79 to 83
Good	83 to 85
Excellent	Above 85

Classification of Cottons According to Micronaire Value

Category	**Range of Micronaire Value**
Very fine	Below 3.0
Fine	3.0 to 3.9
Average	4.0 to 4.9
Coarse	5.0 to 5.9
Very coarse	6.0 and above

Ratings of cotton based on tenacity at 3.2 mm gauge length (HVI mode)*

Category	Range of Bundle tenacity values in g/tex
Very weak	20.0 & below
Weak	20.1 - 25.0
Average	25.1 – 29.0
Good	29.1 – 32.5
Very good	Above 32.5

* The values are provisional subject to revision

Provisional Norms on the basis of HVI mode of testing

Sr. No.	Count Range	Range of UHML (mm)	Minimum value of UI	Minimum Tenacity (g/t) (HVI mode)	Range of Micronaire
1.	14s-18s	24-25	81	27.5	3.9-4.7
2.	20s-24s	25-26	82	28.0	3.8-4.2
3.	25s-30s	26-27	83	29.1	3.4-4.2
4.	31s-40s	27-29	84	29.3	3.3-4.1
5.	41s-50s	29-31	84	31.3	3.3-4.0
6.	51s-60s	31-33	86	33.6	3.2-3.9
7.	61s-80s	33-34	86	36.6	3.2-3.8
8.	81s-100s	34-36	87	38.3	3.1-3.4
9.	101s-120s	36>	88	40.0	2.9-3.2

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ICAR -All India Coordinated Research Project on Cotton

Integrated Disease Management in Cotton

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Satish Kumar Sain

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Contents

S.No.	Title	Page No.
	Summary of IDM modules evaluated at different locations	5
	Introduction	7
1.	**Integrated Disease Management of Soil Borne, Bacterial, Fungal, and Viral Foliar Diseases: Disease symptoms, economic losses**	
1.1.	Cotton leaf curl disease (CLCuD)	8
1.2.	Bacterial leaf blight	9
1.3.	*Alternaria* blight	10
1.4.	Grey mildew	10
1.5.	Leaf Rust	11
1.6.	Myrothecium leaf spot	11
1.7.	Root rot	12
1.8.	Fusarium wilt	13
2.	**IDM modules for the management of cotton diseases: North Zone**	
2.1.	2.1. Integrated Management of Cotton Leaf Curl Disease	15
2.2.	Integrated Management of Cotton Leaf Curl Disease through vector management	17
3.	**IDM modules for the management of cotton diseases: Central Zone**	
3.1.	IDM modules for the management of cotton diseases at Rahuri, Maharashtra	20
3.2.	IDM modules for the management of cotton diseases at Akola, Maharashtra	21
3.3.	IDM modules for the management of cotton diseases at Junagarh, Gujrat	23
3.4.	IDM modules for the management of cotton diseases at Nanded, Maharashtra	26
3.5.	IDM modules for the management of cotton diseases at Surat, Gujarat	28
4.	**IDM modules for the management of cotton diseases: South Zone**	
4.1.	IDM modules for the management of cotton diseases at Coimbatore, Tamil Nadu	31
4.2.	IDM modules for the management of cotton diseases at Guntur, Andhra Pradesh	32
4.3.	IDM modules for the management of cotton diseases at Dharwad, Karnataka	34
	References	36
	Annexure -1	38

Summary of IDM modules evaluated at different locations

- Among the different interventions (2015-16 to 2017-18), the lowest CLCuD PDI was recorded in Salicylic acid treatment(200 ppm) followed by Difenthiuron (0.1%), Cow urine+Calcium nitrate(6.6%+0.5%) & mustard oil(3.0%) treatments. The maximum whitefly reduction was noted in Diafenthiuron(0.1%) followed by Neem oil(1.0%). Among other interventions, Bryonia 30(1ml/L) followed by Buttermilk+ Calcium nitrate, and buttermilk(5.0%) alone showed a good reduction of whitefly populations. The highest seed cotton yield was observed in treatment Cow urine+Calcium nitrate followed by Buttermilk and mustard oil treatments. Based on economics, the maximum benefit-cost ratio was observed in Salicylic acid followed by buttermilk, cow urine+calcium nitrate, and neem oil treatments.
- Among 11 treatment combinations evaluated for the management of CLCuD through its vector *B. tabaci* management, (2012-13 to 2013-14), the highest reduction in CLCuD PDI was recorded in treatment 9 (spray of Nembicidene - 30DAS, Confidor - 45DAS, Nembicidene - 60DAS, *Verticillium lecanii* -75DAS) followed by treatment 6 (spray of Nembicidene - 30DAS, Admire - 45DAS, Nembicidene -60DAS*, V. lecanii* -75DAS , Acephate 95 7SG– 90 DAS) and 10 (spray of Confidor - 45DAS, Aceta-75DAS+Triazophos 40EC-90DAS). The maximum reduction of whitefly per three leaves was recorded in treatment 6 followed by treatment 7 (spray of Nembiciden56.45e - 30DAS, Nembicidence - 45DAS, Nembicidene -60DAS*, V.lecanii* -75DAS , Triazophos 40EC– 90 DAS) in North Zone.
- During 2014-15 to 2015-16, among nine treatment combinations, the highest pooled reduction of whitefly population per three leaves and CLCuD reduction was recorded in the treatment 1 (spray of nimbicidine, *V. lecanii, M. anisopliae,* Difenthiurom, Hort.Min. Oil, Triazophos & Spiromesifen).
- Pooled data of three-year trials (2011-12 to 2013-14) indicated that the module 3 (Seed Treatment - PF TNAU1 @ 10g/Kg of seed, Soil Application of *T. viride* @ 2.5 KG/ha TV-TNAU1 in 250 KG of Compost or FYM, Foliar spray with Ergon @ 1ml/Litre @ 60 DAS and Taqat @ 1.5g/Litre @ 90 and 120 DAS for fungal diseases) was found to be the best in terms of reduction (%) of the *Alternaria* leaf blight disease (60.5 & 58.8) and enhancement of the yield(%) (25 & 25.7) in both the hybrids (NCS 954 & Krishna Rashi)at Rahuri, Maharashtra.
- The pooled data for three years(2014-15 to 2016-17) showed that maximum yield of seed cotton was obtained in treatment i.e. module 6 (ST - *Pseudomonas fluorescens* (PF CICR) @ 10 g/ kg of seed + Soil Application of *Trichoderma viride* @ 2.5 kg/ ha TV-TNAU1 in 250 kg of Compost or FYM and foliar spray with Kresoxim methyl (ergon) @ 1 ml/ litre followed by Captan + Hexaconazole @ 1.5 g/ litre for fungal diseases/ALS or COC (0.3 %) + Streptocycline (0.01 %) for BLB) with maximum ICBR i.e. 1.43 considering all the factors, the same is recommended for farmers use. However, the maximum reduction in the disease intensity was obtained in module 3 with 1.17 ICBR ratio at Akola, Maharashtra.
- The three years pooled results (2014-15 -2016-17) revealed that the significantly minimum *Alternaria* leaf spot was recorded in Module-7 (ST: *P. fluorescens* (PF-JAU) @10g/kg seed; SA: of *T. harzianum* (TH-JAU) @2.5 kg/ha in 250 kg of FYM; FS: with *P. fluorescens* (PF-JAU) *1*% for ALS and COC (0.2%) + Streptocycline (0.01%) for BLB on need basis.) and it was at par with Module-6 (ST: *P. fluorescens* (PF-CICR) @ 10g/kg seed; SA: of *T. viride* (TV-TNAU) @2.5Kg/ha in 250kg of FYM; FS: with Ergon@ 1ml/lit followed by Taqat @1.5g/lit for fungal diseases or COC (0.3%) + Streptocycline (0.01%) for BLB), Module-5 (ST: *P. fluorescens* (PF-CICR) @10g/kg seed; SA: of *T. viride* (TV-TNAU) @2.5Kg/ha; S: with Propiconazole 0.1% and COC (0.3%) +Streptocycline (0.01%) for BLB or Carbendazim 0.1% for GM on need basis) and Module-8 (ST: Carboxin 37.5 % + Thiram 37.5 % DS @3.5 g/ kg of seed; SA: Nil; FS:(1) Captan70% + Hexaconazole 5 % WP 2.0 g/ lit (2) COC (0.2%) + Streptocycline (0.01%) (3) Carbendazim12%+ Mancozeb 63% WP 2.5 g/ lit on need basis) in RCH-2 BG-II hybrid. The maximum ICBR (1:4.2) was obtained also in Module-7. However, ICBR among the

next best modules was obtained in Module-1, Module-2, and Module-6 1:3.9, 1:3.9 and 1:3.4 respectively. Module -7.

- The results of three years trials (2016-17 to 2018-19) indicated that Module 6 – (seed treatment - PF CICR @ 10 g/ kg of seed + soil application of *T. viride* @ 2.5 kg/ ha TV-TNAU1 in 250 kg of Compost or FYM and foliar spray with Kresoxim methyl @ 1 ml/ litre followed by Captan + Hexaconazole @ 1.5 g/ litre for fungal diseases or COC (0.3 %) + Streptocycline (0.01 %) for BLB.), was best for the control of percent disease intensity of bacterial blight, *Alternaria*, grey mildew, wilt/root rot, with achieving higher plant height, germination and seed cotton yield at Nanded, Maharashtra. The maximum gross and net benefit-cost ratio was observed in treatment module 6 (1.6) followed by module 3 (1.5) and module 1 (1.5).
- Pooled data of three years trials (2016-2017 to 2018-19) revealed that Module 6 – (seed treatment PF CICR @ 10 g/ kg of seed + soil application of *T. viride* @ 2.5 kg/ ha TV- TNAU1 in 250 kg of Compost or FYM and foliar spray with Kresoxim methyl @ 1 ml/ litre followed by Captan + Hexaconazole @ 1.5 g/ litre for fungal diseases or COC (0.3 %) + Streptocycline (0.01 %) for BLB.), followed by module 5 (ST – PF CICR @ 10g / kg of seed + Soil Application of *Trichoderma viride* @ 2.5 kg/ ha TV-TNAU1 FS with Propiconazole 0.1 % for fungal diseases and COC (0.3 %) + Streptocycline (0.01 %) for BLB or Carbendazim 0.1 % for grey mildew on need basis) and module 4 (ST – PF CICR @ 10 g/ kg of seed + Soil Application – *P. fluorescens* - PF CICR @ 2.5 kg/ ha in 250 kg of Compost or FYM and foliar spray with *P. fluorescens* 1 % – PF) was best for the control of percent disease intensity of bacterial blight, *Alternaria*, grey mildew, wilt/root rot, with achieving higher plant height, germination and seed cotton yield at Surat, Gujarat. Based on economics calculated at Surat, the maximum gross and net benefit-cost ratio was observed in treatment module 6 (1.8) followed by module 5 (1.6) and module 4 (1.4).
- Pooled data of three-year trials (2011-12 to 2013-14) indicated that the module 2 (ST – *Bacillus subtilis* (BSC5-TNAU1) + SA @ 2.5 Kg/ha + Foliar spray with *B. subtilis* @ 1% on 60, 90 and 120 DAS) was found to be the best in terms of reduction of the root rot and Alternaria leaf spot disease and enhancement of the yield at Coimbatore, Tamil Nadu.
- Pooled data of three-year trials (2011-12 to 2013-14) indicated that the Module 3 (Seed treatment- *P. fluorescens,* Soil application – *T. viride*, Foliar spray with kresoxim methyl @ 1ml/l at 60 DAS for fungal diseases and COC @ 0.3% + Streptocycline @ 0.01% for bacterial blight at 90 DAS, Foliar spray with kresoxim methyl @ 1ml/l at 60 DAS and captan+hexaconazole (Taqat) 1g/l at 90 DAS for fungal diseases.) was comparetively better in term of reduction of Bacterial leaf blight, Alternaria leaf spot disease and enhancement of yield in hybrid 1 (Mallika Bt/ Jadoo BG II). While module 2 (Seed treatment- *P. fluorescens,* Foliar spray with Propiconazole 0.1% for Alternaria leaf spot at 60 DAS and COC @ 0.3% + Streptocycline @ 0.01% for bacterial blight at 90 DAS; Foliar spray with carbendazim 0.1% for grey mildew at 60 DAS and propiconazole 0.1% at 90 DAS for leaf spots and rust.) was found to be comparatively better in terms of enhancement of the yield in hybrid RCH 2 BG II and reduction of the alternaria leaf spot grey mildew disease (Tulasi 9 /RCH 2 BG II) at Guntur, Andhra Pradesh.
- Pooled results (2014-15 to 2017-18) revealed that the lowest seedling mortality and *Alternaria* leaf blight was observed in Module 4 (ST *P. fluorescens* (PF-CICR) @ 10g/kg of SSA *P. fluorescens* (PF-CICR) @ @ 2.5 kg/ha in 250 kg of Compost or FYM FS *P. fluorescens* @ 1%(PF-CICR) followed by Module 8 (ST *P. fluorescens* (UASD)10g/kg of seed) and Module 6 (*P. fluorescens* (PF-CICR) @ 10g/kg of SSA, *T. viride* @ 2.5 kg/ha(TV-TNAU) in 250kg of Compost or FYM, FS Ergon @ 1ml/lit followed by Taqat @ 1.5g/lit for Fungal diseases or COC 0.3% + Streptocycline 0.01% for BLB). Highest yield was however noted in Module 6 followed by Module 4. Module 6 showed the highest B:C ratios also at Dharwad, Karnataka.

Introduction

Cotton (*Gossypium* spp.) known as "White Gold" is worlds, one of the most commercially important and natural textile fiber crops and a significant contributor of oilseeds. The cotton crop was cultivated on 12.2 million hectares in India during 2018 *Kharif* season with the production of 36.1 million bales and productivity of 501 kg lint per hectare. It was grown in North Zone in India in 1.45 million hectares with the production of 6.05 million bales and the productivity of 712 kg lint per hectare (AICRP, 2019).

The Indian Government permitted commercial cultivation of Bt- cotton for central and south zone in March 2002 (Raghuram, 2002). Apart from the introduction of Bt-cotton technology, chemicals such as spinosad, indoxacarb, emamectin benzoate, novaluron, and lufenuron ensured effective control of *Helicoverpa armigera* while being less toxic to beneficial insects in the cotton ecosystem. Additionally, the chloronicotinyls (imidacloprid, acetamiprid and thiomethoxam) and the insect growth regulator diafenthiuron, which are selectively more effective on the sucking pests and less toxic to beneficial insects as compared to the conventional insecticides added to sustainable pest management, reducing the selection pressure from bollworm insecticides early in the season. With the consequent reduction in insecticide sprays, especially during the flowering and boll formation phases, reduced insecticide use has allowed other pests to survive and emerge as important pests. Some minor pests (*Spodoptera litura*, mealybugs, mirid bugs, thrips, leafhoppers, weevils etc.), which are not susceptible to Cry1Ac, showed a resurgence in many parts of the world (Kranthi and Russell, 2009) and caused noticeable damage to the crop for which farmers adopt insecticidal control.

The cotton disease scenario has shown a continuous change during the past sixty years. When mainly indigenous diploid cotton was being grown in the fifties, the *Fusarium* wilt, root rot, seedling blight, anthracnose, and grey mildew were the major problems. With the large scale cultivation of tetraploid upland cotton (*Gossypium hirsutum*), bacterial blight became the major problem to which indigenous cotton was highly resistant. *Fusarium* wilt has become less important as upland cotton (Bt hybrids) now being grown in above 90 percent area and is immune to the Indian race of the pathogen. *Verticillium* wilt which appeared in Tamil Nadu remained restricted mainly to the South zone only. The grey mildew, once a serious problem for diploid cotton especially in central India with the continued cultivation and imposed selection pressure got adapted to tetraploid cotton and their hybrids as well. Presently, it is a major problem in central and south India in Bt-cotton hybrids. *Alternaria* blight and *Myrothecium* leaf spots are prevalent almost everywhere but are severe in the states of Karnataka and Madhya Pradesh, respectively. Other diseases such as *Cercospora* and *Helminthosporium* leaf spots are sporadic only. Rust, although a minor disease may become a problem in southern states in the near future. In north India, the leaf curl disease caused by a Geminivirus and transmitted by whitefly, *Bemisia tabaci* has become a major threat to cotton cultivation since 1993.

After the introduction of Bt-cotton hybrids, the disease scenario has also shown some change. Bt hybrids have manifested more susceptibility to bacterial blight and Alternaria leaf spots as compared to their non-Bt counterparts (Biswas et. al., 2009). The incidence of cotton leaf curl virus disease may also increase due to frequent recombination among the strains. A disease identified as Tobacco Streak Virus (Ilarvirus) transmitted by thrips was observed in the transgenic cotton-growing region of Southern Maharashtra and Andhra Pradesh (Sharma *et al*, 2007) and suspected to be present in North Cotton Growing Zone of India. The important cotton diseases have been described below after categorization into seed-borne and foliar diseases. The Tobacco Streak Virus (TSV) is reported to be an emerging disease in Andhra Pradesh, Tamil Nadu, and Maharashtra and the incidence is reported to be up to 50% (Rageshwari et al 2016).

Several efforts have been made all over the world to minimize crop losses due to diseases of cotton with a focus on eco-friendly and sustainable control. Bt-transgenic cotton has emerged as an important new IPM tool for cotton but should not be taken as a cure-all for cotton insect problems.

1. Integrated Disease Management of Soil Borne, Bacterial, Fungal, and Viral Foliar Diseases: Disease symptoms, economic losses

1.1. Cotton leaf curl disease (CLCuD)

1. **Name of the disease:** Cotton leaf curl disease (CLCuD) is caused by a complex of whitefly (*Bemisia tabaci*) transmitted Begomoviruses (family Geminiviridae) having monopartite genome with circular ssDNA associated with satellite DNA molecules (beta and alpha satellite).

2. **Symptoms description:**

CLCuD is a major threat to cotton production causing enormous losses to cotton crops in most of the cotton-growing countries including the Indian subcontinent. The disease is restricted in the northern cotton growing zone of the country. The CLCuD-affected cotton plants show characteristic symptoms of thickening and darkening of veins when seen against sunlight called small vein thickening type (SVT) followed by distinct upward/downward curling (Fig.1). Leaves of affected plants also show thickened dark green veins as compared to normal translucent veins of healthy plants. Some of the leaves develop secondary leaf-like structures originating from nectaries called enations (Fig.2). Similar symptoms are also observed on bracts. The diseased plants give a dwarf appearance or stunted growth of plants with reduced intermodal length (Fig.3). The disease is spread by the whitefly, *Bemisia tabaci* a vector of the virus.

Fig. 1-3. CLCuD symptoms on leaves, and plant (*Gossypium hirsutum*)

Whitefly: Among several insect-pests, *Bemisia tabaci* (Gennadius) (Hemiptera: Aleyrodidae), a vector of cotton leaf curl diseases (CLCuD) is the most devastating and serious pests that inflicted economic losses to cotton yield and quality. Whitefly is highly polyphagous, invading more than 900 wild and cultivated species and transmitting more than 110 plant viruses worldwide (Brown et al. 1995; Jones 2003). Until now, five outbreaks of whitefly were noticed in different cotton-growing states in India, and in recent times during 2015-16, a severe outbreak of whitefly was occurred in the north cotton growing zone of India and caused up to 50-60% crop loss (Kranthi 2015; Singh et al. 2016). Whitefly reduces the yield by direct feeding (Polston et al. 2014) as well as with the development of black sooty mold on leaves. Sooty mold significantly reduces the photosynthetic capabilities of crop plants, causes leaf shading and results in an economic loss (Fig.2). However, the greatest economic threat is from the transmission of CLCuD viruses that causes yield losses up to 88.4 -81.4% in all northern cotton-growing areas of India (Monga 2014) (Fig.1). In a recent study, three *B. tabaci* biotypes were recorded in India that include Asia-II-7 in Pusa -Delhi, Asia-I in the south and central India and Asia-II-1 in north India (Naveen et al. 2017). Availability of source of absolute resistance against CLCuD and its vector *B. tabaci* in Bt and non-Bt cotton hybrids/varieties in North India is almost negligible (Kranthi 2014).

Fig. 1-2. CLCuD and sooty mold symptoms on leaves, and plant (*Gossypium hirsutum*)

3. **Economic losses:**
   The incidence of diseases is increasing and this has become an emerging problem after the introduction of susceptible Bt cotton hybrids in the north zone. The percent disease incidence (PDI) increases slowly during the month of June and reaches up to 80% during August and September (Monga et al., 1998). Monga et al. (2011) have recorded disease incidence 98%,95.4% and 93.8 during 2001, 2000 and 2006, respectively in India. A recent study revealed that the average yield loss corresponding to disease ratting scale 1,2,3,4,5, and 6 of cotton leaf curl virus disease (CLCuD) was recorded to be 15.0, 28.0, 39.2, 51.5, 62.1 and 65.2%, respectively in eight Bt cotton hybrids evaluated during the last six-year in Haryana and Punjab(personal communication).

1.2. Bacterial leaf blight

1. **Name of the Disease:** Bacterial leaf blight caused by *Xanthomonas citri* pv. *malvacearum*

2. **Symptoms description:**
   Four phases of the disease are recognized. The initial symptoms are round to elongate lesions on cotyledons (seedling phase), initially deep green and water-soaked and later drying to brown. Lesions on hypocotyl are black, elongate cankers that often girdle and kill the seedlings. The foliar phase of the bacterial blight (Angular leaf spot and vein blight phase, Fig.1 & 2) may appear at any time during the season as water-soaked lesions on leaves that are angular in outline. The infected spots tend to be restricted from spreading by the network of fine leaf veins. As the older spots dry, their colour darkens to brown. The infection may also occur on veins causing 'Vein Blight'. Ultimately the severely affected leaves fall due to premature formation of the abscission zone at the base of the petiole. Later the infection also extends to stem causing elongated grayish to black lesions (Black arm phase). On the bolls, the infection starts as small round water-soaked spots which later turn brown (Boll rot phase). Secondary organisms then also enter the bolls and cause extensive boll rotting.

Fig. 1-3. Bacterial leaf blight symptoms on leaves, vein blight and on boll (*Gossypium hirsutum*)

3. **Economic loss:**
During 2010-2012 the potential yield loss due to BLB was estimated to be 22% with the maximum disease index 28.8% at Dharwad, Guntur, Surat & Akola (Monga et al 2013).

1.3. *Alternaria* blight

1. **Name of Disease:** Alternaria blight caused by *Alternaria* spp. including *A. macrospora Zimm. A. alternata* (Fr.) Keissler

2. **Symptoms description :**

The earliest symptom of the disease is the appearance of spots on the cotyledons of the seedlings. In favorable conditions, the spots can enlarge to 10 mm in diameter. Large numbers of spots coalesce together causing cotyledons to shed. On plants symptoms of the disease appears initially on leaves as small dull and dark brown, circular or irregularly shaped spots, varying in diameter from 0.5 to 10 mm on the upper surface of the leaf having concentric rings. In advance stage, the spots dry with grey centre which cracks and some of them drop down giving target board appearance. The spots get coalesced and formed a big patch and such leaves look like burnt or blighted, which results in defoliation. Few spots are also noticed on the petiole, stem, and bolls.

Fig. 1-3. Alternaria blight on leaves (*Gossypium hirsutum*)

3. **Economic losses:**
When the incidence of important diseases in varieties/hybrids/Bt cotton hybrids was studied across the country for the past three years, it was noted that Alternaria blight showed an increasing trend (2008-09 to 2010-11) in LRA 5166 at Rahuri (28.7 to 36.6 PDI) and in case of Bt hybrid RCH 2 i.e. from PDI 21.3 to 39.5 at Dharwad (Monga et al.,2011). During 2006-2008 the potential yield loss due to ALB was estimated to be 26.6% with the maximum disease index 31.6% at Rahuri, Guntur, Dharwad (Monga et al 2013).

1.4. Grey mildew

1. **Name of Disease:** Grey mildew is caused by *Ramularia areola* G.F. Atk.

2. **Symptoms description :**

The disease is prevalent in the central and south zone of India which is characterized by irregular, angular, pale, translucent spots measuring 1-10 mm in size surrounded by veinlets (Fig.1). The disease appears on the older leaves usually when the plants are reaching maturity. A frosty or mildew growth consisting of conidiophores of the fungus appear first on the undersurface and subsequently on the upper surface of affected leaves. As the infection progresses leaves become yellowish-brown and fall off prematurely (Fig.2).

Fig. 1-2. Grey mildew symptoms on leaves (*Gossypium hirsutum*)

3. Economic losses:
During 2009-2011 the potential yield loss due to grey mildew was estimated to be 25.6-46.6% at Dharwad, Guntur, Nanded (Monga et al 2013)

1.5. Leaf Rust

1. **Name of the disease:** Rust caused by *Phakospora gossypii* (Arth.) Hirat. f.

2. **Disease symptoms:** Cotton leaf rust has become an important problem of south zone. Yellowish-brown uredia form on both the surfaces of leaves (Fig.1&2). Primary uredia, on the upper surface, are deeply immersed in the tissues while shallowly seated secondary uredia are on the lower surface of the leaf. Though the disease occurs during the later part of the crop season, it may cause losses in late sown as well as a prolonged irrigated crop. Avoidable loss due to rust disease was estimated to be 21.7% (Fig.3) in Bunny Bt while the loss was to the tune of 34.05% in RCH 2 BG II (Monga *et al* 2013, Bhattiprolu, 2015).

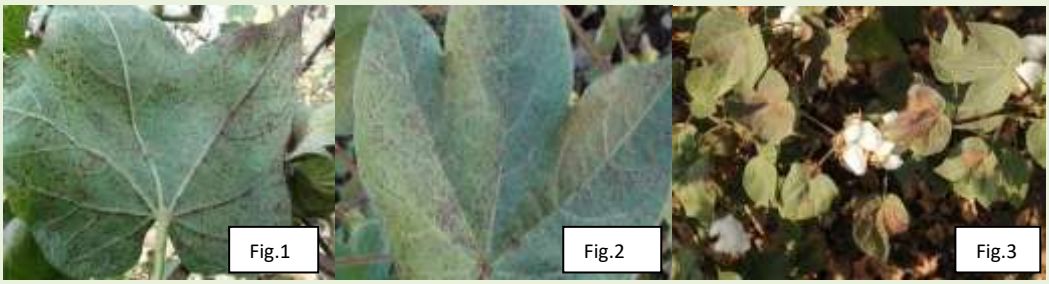

Fig 1-3: Rust symptoms on cotton leaves and plant

4. **Economic Losses:**
The disease has become important since last few years due to its early appearance, and significant losses in seed cotton yield have been reported. During 2009-2012 the potential yield loss due to rust was estimated to be 21.7% with the maximum disease index 32.8% at Dharwad (Monga et al 2013). The PDI ranged from 29.1 to 39.8 on different varieties/hybrids at Dharwad and 35.0 to 37.0 at Guntur. (AICCIP Report, 2014-15).

1.6. Myrothecium leaf spot

1. **Name of the disease: Myrothecium leaf spot** caused by *Myrothecium roridum* Tode.

2. **Disease symptoms:**
Myrothecium leaf spot became an important problem of Madhya Pradesh. Myrothecium disease produces light brown small, circular spots of 2-10mm diameter with dark brown to purple margins. In severe cases, the lesion/spots coalesce to form large patches. Later the bigger spots may show shot hole and infected leaves may fall off. In favourable weather

conditions, conspicuous rings of pinhead size and black sporodochia can be seen on the spots.

Fig. 1-3. Myrothecium leaf spot symptoms on plant, leaves (*Gossypium hirsutum*)

3. **Economic Losses:**

During 2007-2010 the potential yield loss due to Myrothecium leaf spot was estimated to be 29.2 % with the maximum disease index 22.5 % at Khandwa (Monga et al 2013).

1.7. Root rot

1. **Name of the Disease:** Root rot is caused by *Rhizoctonia solani* Kuhn.; *R. bataticola* (Taub) Butler (pycnidial stage *Macrophomina phaseolina*); or *Sclerotium rolfsii* Sacc. The disease caused by soil-borne pathogens occurs in circular patches in the affected field. The pathogen can affect the plant at the seedling stage or after wood formation.

2. **Symptoms description:**

Initially, a yellow patch appears on the lower part of the stem which later turns in black colour leading to drying of seedlings. Affected seedling and plants can easily be pulled out of the ground due to the rotting of secondary roots. Tips of roots are mostly discolored, yellow and become sticky. Under favourable conditions, small black dot-like sclerotia may be seen on the wood beneath the bark and between the shredded bands of bark. The affected plant can be easily distinguished by the discolored stele of the main root and pith of stem. In severe cases, there is the dissolution of the stem and root tissues and minute sclerotia can be found on it. The most identical symptom is dry or wet dark rot of the lower stem followed by shredding of bark and sudden wilting of plants with leaves remaining attached to plants.

Fig. 1-2. Root rot symptoms on plant, leaves (*Gossypium hirsutum & G. arboreum*)

Fig. 3-4. Root rot disease infected roots (*Gossypium hirsutum & G. arboreum*)

3. **Economic loss:**
   The root rot disease is serious in northern India but also reported from Bihar, Gujrat, Andhra Pradesh and Tamil Nadu (Srinivasan, 1994). The disease affects both the *G. hirsutum* (American cotton) and *G. arboreum* (Desi) cotton species in almost all the cotton-growing areas, being more serious on desi cotton (Monga and Raj, 1994a).

1.8. Fusarium wilt

1. **Name of the Disease: *Fusarium* wilt** is caused by both seed and soilborne fungal pathogen *Fusarium oxysporum* f.sp *vasinfectum* (Atk.) Snyder and Hansen. The disease affects only diploid cotton in India as only race 4 is known in India. The pathogen survives on seed and infected plant debris into the soil by producing sclerotized, thick-walled resting bodies (chlamydospores).

2. **Symptoms description:**
   Symptoms of this wilt may appear at any stage of crop development, depending on inoculum density, temperature, and host susceptibility. At very high inoculum density or at the very beginning of infection, plants may be killed at the seedling stage itself. Usually, the first symptoms in the field appear 30-60 days after planting generally, on the onset of flowering. The pathogen colonizes in plant roots and grows systemically into the vascular tissues and proliferates within the xylem vessels eventually spreading throughout the plant. It grows out of the vascular tissues and after the death of the host, sporulates on crop residues. The disease can be recognized at the seedling stage with symptoms first appearing on the cotyledons as the darkening of veins, followed by peripheral chlorosis and necrosis before they drop. In older plants, the infection occurs as yellowing at the margin of one or more of the lower leaves. As the disease progresses within the plant more leaves develop chlorosis, which characteristically appears in patches between the main veins, the rest of the leaf remains green. Under the optimal conditions, all the leaves of affected plants succumb and shed before the stem dries out.

Fig. 1-2. Wilt symptoms on plant, leaves (*Gossypium hirsutum & G. arboreum*)

3. **Economic loss:**
   The wilt disease caused by *Fusarium oxysporum f sp. vasinfectum* appears at any stage of plant development. The loss may vary from field to field and variety to variety from 5 to 40%.

2. IDM modules for the management of cotton diseases: North Zone

2.1. Integrated Management of Cotton Leaf Curl Disease

1. **Location details of the study carried out:**

   The study was carried out at ICAR-Central Institute for Cotton Research, Regional Station, Sirsa, Haryana, CCS HAU Hisar, ARS SKRAU, Sriganganagar, Faridkot & Bathinda the Regional Research Stations of Punjab Agricultural University, Ludhiana, Punjab from 2015-16 to 2017-18.

2. **Description of experimental details:**
   During 2015-2016 to 2017-18, 15 treatments alone and in combinations including untreated control were evaluated at all the locations in the field conditions. Plant to plant and row to row spacing was maintained as per the regional recommendations of Bt hybrids. Experiments were conducted in RBD and each treatment was replicated twice with the plot size of 5.0 x 5.4 m (60 plants/plot). Sprays were initiated at 30 days after sowing. A total of five sprays at the fortnightly interval were applied. Observations were recorded at Pre spray, 7 days-after sprays (DAS) and 15 DAS on CLCuD incidence and for whitefly (before spray, three and seven days after spray). To work out percent disease index (PDI), after a fortnight of 5th spray, observations were recorded according to grade using a rating scale (0 to 6).

3. **Pooled results**
   Based on pooled results (2015-16-2017-18) of the trials conducted at Bhatinda, Faridkot , Hisar, Sirsa, and Sriganganager, all the treatments showed a numerical reduction of CLCuD over control. Pooled results of different interventions showed lowest PDI in Salicylic acid treatment followed by Difenthiuron (0.1%), Cow urine+Calcium nitrate & mustard oil treatments. Based on pooled data maximum whitefly reduction was noted in Diafenthiuron followed by Neem oil. Among other interventions, Bryonia 30 followed by Butter milk+ Calcium nitrate and buttermilk alone showed a good reduction of whitefly populations. The highest seed cotton yield was observed in treatment Cow urine+Calcium nitrate followed by Buttermilk and mustard oil treatments (Table 1). Based on economics, the maximum benefit-cost ratio was observed in Salicylic acid followed by buttermilk, cow urine+calcium nitrate, and neem oil treatments and are recommended for their use by farmers (Table 2).

Table 1: Innovative interventions for the management of CLCuD in North Zone (Pooled data- 2015-16 to 2017-18)

Treatments	15 Days after 5th spray				
	CLCuD PDI	Reduction over control (%)	Whitefly/3 three-leaf	Reduction over control (%)	Yield Q/ha
Butter milk @ 5%	46.7(43.1)	19.8	29.9(5.1)	18.3	28.2
Cow urine @ 6.6 %	46.5(42.9)	20.1	31.9(5.2)	12.8	26.8
Neem oil @ 1%	45.9(42.6)	21.1	28.4(4.7)	22.4	27.2
Mustard oil @ 3%	45.8(42.6)	21.3	31.5(5.1)	13.9	27.5
Calcium nitrate@0.5%	45.9(42.6)	21.1	30.3(5.1)	17.2	27.4
Cow urine + Calcium nitrate	45.8(42.5)	21.3	30.4(5.1)	16.9	29.1
Cow urine + Butter milk	46.7(43.1)	19.8	33.5(5.3)	8.5	26.3
Butter milk + Calcium	47.7(43.6)	18.0	29.8(5.1)	18.6	26.1

nitrate					
Lachesis 30	47.5(43.5)	18.4	32.5(5.2)	11.2	25.4
Digitalis 30	48.7(44.2)	16.3	31.8(5.2)	13.1	27.3
Apis mallifera 30	46.9(43.2)	19.4	30.3(5.1)	17.2	27.0
Bryonia 30	47.6(43.6)	18.2	28.8(5.0)	21.3	26.7
Natrum Mure 30	47.8(43.7)	17.9	32.3(5.3)	11.7	26.5
Diafenthiuron @ 0.1 %	43.1(41.0)	25.9	16.5(4.1)	54.9	26.5
Salicylic acid @ 200ppm**	39.3(43.2)	32.5	31.7(5.2)	13.4	26.4
Control	58.2(49.5)	0.0	36.6(5.3)		23.8

*Figures in parenthesis are mean angles corresponding to percentage are angular transformed

Table 2. Economics of superior treatments

	Diafenthiuron	Neem	Mustard oil	Cow urine+ $CaNO_3$	Butter Milk	Salicylic acid
Total Expenditure	26,562.0	25,844.0	26,422.0	25,451.0	24,704.0	22,629.0
Income:						
SCY @Rs 5300/-Q	56180.0	57664.0	58300.0	61692.0	59784.0	55968.0
Cotton Stick	2000.0	2000.0	2000.0	2000.0	2000.0	2000.0
Gross income	58180.0	59664.0	60300.0	63692.0	61784.0	57968.0
B:C ratio	2.2	2.3	2.3	2.5	2.0	2.6

* Cost of buttermilk @Rs 10/Litre; cost of cow urine @ Rs 15/litre; cost of $CaNO_3$ @ Rs 50/ kg

* Price of seed cotton = Rs 5,300/- rupees per quintal; Income from cotton Sticks/acre =Rs 2,000.00

2.2. Integrated Management of Cotton Leaf Curl Disease through vector management

1. Location details of the study carried out:

The study was carried out at ARS SKRAU Sriganganagar, ARS PAU Faridkot, CCSHAU Hisar, and ICAR-CICR Regional Station Sirsa.

Experiment 1. During 2012-13 to 2013-14, eleven treatment combinations were evaluated for the management of CLCuD through its vector *B. tabaci* management. Compared to all the pooled data the highest reduction in CLCuD PDI was recorded in treatment 9 (spray of Nembicidene - 30DAS, Confidor - 45DAS, Nembicidene - 60DAS, , *V.lecanii* -75DAS) followed by treatment 6 (spray of Nembicidene - 30DAS, Admire - 45DAS, Nembicidene -60DAS, *V.lecanii* -75DAS , Acephate 95 7SG– 90 DAS) and 10 (spray of Confidor - 45DAS, Aceta- 75DAS+Triazophos 40EC-90DAS). The maximum reduction of whitefly per three leaves was recorded in treatment 6 followed by treatment 7 (spray of Nembiciden56.45e - 30DAS, Nembicidence - 45DAS, Nembicidene -60DAS, *V.lecanii* -75 DAS, Triazophos 40EC– 90 DAS) (Table 5 & Fig.1).

Table 5. Effect of different treatment combinations for management of CLCuD through its vector whitefly (Pooled mean 2012-13 & 2013-14)

Treatments	CLCuD (PDI)	*Peak whitefly/3 leaves	**Mean whitefly/3 leaves	Yield q/ha
T1- Nembicidene 30DAS, Acephate 75 SP-45DAS, Nembicidene -60DAS, *V.lecanii* -75DAS , Triazophos40EC – 90 DAS	59.4	27.1	13.4	33.3
T2- Nembicidene - 30DAS, Acephate 75 SP - 45DAS, Nembicidene -60DAS, *V.lecanii* -75DAS , Buprofezin 25SC- 90 DAS	58.8	26.9	13.5	33.1
T3-Nembicidene - 30DAS, Clothianidin - 45DAS, Nembicidene -60DAS, *V.lecanii* -75DAS , Triazophos 40EC – 90 DAS	58.9	25.7	13.6	32.8
T4-Nembicidene - 30DAS, Clothianidin- 45DAS, Nembicidene -60DAS, *V.lecanii* -75DAS , Acephate 95 SG-90DAS	58.4	25.1	12.8	32.1
T5- Nembicidene - 30DAS, Admire - 45DAS, Nembicidene -60DAS, *V.lecanii* -75DAS, Triazophos40EC – 90 DAS	60.3	23.6	12.8	32.2
T6-Nembicidene - 30DAS, Admire - 45DAS, Nembicidene -60DAS, *V.lecanii* -75DAS , Acephate 95 7SG– 90 DAS	57.1	21.7	12.0	30.3
T7-Nembiciden56.45e - 30DAS, Nembicidence - 45DAS, Nembicidene -60DAS, *V.lecanii* -75DAS , Triazophos 40EC– 90 DAS	58.9	22.8	12.0	31.2
T8-Nembicidene - 30DAS, Nembicidene - 45DAS, Nembicidence -60DAS, *V.lecanii* -75DAS	58.4	25.6	12.5	32.2
T9-Nembicidene - 30DAS, Confidor - 45DAS, Nembicidene - 60DAS, , *V.lecanii* -75DAS	57.0	24.1	12.8	31.3
T10-Confidor - 45DAS, Aceta-75DAS+Triazophos 40EC-90DAS	57.1	24.9	13.3	31.8
T11-Untreated control (RST 9)	65.0	30.2	17.3	37.5

#Peak whitefly population is the highest post count population recorded in respective module.

** Mean whitefly population is the average post count population recorded in the respective module after every treatment

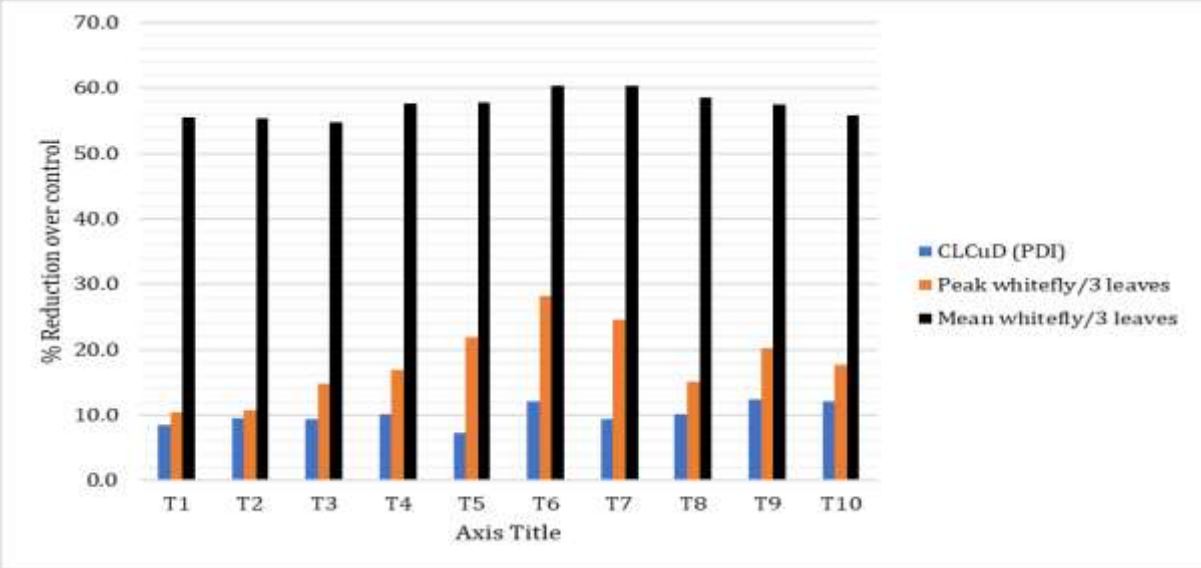

Fig. 1. Effect of different treatment combinations for management of CLCuD through its vector whitefly

Experiment 2. During 2014-15 to 2015-16, nine treatment combinations were evaluated for the management of CLCuD through its vector *B. tabaci* management at Bhatinda, Faridkot, Hisar, Sriganganagr and Sirsa. When compared the pooled data, the reduction of CLCuD was found to be the highest in treatment 1 (spray of nimbicidine, *V. lecanii, M. anisopliae,* Difenthiuron, Hort.Min. Oil, Triazophos & Spiromesifen) followed by treatment -2 (spray of nimbicidine, 20 DAS). The highest pooled reduction of whitefly population per three leaves was recorded in the treatment 1 (spray of nimbicidine, V. *lecanii, M. anisopliae,* Difenthiurom, Hort.Min. Oil, Triazophos & Spiromesifen) followed by treatment 6 (spray of Horticultural Mineral Oil (Hort.Min. Oil), 90 DAS) and treatment -2 (Spray of nimbicidine, 20 DAS) (Table 6, & Fig.2).

Table 6. Effect of different treatment combinations for management of CLCuD through its vector whitefly (Pooled mean 2014-15 & 2015-16)

Treatment	Whitefly/3 Leaves		CLCuD	
	Mean	Reduction over control (%)	PDI	Reduction over Control (%)
T1-Spray of nimbicidine, *V. lecanii, M. anisopliae,* Difenthiuron, Hort.Min. Oil, Triazophos & Spiromesifen	20.6	49.9	44.4	21.8
T2-Spray of nimbicidine, 20 DAS	23.2	45.2	49.1	13.4
T3-Spray of V. lecanii, 45 DAS	24.7	40.5	51.3	9.6
T4-Spray of M. anisopliae, 60 DAS	26.2	36.2	50.5	11.1
T5-Spray of Difenthiuron, 75 DAS	24.8	38.4	51.6	9.1
T6-Spray of Horticultural Mineral Oil (Hort.Min. Oil), 90 DAS	28.7	25.4	48.4	14.7
T7-Spray of Triazophos, 105 DAS	26.1	33.8	52.5	7.5
T8-Spray of Spiromesifen, 120 DAS	30.2	18.1	54.0	4.9
T9-Control	38.9	-	56.8	-

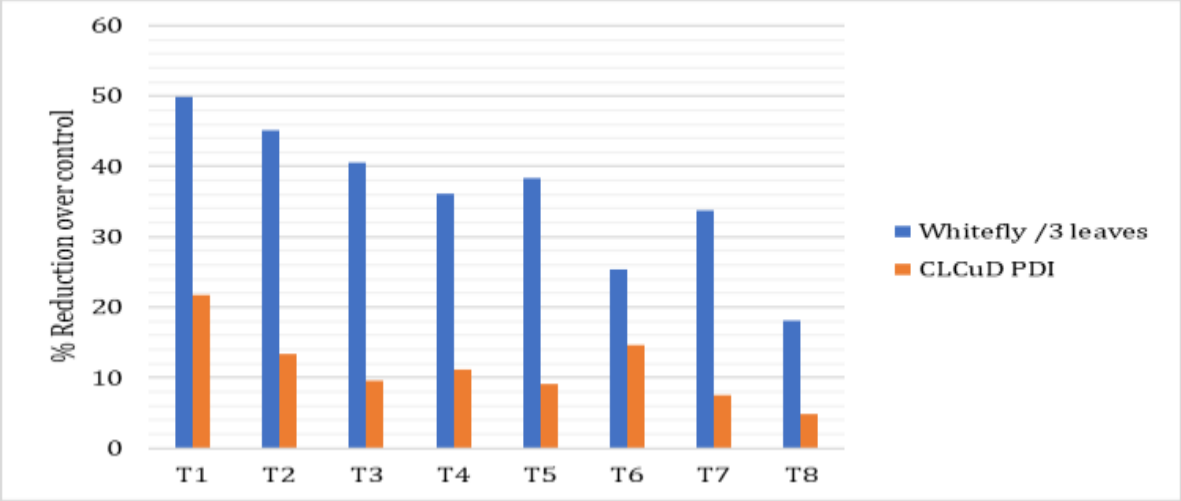

Fig. 2. Effect of different treatment combinations for management of CLCuD through its vector whitefly

3. IDM modules for the management of cotton diseases: Central Zone

3.1. IDM modules for the management of cotton diseases at Rahuri, Maharashtra

During 2011-12 to 2013-14, three Integrated disease management modules were developed for evaluation on two Bt hybrids during each season at on-station trials at Mahatma Phule Agricultural University, Rahuri, Dist. Ahmednagar, Maharashtra State (Table 7). The trials were conducted in RBD and replicated thrice with plot size 50 $m^{2.}$ The treatments combinations include Bt Hybrid 1 + Module 1, 2. Bt Hybrid 1 + Module 2, 3. Bt Hybrid 1 + Module 3, 4. Bt Hybrid 2 + Module 1, 5. Bt Hybrid 2 + Module 2, 6. Bt Hybrid 2 + Module 3, 7 and 8. Farmers' practice control with both Bt cotton hybrids were selected based on tolerance to one or the other disease. Modules were prepared depending upon the severity of the diseases occurring in the zone. The interventions within a module were modified based on location needs. Need-based applications were given based on the disease severity observed in the respective places.

Table 7. Integrated disease management modules developed and evaluated at Rahuri

Module	Treatment
Hyb 1 + Module 1:	ST - PF TNAU1 @ 10g/Kg of seed, SA – *P. fluoresccens* – PF TNAU1 @ 2.5 Kg/ha in 250 KG of Compost or FYM, FS with *Pseudomonas fluoresccens* - 1% PF TNAU1 60,90 and 120 DAS
Hyb 1 + Module 2:	ST - PF TNAU1 @ 10g/Kg of seed, FS with propiconazole 0.1% for foliar diseases and COC (0.3%) + Streptocycline (0.01%) for BLB
Hyb 1 + Module 3:	ST - PF TNAU1 @ 10g/Kg of seed, SA of *T. viride* @ 2.5 KG/ha TV- TNAU1 in 250 KG of Compost or FYM, FS with Ergon @ 1ml/Litre @ 60 DAS and Taqat @ 1.5g/Litre @ 90 and 120 DAS for fungal diseases
Hyb 2 + Module 1:	ST - PF TNAU1 @ 10g/Kg of seed, SA – *P. fluoresccens* – PF TNAU1 @ 2.5 Kg/ha in 250 KG of Compost or FYM, FS with *P. fluoresccens* - 1% PF TNAU1 60,90 and 120 DAS
Hyb 2 + Module 2:	ST - PF TNAU1 @ 10g/Kg of seed, FS with propiconazole 0.1% for foliar diseases and COC (0.3%) + Streptocycline (0.01%) for BLB
Hyb 2 + Module 3:	ST - PF TNAU1 @ 10g/Kg of seed, SA of *T. viride* @ 2.5 KG/ha TV- TNAU1 in 250 KG of Compost or FYM, FS with Ergon @ 1ml/Litre @ 60 DAS and Taqat @ 1.5g/Litre @ 90 and 120 DAS for fungal diseases
Control	Farmers practice; Bt_1 hybrid NCS 954 (no seed treatment and fungicide/bioagent spray)
Control	Farmers practice; Bt hybrid Krishidhan Rashi (no seed treatment and fungicide / bioagent spray)

ST=seed treatment; SA= Soil application; SSA= seed & soil application; FS= foliar spray

Pooled results

Pooled data indicated that the module 3 (Seed Treatment - PF TNAU1 @ 10g/Kg of seed, Soil Application of *T. viride* @ 2.5 KG/ha TV- TNAU1 in 250 KG of Compost or FYM, Foliar spray with Ergon @ 1ml/Litre @ 60 DAS and Taqat @ 1.5g/Litre @ 90 and 120 DAS for fungal diseases) was found to be the best in terms of reduction of the disease (60.5 & 58.8) and enhancement of the yield in both the hybrids (Table 8 & Fig. 3).

Table 8: Percent disease intensity of *Alternaria* leaf blight and seed cotton yield in different treatments at Rahuri (Pooled 2011-12 to 2013-14)

Module	Germination (%)	PDI	PDC	Yield (q/ha)
Hyb 1 + Module 1:	94.9	10.6	54.0	25.0
Hyb 1 + Module 2:	94.4	10.0	56.9	25.0
Hyb 1 + Module 3:	95.8	9.6	58.8	25.7
Hyb 2 + Module 1:	97.2	10.5	56.0	23.9
Hyb 2 + Module 2:	96.8	10.2	57.3	24.5
Hyb 2 + Module 3:	97.7	9.7	60.5	25.0
Farmers practice; Bt Hyb1 NCS 954	93.1	22.5	-	24.0
Farmers practice; Bt Hyb2 Krishna Rashi	93.8	15.9	-	14.5

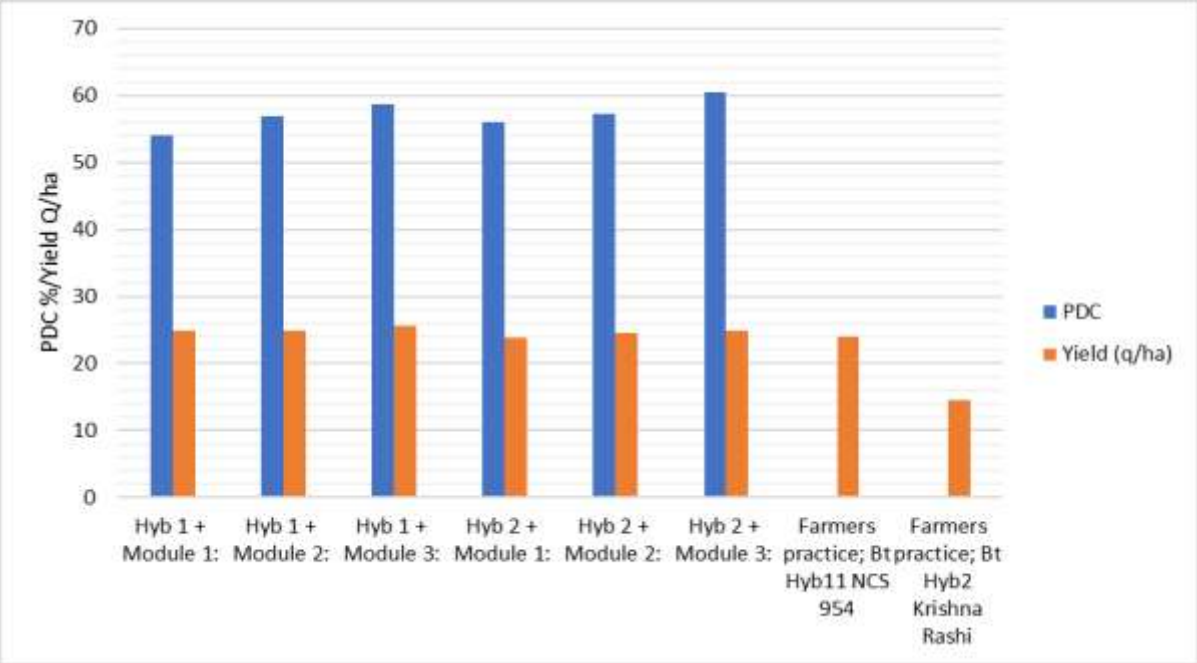

Fig. 3. The pooled effect of IDM modules on *Alternaria* leaf blight control and seed cotton yield at Rahuri

3.2. IDM modules for the management of cotton diseases at Akola, Maharashtra

From 2014-15 to 2016-17, six Integrated disease management modules were tested for on Bt hybrids during each season at on-station trials at Dr. Panjab Rao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra (Table 9). The trials were conducted in RBD and replicated thrice with plot size 50 $m^{2.}$. The treatment combinations include Module 1 – Module 6, and untreated control. Bt cotton hybrid (Bunny Bt.) was selected based on tolerance to one or the other disease. Modules were prepared depending upon the severity of the diseases occurring in the zone. The interventions within a module were modified based on location needs. Need-based applications were given based on the disease severity observed in the respective places.

Table 9. Integrated disease management modules developed and evaluated at Akola

Modules	Treatments
Module 1	ST: *Trichoderma viride* (TV-TNAU) @10g/kg seed; SA: of *T. viride* (TV-TNAU) @2.5kg/ha; FS: with *T. viride* (TV-TNAU) @1%
Module 2	ST: *Bacillus subtilis* (BSC5-TNAU) @ 10g/kg seed; SA: of *B. subtilis* (BSC5-TNAU) @2.5kg/ha; FS: with *B.subtilis* (BSC5-TNAU) @1%
Module 3	ST: *P. fluorescens* (PF-TNA @10g/kg seed; SA: of *P. fluorescens* (PF-TNAU) @2.5Kg/ha; FS: with *P. fluorescens* @ 1%
Module 4	ST: *P. fluorescens* (PF-CICR) @10g/kg seed; SA: of *P. fluorescens* (PF-CICR) @ 2.5 Kg/ha in 250kg of FYM; FS: with *P. fluorescens* (PF-CICR) @ 1%
Module 5	ST: *P. fluorescens* (PF-CICR) @10g/kg seed; SA: of *T. viride* (TV-TNAU) @2.5Kg/ha; FS: with Propiconazole 0.1% and COC (0.3%) +Streptocycline (0.01%) for BLB or Carbendazim 0.1% for GM on need basis.
Module 6	ST: *P.fluorescens* (PF-CICR) @ 10g/kg seed; SA: of *T. viride* (TV-TNAU) @2.5Kg/ha in 250kg of FYM; FS: with Ergon@ 1ml/lit followed by Taqat @1.5g/lit for fungal diseases or COC (0.3%) + Streptocycline (0.01%) for BLB
Control	Untreated

ST=seed treatment; SA= Soil application; SSA= seed & soil application; FS= foliar spray

Pooled results

The pooled data for three years (i.e. 2015-16, 2016-17 and 2017-18) showed that maximum yield of seed cotton was obtained in treatment i.e. module 6 (ST - PF CICR @ 10 g/ kg of seed + Soil Application of *Trichoderma viride* @ 2.5 kg/ ha TV- TNAU1 in 250 kg of Compost or FYM and foliar spray with Kresoxim methyl (ergon) @ 1 ml/ litre followed by Captan + Hexaconazole @ 1.5 g/ litre for fungal diseases or COC (0.3 %) + Streptocycline (0.01 %) for BLB.) with maximum ICBR i.e. 1.43 considering all the factors, the same is recommended for farmers use. However, the maximum reduction in the disease intensity was obtained in module 3 with 1.17 ICBR ratio (**Table 10;** Fig.4).

Table 10: Developing IDM modules for the management of cotton diseases at Akola (Pooled - 2015-16- 2016-17)

Modules	PDI	PDC	Yield Q/ha	ICBR*	Germination (%)	Plant height (cm)	Root length (cm)	Days to Flowering	Boll no.
Module 1	4.9	38.4	5.7	0.46	95.7	63.8	37.6	42.0	17.7
Module 2	5.3	32.7	5.7	0.49	95.4	64.1	35.6	42.0	18.7
Module 3	4.7	40.3	6.2	1.17	95.0	66.7	37.2	39.0	17.8
Module 4	5.4	31.3	6.1	1.14	95.2	64.3	36.7	45.0	16.6
Module 5	4.7	35.5	6.1	1.28	97.3	67.0	38.3	40.0	19.4
Module 6	5.1	40.9	6.3	1.43	97.6	67.8	37.9	40.5	18.0
Control	7.9	0.0	4.8		94.1	64.0	35.4	38.0	14.7

Figures in parenthesis are square-root transformed

*Cost of inputs: FYM 50 kg @200,100kg @ 400/ Labour @ 180/ day, Cost of insecticides Rs. 804 (Including two spray) Bioagents @ Rs.150/kg,

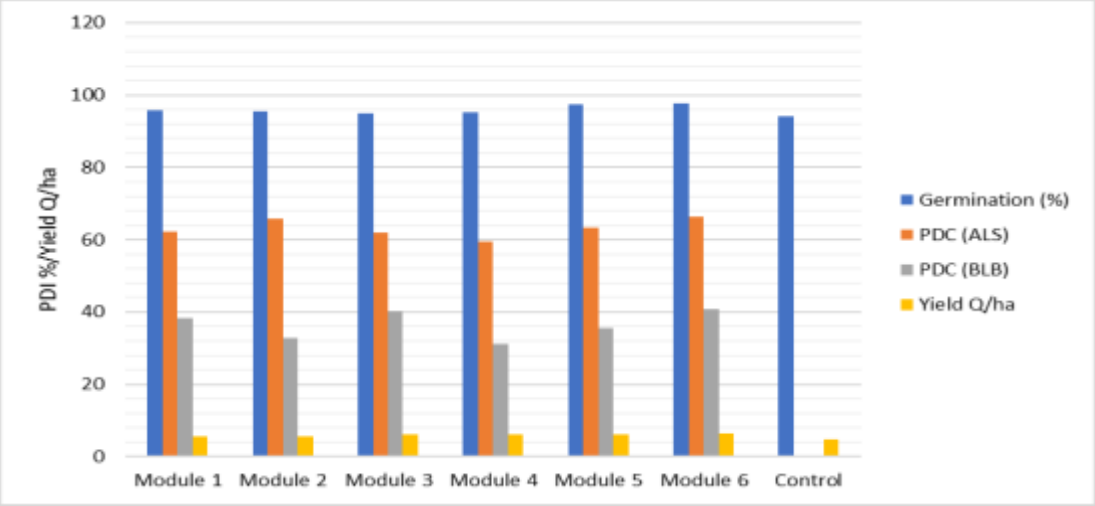

Fig.4. The pooled effect of IDM modules on *seedling mortality, ALB* and seed cotton yield at Akola

3.3. IDM modules for the management of cotton diseases at Junagarh, Gujrat

During 2014-15 to 2016-17, Integrated disease management modules were developed for evaluation on Bt hybrids during each season at on-station trials at Cotton Research Station, Junagadh (Gujarat) (Table **11**). The trials were conducted in RBD and replicated thrice with plot size 50 $m^{2.}$ The treatments combinations include Bt Hybrid + Module 1 – Module 8, and untreated control. Bt cotton hybrid (RCH-2 BG-II) was selected based on tolerance to one or the other disease. Modules were prepared depending upon the severity of the diseases occurring in the zone. The interventions within a module were modified based on location needs. Need-based applications were given based on the disease severity observed in the respective places.

Table 11. Integrated disease management modules developed and evaluated at Junagarh (2014-15 to 2016-17)

Sr. No.	Treatment
Module 1	ST: *Trichoderma viride* (TV-TNAU) @10g/kg seed; SA: of *T. viride* (TV-TNAU) @2.5kg/ha; FS: with *T. viride* (TV-TNAU) @1%
Module 2	ST: *Bacillus subtilis* (BSC5-TNAU) @ 10g/kg seed; SA of *B. subtilis* (BSC5-TNAU) @2.5kg/ha; FS: with *B. subtilis* (BSC5-TNAU) @1%
Module 3	ST: *Pseudomonas fluorescens* (PF-TNAU) @10g/kg seed; SA: of *P. fluorescens* (PF-TNAU) @2.5Kg/ha; FS: with *P. fluorescens* @ 1%
Module 4	ST: *P. fluorescens* (PF-CICR) @10g/kg seed; SA: of *P. fluorescens* (PF-CICR) @ 2.5 Kg/ha in 250kg of FYM; FS: with *P. fluorescens* (PF-CICR) @ 1%
Module 5	ST: *P.fluorescens* (PF-CICR) @10g/kg seed; SA: of *T. viride* (TV-TNAU) @2.5Kg/ha; S: with Propiconazole 0.1% and COC (0.3%) +Streptocycline (0.01%) for BLB or Carbendazim 0.1% for GM on need basis.
Module 6	ST: *P. fluorescens* (PF-CICR) @ 10g/kg seed; SA: of *T. viride* (TV-TNAU) @2.5Kg/ha in 250kg of FYM; FS: with Ergon@ 1ml/lit followed by Taqat @1.5g/lit for fungal diseases or COC (0.3%) + Streptocycline (0.01%) for BLB
Module 7	ST: *P. fluorescens* (PF-JAU) @10g/kg seed; SA: of *T. harzianum* (TH-JAU) @2.5 kg/ha in 250 kg of FYM; FS: with *P. fluorescens* (PF-JAU) *1%* for ALS and COC (0.2%) + Streptocycline (0.01%) for BLB on need basis.

Module 8	ST: Carboxin 37.5 % + Thiram 37.5 % DS @3.5 g/ kg of seed; SA: Nil; FS:(1) Captan70% + Hexaconazole 5 % WP 2.0 g/ lit (2) COC (0.2%) + Streptocycline (0.01%) (3) Carbendazim12%+ Mancozeb 63% WP 2.5 g/ lit on need basis
Control	Untreated Control

ST=seed treatment; SA= Soil application; SSA= seed & soil application; FS= foliar spray

Pooled results

The pooled results indicated that the highest germination percentage was recorded in Module-7 (97.9%) and Module-6 (97.5%). The lowest germination percentage was recorded in control (92.1%). The three years pooled results revealed that the significantly minimum *Alternaria* leaf spot was recorded in Module-7 (9.2%) and it was at par with Module-6 (10.1%), Module-5 (10.3%) and Module-8 (10.4%) in RCH-2 BG-II hybrid. While all the remaining Modules found statistical at par with each other except Module-4 and control against *Alternaria* leaf spot. The maximum *Alternaria* leaf spot (13.6%) was recorded in control. Similarly, the bacterial leaf blight was recorded significantly minimum in Module-7(4.0%) and it was at par with Module-5 (4.6%), Module-6(4.8%) and Module-8 (4.9%) in RCH-2 BG-II hybrid as compared to the control. The maximum bacterial leaf blight (7.2%) was recorded in control. Significantly minimum plant mortality percent (7.2%) was recorded in Module-7 and it was at par with Module-6 (8.1%). However, Module-5 was found (8.8%) statistically at par with the rest of the Modules except control, reduce the mortality percentage. The maximum plant mortality percent (11.8%) was recorded in control. Significantly higher seed cotton yield was recorded in Module-7 (22.8 Q/ha) and it was at par with Module-6 (21.4 Q/ha) as compared to the rest of Modules. The minimum seed cotton yield of 14.8 Q/ha was recorded in control (Table 12).

Looking to economics of various treatments/modules of biocontrol agents alone and with fungicides & soil amendments, the highest net realization of Rs 40,400/ha was obtained in Module-7 (seed treatment with *P. fluorescence* (PF-JAU) @10g/kg seed; soil application of *T.harzianum* (TH-JAU) @2.5 kg/ha in 250 kg of FYM; foliar sprays with *P. fluorescens* (PF-JAU) 1% for *Alternaria* leaf spot and Copper oxychloride (0.2%) + Streptocycline (0.01%) for Bacterial leaf blight on need basis) and followed by Module-6 (seed treatment with *P. fluorescens* (PF-CICR)@ 10g/kg seed; soil application of *T.viride* (TV-TNAU) @2.5Kg/ha in 250kg of FYM ; foliar sprays with Ergon@ 1ml/lit followed by Taqat @1.5g/lit for fungal diseases or COC (0.3%)+ Streptocycline(0.01%) for BLB) Rs 33,350/ha and T1 Rs 24,450/ha. The maximum ICBR (1:4.2) was obtained also in Module-7. However, ICBR among the next best modules was obtained in Module-1, Module-2, and Module-6 1:3.9, 1:3.9 and 1:3.4 respectively. Module -7 is recommended for its use by farmers (Table 12 Fg. 5).

Table 12: Effect of IDM on Germination, ALS, BLB, Mortality and Seed cotton yield, and Economics of various treatments in IDM Modules for controlling diseases of cotton (Pooled-2014 to-17) Junagarh

Module	Germination (%)	ALS PDI	BLB PDI	Mortality %	SCY (Q/ha)	SCY increase over control (Q/ha)	Additional income	Cost of treatment* (Rs/ha)	Net realization	ICBR
Module 1	95.9	3.3 (10.9)	2.4 (5.6)	3.1 (9.4)	19.7	4.9	24450	6120	18331	1:3.9
Module 2	95.6	3.4 (11.2)	2.3 (5.4)	3.13 (9.8)	19.6	4.9	24250	6098	18152	1:3.9
Module 3	94.6	3.5 (11.9)	2.3 (5.2)	3.2 (10.1)	18.5	3.7	18700	5487	13213	1:3.4
Module 4	94.8	3.6 (12.8)	2.6 (6.6)	3.2 (10.2)	18.0	3.3	16250	5593	10658	1:2.9
Module 5	95.8	3.2 (10.3)	2.1 (4.6)	2.9 (8.8)	19.4	4.6	23200	9776	13424	1:2.4
Module 6	97.5	3.2 (10.1)	2.2 (4.8)	2.9 (8.1)	21.4	6.7	33350	9707	23643	1:3.4
Module 7	97.9	3.0 (9.2)	2.0 (4.0)	2.7 (7.2)	22.8	8.1	40400	9563	30837	1:4.2
Module 8	95.4	3.2 (10.4)	2.2 (4.9)	2.9 (8.9)	19.5	4.8	23750	8925	14825	1:2.7
Control	92.1	3.7 (13.6)	2.7 (7.2)	3.4 (11.8)	14.8	--	--	--	--	--
S. Em.±	--	0.1	0.08	0.08	0.58					
C.D.at 5%	--	0.26	0.24	0.23	1.66					
C.V.%	--	7.27	9.38	7.80	0.09					

*(1)Labor charge for seed treatment/ha : Rs 50/ 2.5 kg seed (2) Labor charge for one spray/ha : Rs 500 (3) Price of seed cotton: Rs 50/kg (4) Labor charge for soil application of treat./ha : Rs 500 (5) Picking charge: Rs 110/20 kg seed cotton.

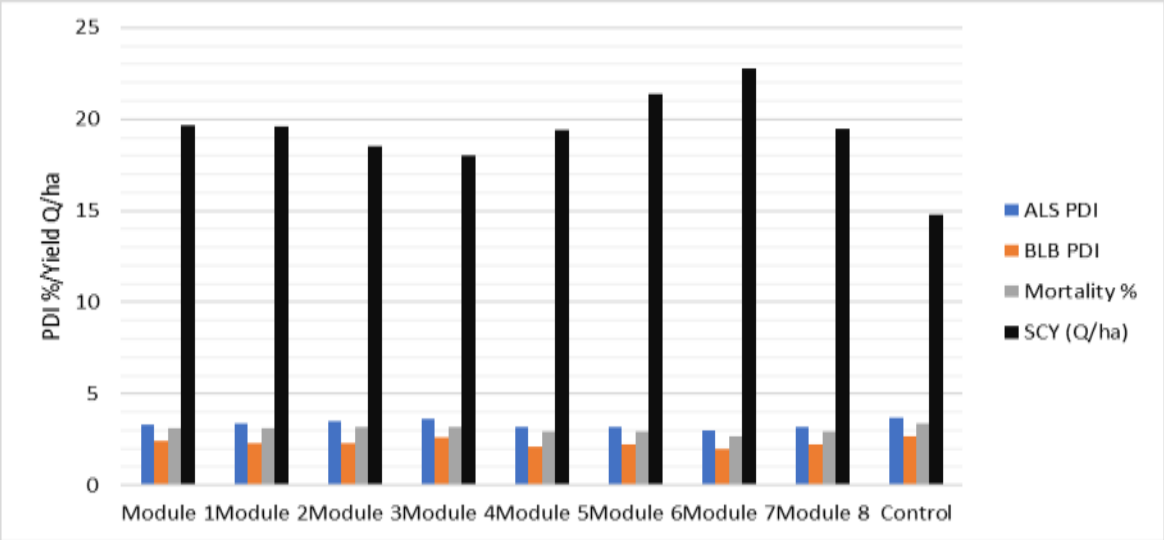

Fig. 5. The pooled effect of IDM modules on *seedling mortality, BLB, ALB* and seed cotton yield at Junagarh

3.4. IDM modules for the management of cotton diseases at Nanded, Maharashtra

During 2016 to 2019, six Integrated disease management modules were developed for evaluation on Bt hybrids during each season at on-station trials at Cotton Research Station, Nanded (Maharashtra) (Table 13). The trials were conducted in RBD and replicated thrice with plot size 50 $m^{2.}$ The treatments combinations include Bt Hybrid 1 + Module 1 – Module 6, and untreated control. Bt cotton hybrid (RCH-2 BG-II) was selected based on tolerance to one or the other disease. Modules were prepared depending upon the severity of the diseases occurring in the zone. The interventions within a module were modified based on location needs. Need-based applications were given based on the disease severity observed in the respective places.

Table 13. Integrated disease management modules developed and evaluated at Nanded

Module	Treatment
Module 1	ST – *Trichoderma viride* (TV-TNAU) @ 10 g/ kg of seed + SA @ 2.5 kg developed in 250 kg FYM or vermicompost/ ha and FS with *T. viride* @ 1%.
Module 2	ST – *Bacillus subtilis* (BSC5-TNAU) @ 10 g/ kg of seed + SA @ 2.5 kg developed in 250 kg FYM or vermicompost/ ha and FS with *B. subtilis* @ 1%.
Module 3	ST – *Pseudomonas fluorescens* (PF-TNAU) + SA @ 2.5 kg developed in 250 kg FYM or vermicompost/ ha and FS with *P. fluorescens* @ 1%.
Module 4	ST – *P. fluorescens* (PF CICR) @ 10 g/ kg of seed + SA – *P. fluorescens* - PF CICR @ 2.5 kg/ ha in 250 kg of Compost or FYM and FS with *P. fluorescens* 1 % – PF.
Module 5	ST – PF CICR @ 10g / kg of seed + SA of *T. viride* @ 2.5 kg/ ha TV-TNAU1 FS with Propiconazole 0.1 % for fungal diseases and COC (0.3 %) + Streptocycline (0.01 %) for BLB or Carbendazim 0.1 % for grey mildew on need basis.
Module 6	ST - PF CICR @ 10 g/ kg of seed + SA of *T. viride* @ 2.5 kg/ ha TV- TNAU1 in 250 kg of Compost or FYM and FS with Kresoxim methyl (ergon) @ 1 ml/ litre followed by Captan + Hexaconazole @ 1.5 g/ litre for fungal diseases or COC (0.3 %) + Streptocycline (0.01 %) for BLB.
Control	Control

ST=seed treatment; SA= Soil application; SSA= seed & soil application; FS= foliar spray

Pooled results

Pooled mean data of three years period (2016-17 to 2018-19) indicated that Module 6 (Seed Treatment – PF CICR @ 10g/Kg of seed; Soil application of *Trichoderma viride* @ 2.5 kg/ha TV-TNAU 1 in 250 kg of compost or FYM; Foliar spray with COC (0.3%) + Streptocycline (0.01 %) for BLB) was found superior over all other treatments for reducing bacterial blight, Alternaria, grey mildew and wilt/root rot infestation with achieving higher plant height & germination and showed significantly highest seed cotton yield (Table 14).

Based on economics calculated at Nanded, the maximum gross and net benefit-cost ratio was observed in treatment module 6 (1.6) followed by module 3 (1.5) and module 1 (1.5) and are recommended for their use by farmers (Table 15 & Fig. 6).

Table 14. IDM modules for the management of Cotton Diseases, yield parameters and economics (Nanded) (Pooled 2016-17 to 2018-19)

Treatments	Bacterial Blight (PDI)	*Alternaria* leaf blight (PDI)	Grey mildew (PDI)	Wilt / root rot (PDI)	Germination (%)	Flowering days	Plant height (cm)	Seed cotton yield (q/ha)
Module 1	7.5	12.4	2.2	0.2	74.5	59.6	131.6	14.3
Module 2	8.0	11.9	1.9	0.7	72.2	61.5	128.6	15.0
Module 3	5.7	10.5	0.5	0.1	81.1	59.0	138.3	16.5
Module 4	6.7	12.3	1.4	0.5	74.1	59.6	125.3	14.9
Module 5	6.9	10.4	0.9	0.5	72.8	59.6	130.7	15.5
Module 6	3.8	8.0	0.1	0.0	83.8	60.2	134.2	18.0
Control	11.2	17.0	6.0	1.6	64.7	62.7	117.3	12.4

Table 15. Economics as influenced by different treatments (Pooled 2016-17, to 2018-19)

Treatments	Seed cotton yield (q/ha)	GMR (Rs. /ha)	NMR (Rs. /ha)	B:C ratio
Module 1	14.3	76073	26129	1.5
Module 2	15.0	80151	24236	1.4
Module 3	16.5	88031	31218	1.5
Module 4	14.9	79392	23576	1.4
Module 5	15.5	82913	27124	1.4
Module 6	18.0	96011	37828	1.6
Control	12.4	65966	17706	1.3

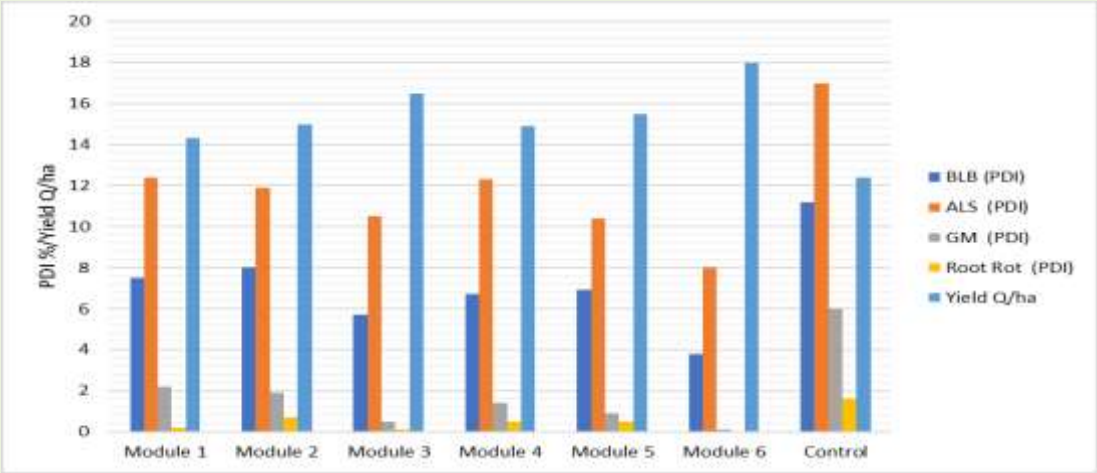

Fig. 6. Pooled effect of IDM modules on *root rot, BLB, ALB, GM* and seed cotton yield at Nanded

3.5. IDM modules for the management of cotton diseases at Surat, Gujarat

During 2016-17 to 2018-19, six Integrated disease management modules were developed for evaluation on Bt hybrids during each season at on-station trials at Main Cotton Research Station, Navsari Agricultural University, Surat (Gujrat) (Table 16). The trials were conducted in RBD and replicated thrice with plot size 50 $m^{2.}$ The treatments combinations include Bt Hybrid 1 + Module 1 – Module 6, and untreated control. Bt cotton hybrid (RCH-2 BG-II) was selected based on tolerance to one or the other disease. Modules were prepared depending upon the severity of the diseases occurring in the zone. The interventions within a module were modified based on location needs. Need-based applications were given based on the disease severity observed in the respective places.

Table 16. Integrated disease management modules developed and evaluated at Surat

Sr. No.	Treatment
Module 1	ST – *Trichoderma viride* (TV-TNAU) @ 10 g/ kg of seed + SA @ 2.5 kg developed in 250 kg FYM or vermicompost/ ha and FS with *T. viride* @ 1%.
Module 2	ST – *Bacillus subtilis* (BSC5-TNAU) @ 10 g/ kg of seed + SA @ 2.5 kg developed in 250 kg FYM or vermicompost/ ha and FS with *B. subtilis* @ 1%.
Module 3	ST – *P. fluorescens* (PF-TNAU) + SA @ 2.5 kg developed in 250 kg FYM or vermicompost/ ha and FS with *P. fluorescens* @ 1%.
Module 4	ST – PF CICR @ 10 g/ kg of seed + SA – *P. fluorescens* - PF CICR @ 2.5 kg/ ha in 250 kg of Compost or FYM and FS with *P. fluorescens* 1 % – PF.
Module 5	ST – PF CICR @ 10g / kg of seed + SA of *Trichoderma viride* @ 2.5 kg/ ha TV-TNAU1 FS with Propiconazole 0.1 % for fungal diseases and COC (0.3 %) + Streptocycline (0.01 %) for BLB or Carbendazim 0.1 % for grey mildew on need basis.
Module 6	ST - PF CICR @ 10 g/ kg of seed + SA of *T. viride* @ 2.5 kg/ ha TV- TNAU1 in 250 kg of Compost or FYM and FS with Kresoxim methyl @ 1 ml/ litre followed by Captan + Hexaconazole @ 1.5 g/ litre for fungal diseases or COC (0.3 %) + Streptocycline (0.01 %) for BLB.
Control	Untreated Control

ST=seed treatment; SA= Soil application; SSA= seed & soil application; FS= foliar spray

Pooled results

Pooled data of three years trials revealed that Module 6 – (ST - PF CICR @ 10 g/ kg of seed + SA of *T. viride* @ 2.5 kg/ ha TV- TNAU1 in 250 kg of Compost or FYM and FS with Kresoxim methyl @ 1 ml/ litre followed by Captan + Hexaconazole @ 1.5 g/ litre for fungal diseases or COC (0.3 %) + Streptocycline (0.01 %) for BLB.), was best for the control of percent disease intensity of bacterial blight, *Alternaria*, grey mildew, wilt/root rot, with achieving higher plant height, germination and seed cotton yield. Data presented in the table clearly stated that significantly lowest BLB disease intensity noted in Module 6 (5.7), followed by Module 5 (7.9) during all three years and in the pooled results. Similarly, Alternaria leaf spot disease (PDI) was significantly lowest in Module 6 (2.9), followed by Module 5 (4.5) during all the three years and in the pooled result (Table 17). Module 6 was found superior over all other treatments for germination percentage. Efficacy of different modules in respect to seed yield analysis, it is found that data presented in the Table for Bacterial leaf blight and Alternaria leaf spot disease with different years and in pooled results clearly states that Module 6 gave significantly higher seed yield 25.9 Q/ha and also reduced the incidence of leaf spot diseases on seed yield of cotton crop. (Table 17; Fig 7).

Based on economics calculated at Surat, the maximum gross and net benefit-cost ratio was observed in treatment module 6 (1.8) followed by module 5 (1.6) and module 4 (1.4) and are recommended for their use by farmers. Hence, the module 6 (Seed Treatment - PF CICR @ 10 g/ kg of seed + Soil Application of *T. viride* @ 2.5 kg/ ha TV-TNAU1 in 250 kg of vermicompost or FYM and foliar spray Kresoxim methyl @ 1ml/ lit followed by COC (0.3 %) + Streptocycline (0.01 %)) with two sprays first from the initiation of the disease and second after the interval of 15 days recorded the lowest incidence of Bacterial leaf blight and Alternaria leaf spot diseases of Cotton and recorded the highest seed yield in module 6 (25.9 Q/ha) followed by module 5 with 23.5 seed yield Q/ha (Table 18).

Cotton growing farmers of South Gujarat region are advised the following Integrated Disease Management module (IDM) for the management of bacterial leaf blight (BLB) and Alternaria leaf spot (ALS) diseases of cotton, seed treatment, soil application, and two sprays first at the initiation of the disease and second at 15 days after first spray is effective in managing the diseases and increasing the cottonseed yield.

Table 17: IDM modules for the management of cotton diseases Surat (Gujrat) (Pooled 2016-2017 to 2018-19)

Treatments	Bacterial Blight (PDI)	Alternaria Blight (PDI)	SCY (Q/ha)
Module 1	11.4 (19.6)	6.3 (14.4)	20.3
Module 2	9.6 (17.9)	7.3 (15.5)	20.9
Module 3	14.3 (22.1)	8.4 (16.6)	18.3
Module 4	12.3 (20.4)	5.5 (13.4)	21.4
Module 5	7.9 (16.2)	4.5 (12.0)	23.5
Module 6	5.7 (13.7)	2.9 (9.6)	25.9
Control	16.8 (24.1)	10.0 (18.3)	16.2

*Figure in the parenthesis Arc sin transformed values and those outside are original values

Table-18. Economics of different fungicidal treatments/ IDM treatments at Surat

Module	Pooled mean Yield (Kg/ha)	Cost of seed treatment, soil application, (Rs. /ha)	Cost of bioagent/fungicide for two spray (Rs. /ha)	Application cost of spray (Rs. /ha)	Total cost of plant protection for two sprays (Rs. /ha)	GMR	NMR	BC Gross	BCR Net
Module 1	2034.7	1676.8	280	1068	1348	111907	62584	2.3	1.3
Module 2	2095.3	1878.8	600	1068	1668	115243	65600	2.3	1.3
Module 3	1832.0	1878.8	600	1068	1668	100760	51117	2.0	1.0
Module 4	2143.6	1878.8	600	1068	1668	117896	68253	2.4	1.4
Module 5	2350.2	1678.8	1476	1068	2544	129262	78743	2.6	1.6
Module 6	2589.4	1678.8	2260	1068	3328	142419	91116	2.8	1.8
Control	1620.9	0	0	0	0	89149	41174	1.9	0.9

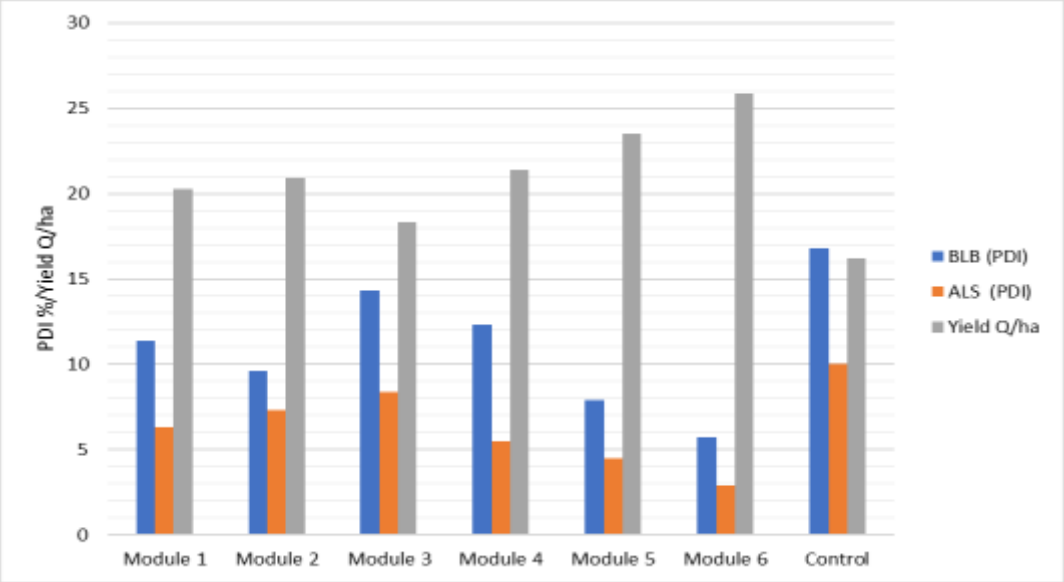

Fig. 7. The pooled effect of IDM modules on *root rot, BLB, ALB, GM* and seed cotton yield at Surat

4. IDM modules for the management of cotton diseases: South Zone

4.1. IDM modules for the management of cotton diseases at TNAU, Coimbatore, Tamil Nadu

During 2011-12 to 2013-14, three Integrated disease management modules were developed for evaluation on two Bt hybrids during each season at on-station trials at Tamil Nadu Agriculture University, Coimbatore, Tamil Nadu (Table 19). The trials were conducted in RBD and replicated thrice with plot size 50 m^2. The treatments combinations include Bt Hybrid 1 + Module 1, 2. Bt Hybrid 1 + Module 2, 3. Bt Hybrid 1 + Module 3, 4. Bt Hybrid 2 + Module 1, 5. Bt Hybrid 2 + Module 2, 6. Bt Hybrid 2 + Module 3, and Farmers practice control. Bt cotton hybrids were selected based on tolerance to one or the other disease. Modules were prepared depending upon the severity of the diseases occurring in the zone. The interventions within a module were modified based on location needs. Need-based applications were given based on the disease severity observed in the respective places.

Table 19. Integrated disease management modules developed and evaluated at Coimbatore

Module	Treatment
Bt Hybrid 1 + Module 1	ST – *Trichoderma viride* (TV-TNAU1) + SA @ 2.5 Kg/ha + FS with *T. viride* @ 1% on 60, 90 and 120 DAS.
Bt Hybrid 1 + Module 2	ST – *Bacillus subtilis* (BSC5-TNAU1) + SA @ 2.5 Kg/ha + FS with *B. subtilis* @ 1% on 60, 90 and 120 DAS.
Bt Hybrid 1 + Module 3	ST – *Pseudomonas fluorescens* (PF-TNAU1) + SA @ 2.5 Kg/ha + FS with *P. fluorescens* @ 1% on 60, 90 and 120 DAS.
Bt Hybrid 2 + Module 1	ST – *T. viride* (TV-TNAU1) + SA @ 2.5 Kg/ha + FS with *T. viride* @ 1% on 60, 90 and 120 DAS.
Bt Hybrid 2 + Module 2	ST – *B. subtilis* (BSC5-TNAU1) + SA @ 2.5 Kg/ha + FS with *B. subtilis* @ 1% on 60, 90 and 120 DAS.
Bt Hybrid 2 + Module 3	ST – *P. fluorescens* (PF-TNAU1) + SA @ 2.5 Kg/ha + FS with *P. fluorescens* @ 1% on 60, 90 and 120 DAS.
Control	Bt Hybrid 1 Tulasi Bt – Farmers Practice
Control	Bt Hybrid 2 Buny Bt/RCH II - Farmers Practice

ST=seed treatment; SA= Soil application; SSA= seed & soil application; FS= foliar spray

Pooled results

Pooled data of three-year trials indicated that the module 2 (ST – *Bacillus subtilis* (BSC5-TNAU1) + SA @ 2.5 Kg/ha + Foliar spray with *B. subtilis* @ 1% on 60, 90 and 120 DAS) was found to be the best in terms of reduction of the root rot and Alternaria leaf spot disease and enhancement of the yield in both the hybrids (Table 20 & Fig. 8).

Table 20: Developing IDM module for the management of cotton diseases at TNAU Coimbatore. (Pooled 2011-12 to 2013-14)

Module	GM (PDI)	TSV (%)	Root rot (%)	ALB (PDI)	SCY (Q/ha)
Hyb 1 + Module 1	10.0	10.3	4.0	12.6	7.9
Hyb 1 + Module 2	6.5	6.0	4.0	8.5	11.9
Hyb 1 + Module 3	8.0	9.7	6.3	10.9	10.5
Hyb 2 + Module 1		8.7	8.1	15.0	9.9
Hyb 2 + Module 2		4.0	6.0	6.0	11.4
Hyb 2 + Module 3		9.7	10.3	14.0	9.6
Hyb 1 Tulasi Bt	18.5	23.3	20.2	16.0	7.3
Hyb 2 Bunny Bt/ RCH II Bt		16.0	20.3	17.0	7.4

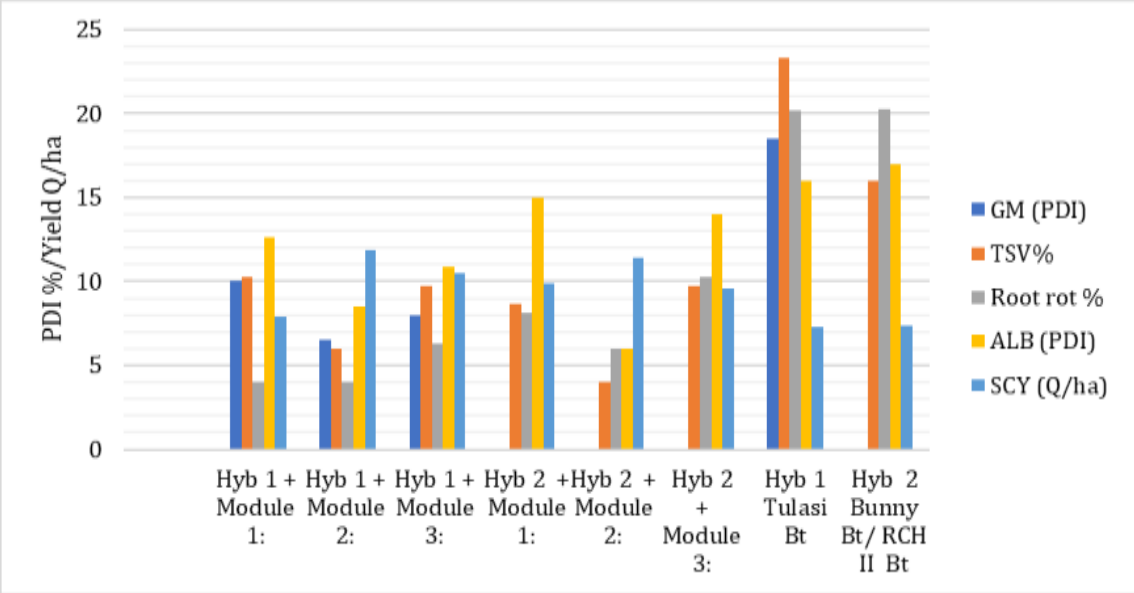

Fig. 8. The pooled effect of IDM modules on *grey mildew, TSV, root rot, ALS* and seed cotton yield at TNAU Coimbatore

4.2. IDM modules for the management of cotton diseases at Guntur, Andhra Pradesh

During 2011-12 to 2013-14, three Integrated disease management modules were developed for evaluation on two Bt hybrids during each season at on-station trials at Regional Agricultural Research Station (ANGRAU) Lam, Guntur, Andhra Pradesh (Table 21). The trials were conducted in RBD and replicated thrice with plot size 50 $m^{2.}$ The treatments combinations include Bt Hybrid 1 + Module 1, 2. Bt Hybrid 1 + Module 2, 3. Bt Hybrid 1 + Module 3, 4. Bt Hybrid 2 + Module 1, 5. Bt Hybrid 2 + Module 2, 6. Bt Hybrid 2 + Module 3, and 7. Farmers practice control. Bt cotton hybrids were selected based on tolerance to one or the other disease. Modules were prepared depending upon the severity of the diseases occurring in the zone. The interventions within a module were modified based on location needs. Need-based applications were given based on the disease severity observed in the respective places.

Table 21. Integrated disease management modules developed and evaluated at Guntur

Module	Treatments
Bt Hybrid 1 + Module 1	ST- *Pseudomonas fluorescens, SA – P. fluorescens,* FS with 1% *P. fluorescens* at 60 and 90 DAS.
Bt Hybrid 1 + Module 2	ST- *P. fluorescens,* FS with Propiconazole 0.1% for Alternaria leaf spot at 60 DAS and COC @ 0.3% + Streptocycline @ 0.01% for bacterial blight at 90 DAS; FS with carbendazim 0.1% for grey mildew at 60 DAS and propiconazole 0.1% at 90 DAS for leaf spots and rust.)
Bt Hybrid 1 + Module 3	ST- *P. fluorescens,* Soil application – *Trichoderma viride*, FS with kresoxim methyl @ 1ml/l at 60 DAS for fungal diseases and COC @ 0.3% + Streptocycline @ 0.01% for bacterial blight at 90 DAS. FS with kresoxim methyl @ 1ml/l at 60 DAS and captan+hexaconazole (Taqat) 1g/l at 90 DAS for fungal diseases.)
Bt Hybrid 2 + Module 1	ST- *P. fluorescens,* SA – *P.fluorescens,* FS with 1% *P. fluorescens* at 60 and 90 DAS.
Bt Hybrid 2	ST- *P. fluorescens,* FS with Propiconazole 0.1% for Alternaria leaf spot

+ Module 2	at 60 DAS and COC @ 0.3% + Streptocycline @ 0.01% for bacterial blight at 90 DAS
Bt Hybrid 2 + Module 3	ST- *P. fluorescens,* SA – *T. viride*, FS with kresoxim methyl @ 1ml/l at 60 DAS for fungal diseases and COC @ 0.3% + Streptocycline @ 0.01% for bacterial blight at 90 DAS.
Control	Bt Hybrid 1 Mallika Bt / Jadoo BG II Farmers practice
Control	Bt Hybrid 2 Tulasi 9/RCH 2 BG II Farmers practice

ST=seed treatment; SA= Soil application; SSA= seed & soil application; FS= foliar spray

Pooled results

Pooled data of three-year trials indicated that the Module 3 (Seed treatment- *Pseudomonas fluorescens,* Soil application – *Trichoderma viride*, Foliar spray with kresoxim methyl @ 1ml/l at 60 DAS for fungal diseases and COC @ 0.3% + Streptocycline @ 0.01% for bacterial blight at 90 DAS, Foliar spray with kresoxim methyl @ 1ml/l at 60 DAS and captan+hexaconazole (Taqat) 1g/l at 90 DAS for fungal diseases.) was comperetively better in term of reduction of Bacterial leaf blight, Alternaria leaf spot disease and enhancement of yield in hybrid 1 (Mallika Bt/ Jadoo BG II). While module 2 (Seed treatment- *Pseudomonas fluorescens,* Foliar spray with Propiconazole 0.1% for Alternaria leaf spot at 60 DAS and COC @ 0.3% + Streptocycline @ 0.01% for bacterial blight at 90 DAS; Foliar spray with carbendazim 0.1% for grey mildew at 60 DAS and propiconazole 0.1% at 90 DAS for leaf spots and rust.) was found to be comparatively better in terms of enhancement of the yield in hybrid 2 and reduction of the alternaria leaf spot grey mildew disease (Tulasi 9 /RCH 2 BG II)(Table 22 & Fig. 9).

Table 22. Developing IDM module for the management of cotton diseases at Guntur (Pooled 2011-12 to 2013-14)

Treatment	Bacterial Leaf blight (PDI)*	Grey mildew (PDI)*	Alterneria leaf spot (PDI)	Rust (PDI)	Yield (q/ha)
Hyb 1 + Module 1	7.5	12.0	10.4	13.7	13.4
Hyb 1 + Module 2	9.7	11.0	11.2	11.0	12.9
Hyb 1 + Module 3	8.8	15.0	11.6	10.0	13.9
Hyb 2 + Module 1	7.7	2.0	11.3	10.2	12.7
Hyb 2 + Module 2	9.5	3.0	10.7	14.2	13.2
Hyb 2 + Module 3	7.5	5.9	11.0	11.6	12.2
Hyb 1 Mallika Bt/ Jadoo BG II	16.5	39.0	27.7	28.9	10.3
Hyb 2 Tulasi 9 /RCH 2 BG II	16.4	7.5	27.8	26.7	10.1

* One year data only

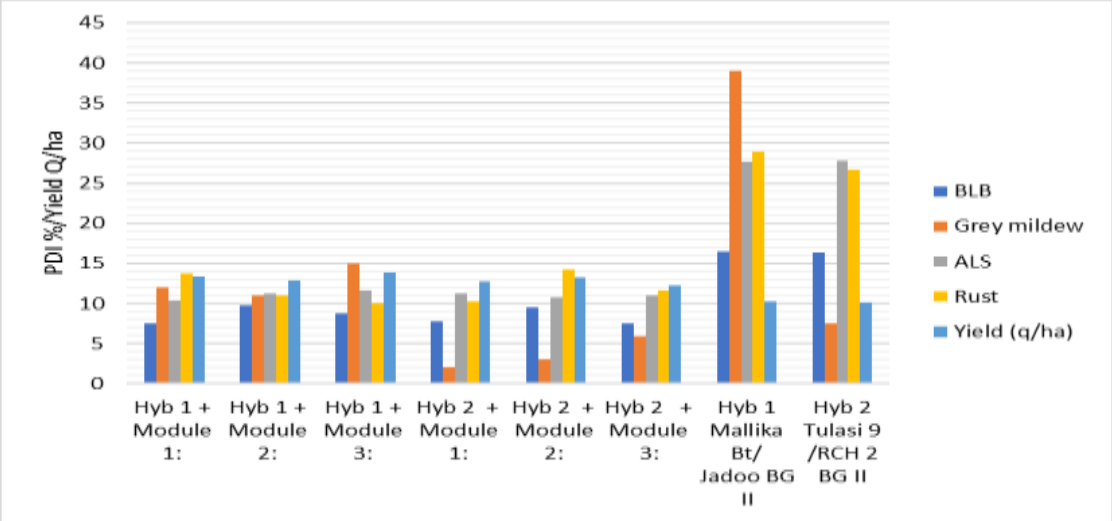

Fig. 9. Pooled effect of IDM modules on *BLB, GM, ALS, rust* and seed cotton yield at Guntur

4.3. IDM modules for the management of cotton diseases at UAS, Dharwad, Karnataka

During 2014-2015 to 2016-17, eight Integrated disease management modules were developed for evaluation on Bt hybrids during each season at on-station trials at the University of Agriculture Sciences, Dharwad, Karnataka (Table 23). The trials were conducted in RBD and replicated thrice with plot size 50 $m^{2.}$ The treatments combinations include Bt Hybrid 1 + Module 1 – Module 8, and untreated control. Bt cotton hybrid (Bunny Bt) was selected based on tolerance to one or the other disease. Modules were prepared depending upon the severity of the diseases occurring in the zone. The interventions within a module were modified based on location needs. Need-based applications were given based on the disease severity observed in the respective places.

Table 23. Integrated disease management modules developed and evaluated at Dharwad

Module	Treatments
Module 1	ST – *Trichoderma viride* (TV- TNAU) @ 10g/kg of seed; SA @ 2.5 kg developed in 250 kg FYM/ ha; FS with *T. viride* @ 1%
Module 2	ST – *Bacillus subtilis* (BSC5- TNAU) @ 10g/kg of Seed; SA @ 2.5 kg developed in 250 kg FYM / ha; FS with *B. subtilis* @ 1%
Module 3	ST- *Pseudomonas fluorescens* (PF-TNAU); SA @ 2.5 kg developed in 250 kg FYM / ha; FS with *P. fluorescens* @ 1%
Module 4	ST – PF CICR @ 10g/kg of seed; SA – *P. fluorescens* – PF CICR @ 2.5 kg/ha in 250 kg of compost or FYM; FS with *P. fluorescens* 1 % - PF CICR
Module 5	ST – pf CICR @ 10g/kg of seed; SA of *T. viride* @ 2.5 kg/ ha (TV – TNAU 1 FS) with carbendazim 0.1 % for grey mildew on need basis
Module 6	ST – PF CICR @ 10g/Kg of seed; SA of *T. viride* @ 2.5 kg/ha TV-TNAU 1 in 250 kg of Compost or FYM; FS with Kresoxim methyl (ergon) @ 1 ml/ litre followed by Captan + Hexaconazole @ 1.5 g/ litre for fungal diseases or COC (0.3 %) + Streptocycline (0.01 %) for BLB.
Module 7	ST *T. viride* (UASD)10g/kg of seed
Module 8	ST *P. fluorescens* (UASD)10g/kg of seed
Module 9	Untreated control

** - Need based application of sprays (number as well as time) may be given based on the disease severity observed in the respective places.
ST=seed treatment; SA= Soil application; SSA= seed & soil application; FS= foliar spray

Pooled results

Based on pooled results (2014-15 to 2017-18), the lowest seedling mortality and *Alternaria* leaf blight was observed in Module 4 (ST *P. fluorescens* (PF-CICR) @ 10g/kg of SSA *P. fluorescens* (PF-CICR) @ @ 2.5 kg/ha in 250 kg of Compost or FYM FS *P. fluorescens* @ 1%(PF-CICR) followed by Module 8 (ST *P. fluorescens* (UASD)10g/kg of seed) and Module 6 (*P. fluorescens* (PF-CICR) @ 10g/kg of SSA, *T. viride* @ 2.5 kg/ha(TV-TNAU) in 250kg of Compost or FYM, FS Ergon @ 1ml/lit followed by Taqat @ 1.5g/lit for Fungal diseases or COC 0.3% + Streptocycline 0.01% for BLB). Highest yield was however noted in Module 6 followed by Module 4. Module 6 showed the highest B:C ratios also. Hence, Module 6 is recommended for its use by the farmers (Table 24, 25 & Fig.10).

Table 24. Developing IDM Modules for the management of cotton diseases at Dharwad 2014-15 to 2017-18

Treatments*	Seedling mortality (%)	AB PDI 120 DAS	Yield (Q/ha)
Module 1	25.5 (30.3)	27.5 (31.6)	17.4
Module 2	23.5 (29.0)	27.9 (31.9)	18.1
Module 3	24.2 (29.5)	29.6 (32.5)	17.5
Module 4	21.0 (27.5)	26.2 (30.7)	19.3
Module 5	24.6 (29.7)	27.4 (31.5)	17.7
Module 6	22.8 (27.7)	26.6 (31.0)	19.9
Module 7	26.5 (30.8)	28.3 (32.1)	14.8
Module 8	22.5 (28.3)	27.7 (31.8)	14.6
Module 9	25.4 (30.3)	33.8 (35.4)	15.9
SEm±	0.96	0.86	1.13
CD at 5%	2.92	2.63	3.43

Table 25. Economics of different fungicidal treatments/IDM treatments at Dharwad

Treatments	Total cost (Rs.)	Yield (kg/ha)	Total return (Rs.) *	Net return (Rs.)	B:C ratio
Module 1	53528	1742.3	84618.0	31090.0	1.58: 1
Module 2	53640	1813.6	88123.5	34483.5	1.64: 1
Module 3	53000	1749.3	85467.0	32467.0	1.61: 1
Module 4	53403	1929.8	90942.5	37539.5	1.70: 1
Module 5	53728	1773.3	91335.0	37607.0	1.70: 1
Module 6	54128	1997.3	92339.5	38211.5	1.71: 1
Module 7	56540	1476.2	75773.0	19233.0	1.34: 1
Module 8	56540	1459.5	75893.0	19353.0	1.34: 1
Control	52365.5	1587.5	76274	23908.5	1.46: 1

ST=seed treatment; SA= Soil application; SSA= seed & soil application; FS= foliar spray *Cotton capas market rate @Rs.4600/qtl

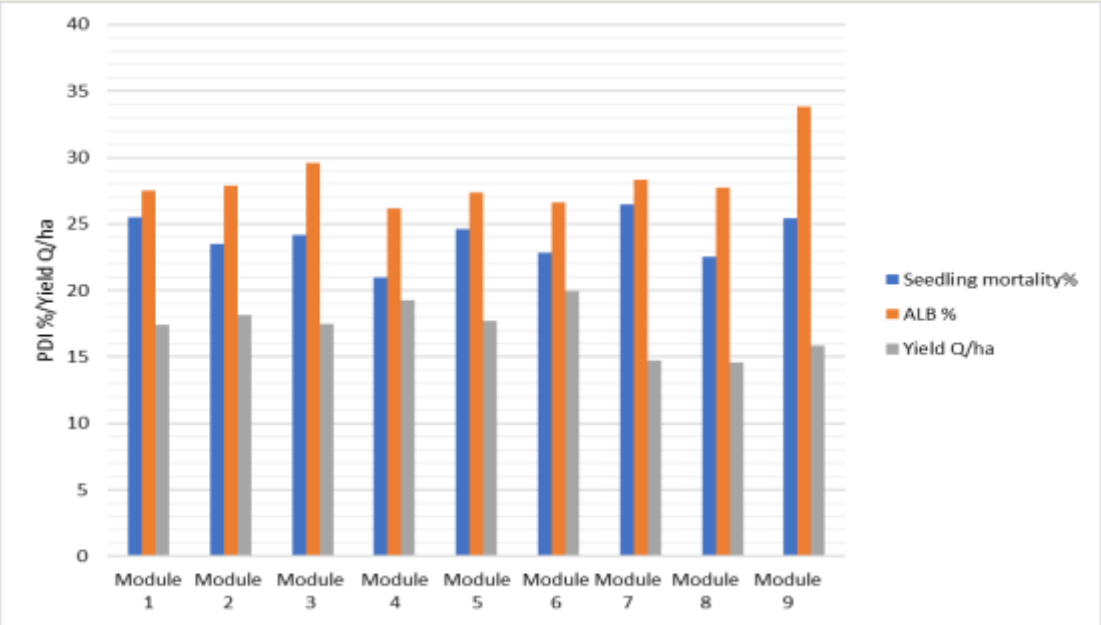

Fig. 10. The pooled effect of IDM modules on *seedling mortality, ALB* and seed cotton yield at Guntur

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Annexure1:
Detailed cost of fungicides/Seed and soil application (Surat (Gujrat)

- Average cost of Cotton seed yield @ Rs.55/- per kg
- Cost of Cotton cultivation @ Rs. 47,975/-
- Seed treatment with *Trichoderna viride* per kg Rs. 70/- @ 10 g/kg seed so, total 2.5 kg/seed/ ha so, required 25 g @ Rs. 1.75/-
- Cost of soil application of *Trichoderna viride* per kg Rs. 70/- for 2.5 kg developed in 250 kg vermicompost so, total Rs. 175/-
- Cost of *Trichoderna viride* ($2x10^6$ cfu/g) per kg Rs. 70/- and cost of two spray Rs. 280/-
- Seed treatment with *Bacillus subtilis* ($2x10^6$ cfu/g) and *Pseudomonas fluorescens* ($2x10^8$ cfu/g) Rs. 150/- @ 10 g/kg seed so, total 2.5 kg/seed/ ha so, required 25 g @ Rs. 3.75/-
- Cost of soil application of *Bacillus subtilis* ($2x10^6$ cfu/g) and *Pseudomonas fluorescens* ($2x10^8$ cfu/g) Rs. 150/- for 2.5 kg developed in 250 kg vermicompost so, total Rs. 375/-
- Cost of *Bacillus subtilis* per kg Rs. 150/- and cost for two spray Rs.600/-
- Cost of *Pseudomonas fluorescens* per kg Rs. 150/- and cost for two spray Rs. 600/-
- Cost of vermicompost @ 50 kg Rs.300/- so, total cost of soil application for 250 kg Rs.1500/-
- Cost of Propiconazole, 25% EC (0.1%) for two sprays Rs.780/-
- Cost of Carbendazim, 50% WP (0.1%) for two sprays Rs. 696/-
- Cost of Ergon (Kresoxim methyl, 44.3% SC) @ 1 ml/ lit for two sprays Rs. 660/-
- Cost of CoC (0.2%) + Streptocycline (0.01%) for two sprays Rs.1600/-
- Cost of spray operations (3 labour x Rs.178) per day Rs.534/- (Two spray Rs.1068/-)
- Cost of labour Rs.178/- per day
- Picking charge Rs. 6/- per kg seed cotton

Proceedings of the Annual Group Meeting of AICRP on Cotton through Video Conference

The All India Coordinated Research Project on Cotton held its Annual Group Meeting on 18 & 19th May, 2020 through Video Conference.

Inaugural Session

The Annual Group Meeting of All India Coordinated Research Project on Cotton was conducted through video conference on 18th and 19th May 2020 hosted by ICAR-CICR, Regional Station, Coimbatore. The session started with ICAR song followed by formal Welcome address given by Dr. S. Usha Rani, Principal Scientist, ICAR-CICR-RS, Coimbatore. Dr. T.R. Sharma, DDG (Crop Science), Dr. R. K. Singh, ADG (Commercial Crops), Dr. C.D. Mayee, Former ASRB Chairman, Dr. V.N. Waghmare, Director ICAR-CICR, Dr. P.G. Patil, Director ICAR-CIRCOT and the members of programme advisory and monitoring committee, scientists from various public and private institutes joined the meeting.

Dr. A. H. Prakash, Project Coordinator presented the Research highlights of AICRP during 2019-2020. He informed that the productivity was higher in Tamil Nadu and Rajasthan during 2019-2020. Maharashtra is having major share (>38 %) of cotton area but recorded the lowest due to erratic rainfall and insect-pest incidences. He enlisted the entries that were promising during the previous season at all the three zone trials and also made a note on colour cotton, which was tested first time in AICRP system for three years and now forwarded to agronomy trials. During the year under the chairmanship of DDG, institute-Industry tie-up meeting was organized by Director Dr V.N. Waghmare and it was decided that the private sector will be facilitated to visualise the plant materials and select the best entries. This was carried out in South and Central zones, but could not be done in North zone as the crop had already matured. He also mentioned that during the year 12 Non Bt and 19 Bt variety/ hybrids were identified for commercial cultivation.

Dr. V. N. Waghmare in his Special Address mentioned that there was an unusual weather last year with short dry spell during the initial cropping season followed by heavy rains from August and September 2019 and then intermittent rains prolonged during the cropping season in Central & Southern zone. As the crop duration prolonged, the pink boll worm incidence was observed during the month of December. The pink boll worm survey was carried out from October to December and it was found that the pest was under control until mid-November but the pest population increased thereafter in all the Central and Southern zonestates. A brain storming was conducted under the chairmanship Hon'ble DG, ICAR and the major recommendation was about public-private partnership (PPP). Based on the recommendations an Institute-Industry interface meeting was held and collaboration was made with private sector to promote the public sector varieties to farmers. ICAR-CICR released 8 Bt cotton varieties in 2017 and MoU was signed with Maharashtra State Seed Corporation and Dr. PDKV, Akola for seed multiplication and commercialization. Maharashtra state seed corporation has already multiplied 200 quintal seeds of 3 Bt varieties and made available for farmers. Under SCSP, TSPand MeraGoanMeraGourav, seeds of Bt varieties were distributed to the farmers and it will be continued for this year too. The FLDs were conducted under National Food Security Mission in AICRP to demonstrate Bt varieties. Experiments were also conducted to find out cost of cultivation, so as to understand inputs and labour cost dynamics across the states. The information generated also serve as basic input for policy makers to arrive at MSP for cotton.Collaborations were extended with CSIR-NBRI, Lucknow for GM cotton, CSIR-Central Mechanical Engineering Research Institute for cotton picker, and CSIR-Indian Institute of Chemical Technology for pheromone application. For mechanization, the CICR collaborated with ICAR-CIAE and ICAR-CIRCOT for development of cotton picker. ICAR-CICR has also intensified its efforts on breeding for variety suitable for mechanization. He also brought about the achievements of ICAR-CICR in disseminating the IPM and

IRM strategies for control of major insect-pests, especially pink bollworm and sucking pests, and this programme will be implemented this year across eight states with financial support from DAC for which approval has already been provided by DAC.

Dr. P.G. Patil, Director, ICAR-CIRCOT, Mumbai in his special address made comments on textile industry demand, shortage of ELS cotton production in the country and also insisted that past two years the micronair value of most of the genotypes is becoming coarser so that the yarn strength is getting reduced. He also suggested that there were genotypes with 42g/tex strength and 39mm length in *Barbadense* and 29.5 mm length in long-linted*Arboreum* in various trias, which need to be promoted. The spinning industries are the most modern in our country with fast spinning machines and they demand high fiber strength genotypes. The fiber traits of all the entries are analyzed in HVI mode for the past four years. He also recommended training for the breeders on fiber quality parameters to breed geneotypes amenable for machine picking. He suggested that for mechanization the industries require synchronized maturing varieties. Colour cotton trials were initiated this year and the results showed that the genotypes with 22 mm had lesser strength. Hence improvement in the colour cotton need tobe carried further.

Dr R.K. Singh, ADG (CC), ICAR delivered his special address, and commended the achievements of AICRP on Cotton especially in terms of publications. He appreciated the support given by the private industries to the AICRP programme. The cotton production has increased by 8.33 per cent during 2019-2020 when compared to last year even though the area has gone down. Twelve non-Bt varieties, 15 Bt hybrid and 4 Bt varieties have been identified and proposal has been sent to DAC & FW, GOI for notification. He mentioned bridging the gap between the world cotton average productivity with Indian average productivity especially in the state of Maharashtra. More than 1500 hybrids were developed over the years from private sectors but in the field only 40-50 Bt hybrids are performing well. He suggested that private seed industries should concentrate on development of improved high yielding Bt hybrids not to shake increasing the number of hybrids. To increase the average productivity as per recommendation of Group of Secretaries on Natural Fibres 'Best package of practices of ELS cotton and technologies on seed production have been already given to DAC &FW for onward transmission to cotton growing states for compliance. DAC & FW has supported financially by sponsoring the IPM project for pink bollworm management for Central and South zone particularly. Similarly white fly was a menace that could be controlled by the management practices developed by CICR with the support of state Agricultural Universities. Emphasis has to be given for export of organic cotton from India as Parliament Standing Committee on Department of Comerce has given recommendation for the same. Extensive may be initiated on production of organic cotton in the benifite of the farming community. He pointed out that under AICRP, two new programmes have been proposed to initiate: (i) Pre-breeding for biotic, abiotic stress, and (ii) quality cotton and climate resilient hotspots research. The work plan has to be developed and work should be initiated in this season as this Plan Period is going to start this year.

Dr. C.D. Mayee, Former ASRB Chairman during his special address suggested to analyze the impact of COVID-19 on cotton cultivation as cotton harvest in the north zone was over before the lockdown period but in south and central zone the crop was still in the field. The entire cotton chain has been disrupted. The farmers in the central and south India had problems with cotton selling, as the cotton prices came down to virtually half of the MSP, which may affect cotton cultivation for the next year. While examining the yield scenario, the irrigated fields in north Rajasthan had lower yield when compared to that of south Rajasthan. He has mentioned that the area under micro-irrigation had higher cotton productivity when compared to other areas, and this technology should be promoted. Secondly, HT-Bt cotton was grown on huge areas in Telagana and Vidharbaregion. An analysis is required to know whether farmers really want to adopt this technology! He suggested that the technologies from private sector may be given to public sector so that the farming community can be benefitted instead of providing license,

sub-license etc. He also stressed on breeding for quality rather than yield improvement by reconstructing the breeding programme like breeding varieties for machine picking, use of drone technology in cotton and gossypol free cotton. He suggested that economics and extension scientists should analyze the factors responsible for yield gap in the regions of same state.

Web versions of seven Publications were released, namely Annual report of AICRP on cotton, Annual Report of AICRP on Bt cotton (North, Central & South zone), Annual Report NFSM-FLD Frontline Demonstration in Cotton, Integrated Disease Management in Cotton- Technical Bulletin, and Field Technology Report of ICAR-CIRCOT, Mumbai.

Hon'ble Deputy Director General (Crop Science), Dr. T. R. Sharma in his Presidential Address mentioned that cotton and jute are important commercial fiber crops where we have achieved the self-sufficiency. However, he suggested that the importance of molecular breeding in cotton and utilization of the cotton genome sequence databases available in the public domain from 2014. The genome of cotton has repetitive elements which have their own role and about 41,000 genes have been identified and large numbers of markers are available. He suggested the breeders to work on specific traits by using the genome database and genome editing technologies for breeding gossypol free seeds. Target the traits vertically by using the technologies available and the genetic material available in the Institute has to be exploited. He stressed on importance of wild species and land races, pre-breeding, apomixes and the use of data mining, precision breeding, artificial intelligence in cotton improvement programme. The projects have to be defined carefully in the coming EFC and pre-breeding has to be put on the main mandate. We need to compliment the efforts of private and public institutes in bringing the improvement in the cotton breeding programme. The variety release programme will be organized through video conferencing for the first time. He pointed that speed breeding has been initiated at five zonal regions and drone technology will be as a prime area to be used in cotton. Genome technology needs to be explored further as o reports from India have been found in Markers assisted breeding in cotton. Basic science research has to be initiated in the public institutes, creating expertise to work in data mining, artificial intelligence, and training of scientists in quality parameters. He emphasized on the need for initiating work on water-use efficiency, nitrogen-use efficiency, and breeding for photoinsensitive cotton. Ensuring the seed quality is of prime importance so the private concerns need to have an eye on the quality. He shared his concern on narrowing genetic base of parents used in hybrid production as all the hybrids from private sectors show susceptibility to one or more biotic stresses. He emphasized that guidelines have been issued by the ICAR to meet the impact of COVID 19 on carrying out agricultural activities. We have introduced concepts of "Experts", who have worked in the specific crops and area. Written suggestions need to be sought from the experts so that these can be used in redefining the projects.

Dr. K. Baghyalakshmi, Scientist, ICAR-CICR, RS delivered the vote of thanks and the inaugural session came to an end.

Session I: Review of Results of AICRP Trials during 2019-2020

The session was chaired by Deputy Director General (Crop Science), Dr. T. R. Sharma and Co-chaired by Dr R.K. Singh ADG (CC), ICAR. Dr. S. Manickam presented the achievement of Crop Improvement trials. Dr. K.Shankarnarayanan presented the results of Agronomy trials followed by Dr. B. Dhara Jothi on Entomology, Dr. S. K. Sain on Plant Pathology, Dr. Pradeep Madhyan on Fiber quality, Dr. K. Rathinavelu on DUS testing, and Dr. Sunil Mahajan on germplasm status in Cotton.

Suggestions:

Dr P.G Patil (Director, CIRCOT): For Ginning per cent the sample has to be sent to CIRCOT, since there is large variation in the values.

R.K. Singh (ADG): The PDI for varietal identification in Bt Varitey/ hybrid is fixed as 40 as against Non Bt counter part with < 20 PDI for identification. When Dr Mainckam was presenting the Bt hybrid data, there were many entires with less than 20 PDI. So there are many CLCuV tolerant lines in Bt entires. It needs to be clarified by the PI of Plant Pathology.

Dr. T.R. Sharma (DDG) suggested the following:

- Specific conclusions have to be made scientifically from each experiment. Collect scientific data so that it could be converted into publication.
- Categorize the data based on fiber quality parameters from each zone, which would depict the environmental effect on the cotton cultivation.
- In plant pathology experiment, the data has been published in bulletin form. If there are two or more year data, it could be published in peer reviewed journals. It will give a view on yield loss due to pest and disease incidents.
- PAU centre has developed four Bt varieties which have to be tested. Thecentre from North Zone is doing good work and they are very productive.
- Germplasm works need to be strengthened. The mini core collection has to be developed and collaboration can be made with Dr. Rana, ICAR- NBPGR. Collaboration across institutions is needed to be more productive. Collaborating with ICAR-NBAIR, Bengaluru, ICAR-NRCIPM, New Delhi, ICAR-NBPGRmay be looked into and the Directors of these institutes should be invited for the AICRP group meeting.
- All experiments have to be carried out in a scientific manner. The data has to be collected, synthesized, processed and conclusions need to be derived systematically. There should be new findings which have to be highlightened.

Session II: Interactive session with stakeholders (PPP)

The session was chaired by Deputy Director General (Crop Science), Dr. T. R. Sharma and Co-chaired by Dr R.K. Singh ADG (CC), ICAR. The panel members were: Dr. Prabhakar Rao, President, NSAI, Dr. Ramasamy, President, FSII, Dr. V. N. Waghmare, Director, ICAR-CICR, Dr. A.H. Prakash, Project Coordinator, and Sh. Raghavendra Udupa, Bayer Crop Science.

Suggestions and Discussions:

Dr. T.R. Sharma: The interaction between public and private should be complementing each other instead of competing with each other.

Dr. Prabhakar Rao:

Important problem in cotton cultivation is that 20-25% of labour cost is spent for cotton picking. Breeding varieties suitable for mechanization include breeding but also the aspects of engineering, weed management and chemicals required for maintaining crop architecture.. Ginning out-turn of cotton in India has the lowest per cent of GOT, which has to be increased above 40 per cent. Cotton offers significant opportunity towards improving the seed oil percent. Cotton industry can also contribute to the edible oil demand of the country.

New challenges and new diseases are emerging across the zones. In Telangana, cotton crops were affected by tobacco streak viruses. Sources of resistance need to be worked in order to incorporate the resistance into the cultivar. These are the areas which need collaboration from private and public cotton industry. Streamlining of the release of new BT cotton hybrids, inspite of the procedure from 2016 we had only one time release of Bt cotton because of delays in fixing the expression levels followed by NOC issues. The data were generated for both irrigated and rainfed conditions, but the release was considered for irrigated in central zone and for rainfed in south zone . Regarding pink boll worm management, package of practices need to be developed exclusively for managing them.

Dr. Ramasamy:

Since the introduction of Bt cotton, the productivity increased from 300 to 566 kg/ha during 2013. Later there was a decline in productivity, and presently it is 460 kg/ha. There is a need to broaden the genetic basis through pre-breeding. If the crossed materials are shared with private companies, there are possibilities to break the yield barrier. Climate change and soil deterioration also play a major role in deciding the hybrid yield. HDPS becomes complicated because for various reasons.Hybrids are preferred, and these plants require PGR and defoliants to maintain the canopy. The trial system has not changed for the past 20-25 years. Trial locations could be increased to test the hybrids in more environments to see theirstability.

No new hybrids have been released since 2017 for cultivation in the country. The number of years of trial testing could be decreased to two years. States are demanding to undertake SAUs trials during sale permission, this could be taken care. Once the variety is identified, it should be accepted by all the state governments and the approval for sale could be provided. North zone requires CLCuV resistant varieties. Once the variety is released, the SAUs are testing the variety every year. This could be changed for conducting trial once in three years. Private sector is addressing the issue of biotic and abiotic stress tolerance varieties, and the ICAR institutes can also help in achieving the goal. ICAR association is needed for breeding Gossypol free cotton, either by marker assisted breeding, gene editing or through transgenic technology. Teams from private sector have visited the Institute and selected few germplasm butthey are yet to be received. ICAR and private industry has to meet and make brain storming to decide possible collaboration and to understand the strength of each other. Some private companies are part of international consortiums. Such models could be developed.

Dr. Raghavendra:

Need to contribute to the cotton oil production of the country by critically looking into the inputs and improve the productivity holistically with genetics & quality seeds and germplasm. Secondly, timely advice on agronomic package practices, impact of weed and pest management need to be instructed, which would evade huge loss to the farmers. It includes best agronomy practices, efficient nutrient management, and knowledge sharing through PPP mode enabling farmers to get more information. India is far behind with other countries in mechanization which need to be addressed and it would be a good opportunity to improve farmer’s income. Use of Drone Technology not only overcome labour shortage and it would also reduces the usage of chemicals, reducing the exposure of humans to the chemicals. HDPS has still needs to be worked out since farmers prefer hybrids and the plant canopy doesn’t suit the system. Whitefly still remains as a threat followed by whitefly, aphids, jassids and thrips. In India, the longer registration timeline when compared to other countries inhibits many companies to introduce a new molecule at a quicker phase to the farmers and slower advancement of application technology concept like unmanned Arial vehicles concept, approval, testing and getting right partners in India still makes it difficult.

Dr. V.N. Waghmare

ICAR-CICR, Nagpur is maintaining about 12337 germplasm of all the four species which includes nearly 8851*hirsutum* accessions, 536*barbadense*, 565*herbaceum*, 2053*arboreum* along with wild species and races of cultivated cotton. ICAR-CICR has strong team of scientists, germplasm have been identified for sucking pest tolerance, CLCuV resistance along with other disease except for boll worms. The crosses have been attempted with the two lines conferring resistance to CLCuV and are at BC_3 stages which were completely immune to the disease. If these genes could be mapped as mapping population will be taken up this season and genotyping will be attempted. This could be shared, which will address the CLCuV disease of cotton growers of North zone.

Pre-breeding activities has been emphasized in the IRC and the unused germplasm will be utilized. High GOT stabilized lines (>40) have been identified in *hirsutum* and *barbadense* crosses and they will be used in further development of varieties and hybrids. For disease resistance, monitoring is done across eight states along with pink bollworm and this time TSV is recorded in both north and south India. Specific programmeshavebeen initiated across three stations to address emergingissue. Also coordinated works on boll rot, newBacteria was identified associated with boll rot which otherwise was believed to be caused by fungus; and this is under surveillance to confirm if the same bacteria is causing boll rot across the states.

He answered to DDG query about testing facilities at the institute, and told that the expression of Cry protein is being monitored from past three years. At present lyopholization is being outsourced, this could be met if lyophilizer is purchased. A project has been submitted to DAC, New Delhi, once the funds are released lyophilizer will be purchased. This machine could processes 200-300 samples at a time and this will help in analyzing the samples faster.

Dr. A.H. Prakash

During the Annual Group Meeting of AICRP on Cotton the session on Public Private Partnership is being organized from 2011 onwards. In PPP mode the private sectors are more concern about the germplasm and no real effort is done for collaborative work. Even modalities for sharing of Germplasm has not been worked out. TO this DDG (CS) informed that at IARI they have a system wherein they pay for the germplasm and this could be followed here too.

There is no much genetic diversity in the hybrid developed, so production and protection has to be strengthening in order to allow the farmers to harness the benefits of new hybrids. Hence the private has to associate with CICR to develop agronomy and entomology packages along with the hybrids to harvest its full potential.

There is a shortage of short, medium and extra long cotton as most of the hybrids are in the long staple cotton. It's possible through collaborative program to develop cotton hybrids to meet the demand.

Dr. Ramasamy during the reply was of the opinion that Productivity in Maharashtra could be addressed by HDPS followed by mechanical picking, as large trail was conducted in Akola and there was 20-30 per cent yield increase. Mechanical planter is needed to achieve required plant density and maximize the yield. He has pointed out that private companies are working based on farmers demand. Farmers are cultivating as per the trade demand where long staple fetches better price especially 35 mm the ELS cotton. Farmers don't get a remunerative income in ELS because of low yield and longer duration. In short staple the yield levels are low when compared to *hirsutum*.

Sh Mepani, Director, Cotton Association of India informed that this year export of 45 lakh bales of cotton is expected. There are lots of variation in terms of the micronaire and length. But the basic requirement of export is variety with 3.8-4.2 of micronaire and 28.5-29.0 mm length. So some varieties can be denotified as few varieties meeting this requirement are sufficient. At the same time, 15 lakh bales of Egyptian and pima cotton arebeing imported. The ELS cultivated in the country has a micronaire of about 2.9-3.2 and strength is 32-33g/tex and but the imported materials has 3.9-4.2 micronaire and strength of 34-35 g/tex. The grade expected is super fine and the materials are of fine grade, which need to be improved. So ELS meeting import expectations need to be grown in India to reduce import.

There were few *more suggestions from the audience:*

Dr. Vipin, representing M/s Bayer BioScience Pvt. Ltd. desired that pre-breeding can be done through PPP approach. Interaction can be arranged between private people and scientists from CIRCOT and CICR to discuss and take decision regarding particular issues like CLCuV. MoU can be signed to develop material right from the pre-breeding to the finished product. Cotton being a commercial crop, there can be few issues which could be discussed and addressed.

Sh Dr Baljinder Singh Nandra representing M/s US Seeds Works Ltd. was of the opinion that protein expression is to be tested in two locations so that crucial data are not lost. In reply Dr Wagmare, Director, ICAR-CICR, Nagpur informed that the samples are being tested in replications and averages of the nine replications are provided.However if the house agrees we can do for two locations with proper sapling.

Dr. G. Balasubramani: For Cry protein estimation, two more centers are included along with 3-zones. Trials at Rahuri for irrigated in Central zone and Dharwad for rainfed in South zone are being tested from 2019-20. Each entry 9-replication were tested for Cry protein estimation and average is presented, thus, there is no chance of failing of any entry without Cry protein data.

Dr. V.N. Waghmare: During the interaction session an offer was made for pre-breeding and developing pest and disease resistance lines and the developed materials can shared at the end either on payment basis or by Signing MoU and proposal can be made.

Dr. Ramasam (President, FSII): Public sector need to understand the need of private sectors in order to meet farmers demand.

Miland Challawar (representing Rallis India): There can be single nodal agencies for exchange of germplasm as in ICRISAT and IRRI. There has to be efforts for heterotic pooling to address the low genetic diversity in a collaborative mode

The Deputy Director General (CS) in his remarks informed that Institutes are nodal agencies and the materials can be shared by signing MoU.

Mechanization, developing disease resistance lines, edible oil opportunities i.e. gossypol free seeds have to be strengthened

Issue of release of Bt cotton hybrid, meeting could not be arranged due to various reason. DAC & FW has to release the variety DDG only chairs the committee meeting.

As per guidelines, the data of three years need for consideration in the Identification for Bt cotton Hybrids. The guidelines were prepared in discussion with the stakeholders. If there is something significant which will benefit the farmers then varietal release committee can take that into consideration and hybrids can be release. Protein expression analysis has already resolved. To speed up the whole process DDG can

involve, other than that all the other issues are in streamline and guidelines are there. While developing the material see that materials are selected with broad genetic base.

Session III: Varietal Identification Committee Meeting: A Separate proceeding is prepared

19.05.2020

Session IV: Technical programme- Breeding Panel (2020-21)

Chairman: Dr. B. M. Khadi, Former Director, ICAR-CICR, Nagpur

Co- Chairman: Dr. R.K. Singh ADG (CC), New Delhi

Dr. VN Waghmare, Director, ICAR-CICR, Nagpur

Convener: Dr. S. Manickam, Principal Investigator, (Plant Breeding),

Rapporteurs:Dr. A. Manivannan, Scientist, ICAR-CICR, RS, Coimbatore

Dr. B. M. Khadi: The cultivated species in India was well defined till 2000-2001, 32% *hirsutum*, 17 % *arboreum*, 11% *herbaceum* and 40% Hybrids under commercial cultivation. Now the scenario has changed after Bt cultivation came into existence. Since then the area under Bt cotton cultivation increased and at present >98 percent area is occupied by Bt hybrids. Farmers are looking for big boll size with increased tolerance to sucking pests. Early to medium maturing high yielding varieties/hybrids along with synchronous boll opening is preferred by the farmers combined with jassid tolerance in South and Central zone.

Technical programme has to be proposed based on the requirement of the farmers. Now 12 common trials in both central and south zone and 15 zonal trials comprising of non bt entries have been proposed. There are no takers of these non Bt varieties and hybrids developed in the system. Totally 77 non Bt cotton varietis and hybrids have been released and notified during last decade (2011-20) none of these are under cultivation. So AICRP on Cotton has to consider the proposed Technical Programme in light of the above comments. AICRP on Cotton should have programme of mainly developing of Bt cotton varieties and hybrids which should meet the requirements of farmers to serve cotton farmers in the country.

*Dr. R.K. Singh:*Public sectors need to work based on the farmers needs. Conversion of Bt varieties need to be strengthen. CLCuV is the major problem in North India and the hybrids need to be tolerant to that disease. Similarly location specific issues have to be addressed in the breeding programme.

Dr. V.N . Waghmare: Most of the hybrids developed from the private sector may have at least one of the parents from the public sectors. The hybrids from private sector now have become susceptible to pink boll worm, but the public sector are now breeding for tolerant genotypes specifically for sucking pests. Recently organic cotton demand is raising up in the market. There are nonbt varieties with yield potential comparable to that of Bt hybrids. The agronomy if worked out properly the yield potential could be much improved.

Dr. Prakash, Project Coordinator informed the panel that for all ELS trial, Chamrajnagar may be included as centre and the house accepted and accordingly trials were allocated.

Formulation of technical programme: Dr. Manickam made the presentation on details of the trials for Central & South zone to be conducted during 2020-2021. Coding of breeding materials will be done at CICR Coimbatore and the last date for seed submission is 02.06.2020 before 4.00 pm. The entries received for trials were listed along with the local check. Various trials and the materials for trials were discussed for both central and south zone. The released varieties will be included as local checks

GENERAL POINTS TO BE NOTED

- The trials should be conducted strictly as per the technical programme **and no other entry should be included** in the trial (including the check varieties).
- All the trials should have at least one border row.
- All the data sheets should have Name of the agency conducting trial, location of the trial (and not the location of the company) and the name of the trial.
- All those who are conducting the breeding trials are requested to furnish both the mean data as well as the replicated data analyzed statistically. The mean data is to be submitted as per the model data sheet given below as **Excel sheet and not as Word file**.

S. No.	Code#	SCY (kg/ha)	LY (kg/ha)	GOT (%)	Boll No	Boll Wt (g)	Upper Half Mean Length (mm)	Mic	BS (g/tex)	Seed Oil (%)
1	101									
2	102									
N	10n									
	CD@5%									
	CV %									

#Code numbers in ascending order; n=number of coded entries

- The data should be submitted separately in different Excel sheets for each trial, and the data of different trials are not to be combined in a single sheet.
- The incomplete and insufficient data will not be included in report preparation, and shall be reported to the higher officials for non compliance.
- The **lint samples pooled over replications should be prepared for all the entries from the first picked kapas**, cleaned neatly and labeled properly (mentioning the name of the agency conducting the trial, location of the trial, and AICRP code number in each packet of the lint sample) and sent to concerned CIRCOT centre for fibre quality evaluation in time (**on or before 30-12-2020**). Kindly send the lint samples with AICRP Breeding trial code only to CIRCOT, or else the sample will not be evaluated. **The centres should ensure door delivery of lint to above mentioned CIRCOT units**.
- **Kindly send the data on or before 15-01-2021 (for central zone locations) and 30-01-2021 (for south zone locations).**
- All are requested to visit the website of CICR / AICCIP at **www.cicr.org**.in for any information, announcement etc. No communication in any respect will be sent individually.

- **All the breeders are requested to part 40g seed of varieties and 20 g of hybrids for Pathology / entomology observations and no separate packets will be given to pathologists / entomologists.**
- Seeds received in less quantity than the prescribed quantity will not be included in the trial.
- All the breeders of the varieties / hybrids recommended for agronomic trials are requested to submit the required quantity of **seeds directly to the concerned agronomists (and not to Project Coordinator)** and to keep track with the agronomists for getting the data on agronomy trial and to submit the lint samples for micro-spinning to CIRCOT, Mumbai.

NATIONAL TRIALS (CZ & SZ)

Br. 02a - IET- *G. hirsutum* (IRRIGATED)

Design: RBD; Rows: 2 (6 m length); Reps: 3; Seed Qty: 120 g X 14+2

S. No	Name of Entry	Sponsor	Locations	LC (2 pkts)
1.	GISV 328	NAU, Surat	Banswara	Wagad Kalyan
2.	GISV 332	NAU, Surat	Surat	GN.Cot. 32
3.	GJHV 548	JAU, Junagadh	Talod	GN.Cot. 32
4.	GJHV 568	JAU, Junagadh	Junagadh	GN.Cot. 32
5.	GTHV 18/19	SDAU, Talod	Khandwa	JK 4
6.	BS 10-20	OUAT, Bhawanipatna	Rahuri	Phule 688
7.	RB 602	MPUAT, Banswara	Bhawanipatna	Surabhi
8.	RB 1903	MPUAT, Banswara	Raichur	BGDS 1063
9.	CPD 2001	UAS, Dharwad	B'Gudi	BGDS 1063
10.	CPD 2002	UAS, Dharwad	Arabhavi	ARBH 813
11.	CPD 2003	UAS, Arabhavi	Lam	NDLH 1938
12.	RAH 1081	UAS, Raichur	Adilabad	NDLH 1938
13.	RAH 1082	UAS, Raichur	Coimbatore	Co 14
14.	RAH 1083	UAS, B'Gudi	Srivilliputhur	SVPR 6
15.	L 1536	ANGRAU, Lam		
16.	ADB 727	PJTSAU, Adilabad		
17.	TCH 1941	TNAU, Coimbatore		
18.	TSH 354	TNAU, Srivilliputhur		
19.	TSH 387	TNAU, Srivilliputhur		
20.	SHSV 14	SIMA-CDRA		
21.	ZC (Phule Yamuna/BGDS 1063)			
22.	Quality Check (Suraj)			
23.	LC			

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to Ginning Training Centre, ICAR-CIRCOT, Nagpur for fibre quality evaluation in HVI mode.

Br. 02 b – IET- *G. hirsutum* (RAINFED)

Design: RBD; Rows: 2 (6 m length); Reps: 3; Seed Qty: 120 g X 9 + 2

S. No	Name of Entry	Sponsor	Locations	LC (2)
1.	GBHV 202	NAU, Bharuch	Banswara	Wagad Kalyan
2.	GBHV 217	NAU, Bharuch	Bharuch	GN.Cot.26
3.	NH 723	VNMKV, Nanded	CICR, Nagpur	AKH 8828
4.	AKH 2013-3	PDKV, Akola	Akola	AKH 8828
5.	AKH 2016-1	PDKV, Akola	Nanded	NH 545
6.	BS 10-20	OUAT, Bhawanipatna	Dharwad	Sahana
7.	RB 1910	MPUAT, Banswara	Nandyal	Sivanandhi
8.	RB 1908	MPUAT, Banswara	Adilabad	Sivanandhi
9.	CNH 18298	CICR, Nagpur	Perambalur	KC 3
10.	CNH 18173	CICR, Nagpur		
11.	CNDTS 287	CICR, Nagpur		
12.	CNDTS 2131	CICR, Nagpur		
13.	CNH 119	CICR, Nagpur		
14.	CNH 1137	CICR, Nagpur		
15.	CPD 2051	UAS, Dharwad		
16.	CPD 2052	UAS, Dharwad		
17.	CPD 2053	UAS, Arabhavi		
18.	RAH 1081	UAS, Raichur		
19.	RAH 1082	UAS, Raichur		
20.	RAH 1083	UAS, B'Gudi		
21.	TSH 337	TNAU, Srivilliputhur		
22.	TSH 358	TNAU, Srivilliputhur		
23.	TVH 003	TNAU, Veppanthattai		
24.	TKH 1197	TNAU, Kovilpatti		
25.	TKH 1225	TNAU, Kovilpatti		
26.	NDLH 2061-4	ANGRAU, Nandyal		
27.	NDLH 2071-2	ANGRAU, Nandyal		
28.	WGCV 192	PJTSAU, Warangal		
29.	ADB 728	PJTSAU, Adilabad		
30.	Quality Check (Suraj)			
31.	ZC (NH 615/ NDLH 1938)			
32.	LC			

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to Ginning Training Centre, ICAR-CIRCOT, Nagpur for fibre quality evaluation in HVI mode.

Br. 02 a/b CC – IET- *G. hirsutum* – Coloured Cotton (IRRIGATED / RAINFED)

Design: RBD; Rows: 2 (6 m length); Reps: 3; Seed Qty: 100 g X 6 + 2

Trial to be conducted in Isolation (Minimum 50 m)

S. No.	Entries	Sponsor	Location	Local Check
1.	DHCC 2001	UAS, Dharwad	CICR, Nagpur (R)	AKH 8828
2.	DHCC 2002	UAS, Dharwad	Surat (R)	G.Cot. 16
3.	CNH 19325	CICR, Nagpur	Khandwa (I)	JK 4
4.	CNH 19480	CICR, Nagpur	CICR, Coimbatore (I)	CCH 2623
5.	SHSCC 5	SIMA-CDRA	Dharwad (R)	ARBH 813
6.	ZC (Phule Yamuna/Suraj)		Lam (I)	NDLH 1938
7.	Local Check			

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to Ginning Training Centre, ICAR-CIRCOT, Nagpur for fibre quality evaluation in HVI mode.

Br. 06 a – IET of Compact genotypes under irrigated condition

Design: R.B.D. Reps: 3 Rows: 3 Row Length: 6.0 m

Spacing: 60.0 cm X 15.0 cm Seed quantity: 300 g X 9+1

S. No.	Genotype	Sponsor	Location	Local Check (2)
1.	RHC 1651	MPKV, Rahuri	Banswara	Wagad Kalyan
2.	RHC 1639	MPKV, Rahuri	Talod	G. Cot. 20
3.	BS 11-20	OUAT, Bhawanipatna	Junagadh	G. Cot. 20
4.	RB 1901	MPUAT, Banswara	Bhawanipatna	Suraj
5.	RB 1918	MPUAT, Banswara	Khandwa	Suraj
6.	RAHC 1031	UAS, Raichur	Rahuri	Phule 688
7.	RAHC 1032	UAS, Raichur	Coimbatore	Suraj
8.	TCH 1895	TNAU, Coimbatore	Raichur	Sujay
9.	CNH 20-31	CICR, Nagpur	Lam	Sivanandi
10.	Local Check			
11.	Common Check (Suraj)			

One popular BG II hybrid (without coding) should be included with recommended spacing as local check

Data to be recorded:

1. Seed cotton yield (kg/ha) at 130 DAS
2. Seed cotton yield (kg/ha) at 160 DAS
3. Total Seed cotton yield (kg/ha) at 160 DAS (1+2 above)
4. No. of bolls/m^2
5. Plant height (cm)

6. Days to 1st boll bursting
7. No. of monopodia / plant
8. No. of sympodia / plant
9. Sympodial length (cm)
10. Boll weight (g/boll)
11. Lint index (g)
12. Seed index (g)
13. Ginning outturn (%)
14. Consolidated lint samples may be prepared and sent to Ginning Training Centre, ICAR-CIRCOT, Nagpur for fibre quality evaluation in HVI mode.
15. Pest and disease incidence by entomologists / pathologists before spraying

Br. 06 b – Initial Evaluation of Compact genotypes under rainfed condition

Design: R.B.D. Reps: 3 Rows: 3 Row Length: 6.0 m

Spacing: 60.0 cm X 15.0 cm Seed quantity: 300 g X 8 + 1

S. No.	Genotype	Sponsor	Location	Local Check (2)
1.	CNH 1139	CICR, Nagpur	Akola	AKH 8828
2.	CNH 1140	CICR, Nagpur	Nanded	NH 615
3.	CNDTS 5114	CICR, Nagpur	CICR, Nagpur	AKH 8828
4.	CNDTS 5170	CICR, Nagpur	Bharuch	G.Cot.16
5.	CNH 120	CICR, Nagpur	Perambalur	Suraj
6.	CNH 121	CICR, Nagpur	Nandyal	Siva Nandi
7.	CNH 20-31	CICR, Nagpur	Dharwad	ARBH 813
8.	CNH 20-32	CICR, Nagpur	Adilabad	Suraj
9.	CNH 20-33	CICR, Nagpur		
10.	DSC 2051	UAS, Dharwad		
11.	RAHC 1031	UAS, Raichur		
12.	RAHC 1032	UAS, Raichur		
13.	Local Check			
14. .	Common Check (Suraj)			

One popular BG II hybrid (without coding) should be included with recommended spacing as local check

Data to be recorded:

1. Seed cotton yield (kg/ha) at 130 DAS
2. Seed cotton yield (kg/ha) at 160 DAS
3. Total Seed cotton yield (kg/ha) at 160 DAS (1+2 above)
4. No. of bolls/m^2
5. Plant height (cm)
6. Days to 1st boll bursting
7. No. of monopodia / plant
8. No. of sympodia / plant
9. Sympodial length (cm)

10. Boll weight (g/boll)
11. Lint index (g)
12. Seed index (g)
13. Ginning outturn (%)
14. Consolidated lint samples may be prepared and sent to Ginning Training Centre, ICAR-CIRCOT, Nagpur for fibre quality evaluation in HVI mode.
15. Pest and disease incidence by entomologists / pathologists before spraying

Br. 22 a/b IET-*G. arboreum*

Design: RBD; Rows: 2 (6 m length); Reps: 3; Seed Qty: 120 g X 11 + 2

S. No	Entry	Sponsor	Locations	LC (2)
1.	JLA-1430	MPKV, Jalgaon	Amreli	G.Cot.19
2.	JLA-1512	MPKV, Jalgaon	Khandwa	JK 5
3.	GAM 266	JAU, Amreli	Akola	AKA. 8
4.	GAM 269	JAU, Amreli	Parbhani	PA 740
5.	CNA 1071	CICR, Nagpur	Jalgaon	JLA 505
6.	CNA 1072	CICR, Nagpur	Nagpur	AKA. 8
7.	CNA 2034	CICR, Nagpur	Dharwad	AK 235
8.	CNA 18408	CICR, Nagpur	Raichur	AK 235
9.	CNA 18392	CICR, Nagpur	Nandyal	Yaganti
10.	AKA 2015-8	PDKV, Akola	Kovilpatti	K 12
11.	PA 881	VNMKV, Parbhani	Mudhole	Veena
12.	PA 885	VNMKV, Parbhani		
13.	DWDa 2051	UAS, Dharwad		
14.	MDL ABB1	PJTSAU, Mudhole		
15.	MDL 2674	PJTSAU, Mudhole		
16.	NDLA 3140	ANGRAU, Nandyal		
17.	NDLA 3151	ANGRAU, Nandyal		
18.	ZC (AKA 7/DLSa 17)			
19.	LC			

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to Ginning Training Centre, ICAR-CIRCOT, Nagpur for fibre quality evaluation in HVI mode.

Br. 22 a/b IET-Long Linted *G. arboreum*

Design: RBD; Rows: 2 (6 m length); Reps: 3; Seed Qty: 100 g X 7

S. No	Entry	Sponsored by	Locations
1.	PA 887	VNMKV, Parbhani	Amreli
2.	PA 888	VNMKV, Parbhani	Bharuch
3.	PA 898	VNMKV, Parbhani	Nagpur
4.	PA 904	VNMKV, Parbhani	Akola
5.	PAIG 410	VNMKV, Parbhani	Parbhani
6.	PAIG 411	VNMKV, Parbhani	Nandyal
7.	CNA 1074	CICR, Nagpur	Kovilpatti
8.	CNA 1075	CICR, Nagpur	
9.	DWD (LL) 2051	UAS, Dharwad	
10.	QC (PA 255 - CZ; DLSa 17-SZ)		

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to Ginning Training Centre, ICAR-CIRCOT, Nagpur for fibre quality evaluation in HVI mode.

Br. 25 a/b PHT - Desi Hybrid

Design: RBD; Rows: 2 (6 m length); Reps: 4; Seed Qty: 100 g X 4

S. No	Name of Entry	Sponsor	Locations	LC
1.	KR 148	Shakti Vardhak	Amreli	G.Cot.MDH-11
2.	KR 149	Shakti Vardhak	Akola	PDKVDH 1
3.	KR 150	Shakti Vardhak	Pachora (Nirmal)	PDKVDH 1
4.	LC		Parbhani	PDKVDH 1
5.	ZC (KR 64-NZ; NACH 12-CZ)			

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to Ginning Training Centre, ICAR-CIRCOT, Nagpur for fibre quality evaluation in HVI mode.

Br. 32b IET of *G. herbaceum*

Design: RBD; Rows: 2 (6 m length); Reps: 3; Seed Qty: 120 g X 7 + 2

S.No	Name of Entry	Sponsor	Locations	LC (2)
1.	GShv 219/16	NAU, Surat	Surat	GN.Cot.25
2.	GShv 789/16	NAU, Surat	Bharuch	GN.Cot.25
3.	GShv 833/16	NAU, Surat	Viramgam	GADC 2
4.	GBhv 316	NAU, Bharuch	Bharuch (CSSRI)	GN.Cot.25
5.	GBhv 324	NAU, Bharuch	Dhandhuka	GADC 2
6.	GVhv 996	RCRS, Viramgam	Dharwad	Jayadhar
7.	ZC (G Cot 23/DDhc 11)		Kovilpatti	Jayadhar
8.	LC			

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to Ginning Training Centre, ICAR-CIRCOT, Nagpur for fibre quality evaluation in HVI mode.

CENTRAL ZONE TRIAL

Br-03 a – PVT - Irrigated

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 6

Entries promoted	Entries Retained	Location	Local Check
GJHV 566	RAH 1076	Surat	GN. Cot 32
RHC 1409		Talod	GN. Cot 32
CPD 1902		Junagadh	GN. Cot 32
GISV 323	ZC (Phule Yamuna)	Rahuri	Phule 688
GISV319	LC	Bhawanipatna	Surabhi
CCH 19-2	Quality Check (Suraj)	Khandwa	JK 4

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Surat / Mumbai for fibre quality evaluation in HVI mode.

Br-03 a – PVT Coloured cotton - Irrigated

Design: RBD; Reps: 4; Rows: 4 (6 m length); Seed qty: 200 g X 3

Entries promoted	Entries Retained	Location	Local Check
DHCC 1901	LHCC 4	Surat (I)	GN.Cot. 22
CNH 18528	DHCC 1801	Khandwa (I)	JK 4
CNH 18529	CNH 17395	CICR, Nagpur (R)	AKH 8828
CCHC 19-1	Phule Yamuna (Zonal Check)		
CCHC 19-2	Local Check		
DHCC 1902			

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Surat / Mumbai for fibre quality evaluation in HVI mode.

Br-04 a – CVT - Irrigated

Design: RBD; Reps: 3; Rows: 8 (6 m length); Seed qty: 600 g X 4

Entries promoted	Entries Retained	Location	Local Check
GJHV-554		Surat	GN. Cot 32
GJHV-522	Quality Check (Suraj)	Junagadh	GN. Cot 32
SHS 113	ZC (Phule Yamuna)	Rahuri	Phule 688
TSH 367	LC	Bhawanipatna	Surabhi

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Surat / Mumbai for fibre quality evaluation in HVI mode.

Br-05a – CHT HXH

Design: RBD; Reps: 5; Rows: 4 (6 m length); Seed qty: 200 g X 5

New Entries	Sponsor	Location	Local Check
GJHH 19	JAU, Junagadh	Surat	GN. Cot. Hy. 14
GSHH 15035	NAU, Surat	Talod	GN. Cot. Hy. 14
GTHH 17/01	SDAU, Talod	Rahuri	Phule Suman
GTHH 1203	SDAU, Talod	Banswara	GN. Cot. Hy. 14
ZC (Phule Asmita)		Junagadh	GN. Cot. Hy. 14
LC			

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Surat / Mumbai for fibre quality evaluation in HVI mode.

Br-06a – CVT Compact Cultures - Irrigated

Design: RBD; Reps: 3; Rows: 8 (6 m length); Seed qty: 500 g X 6; Spacing: 60 X 15 cm (CZ)

Entries promoted	Entries retained	Location	Local Check
RHC-HD 1405	RHC-HD 1438	Talod	G.Cot.20
RHC-HD 1312	SHC 374	Junagadh	G.Cot.20
GTHV 18/17		Bhawanipatna	Suraj
RAHC 1902	Local Check	Rahuri	Phule 688
CCH 19-2	Zonal check (Suraj)	Banswara	Wagadkalyan
CCH 19-4		Khandwa	NH 615

One popular BG II hybrid (without coding) should be included with recommended spacing as local check

Data to be recorded:

1. Seed cotton yield (kg/ha) at 130 DAS
2. Seed cotton yield (kg/ha) at 160 DAS
3. Total Seed cotton yield (kg/ha) at 160 DAS (1+2 above)
4. No. of bolls/m^2
5. Plant height (cm)
6. Days to 1st boll bursting
7. No. of monopodia / plant
8. No. of sympodia / plant
9. Sympodial length (cm)
10. Boll weight (g/boll)
11. Lint index (g)
12. Seed index (g)
13. Ginning outturn (%)
14. Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Surat / Mumbai for fibre quality evaluation in HVI mode.
15. Pest and disease incidence by entomologists / pathologists before spraying

Br – 13 a PVT *G. barbadense*

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 2

New Entries	Entries promoted	Entries Retained	Location
CCB 6	CCB 141	DB-1601	Anand
CCB 15	CCB 64B	CCB 64	Rahuri
ZC (Phule Rukmai)	DB 1901	DB-1701	

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Surat / Mumbai for fibre quality evaluation in HVI mode.

Br – 14 a CVT *G. barbadense*

Design: RBD; Reps: 5; Rows: 4 (6 m length); Seed qty: 400 g X 2

Entries promoted	Entries Retained	Location
CCB 51-2		Anand
DB 1801		Rahuri
CCB 143B		
ZC (Phule Rukmai)		

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Surat / Mumbai for fibre quality evaluation in HVI mode.

Br-15 a – CHT H x B

Design: RBD; Reps: 4; Rows: 4 (6 m length); Seed qty: 250 g X 3

New Entry	Entries promoted	Entries Retained	Location
DHB 2001	DHB 1902	RHB 1623	Anand
DHB 2002	RHB 1401	RHB 1624	Rahuri
DHB 2003	LAHB 2	Phule Dhara (ZC)	Banswara

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Surat / Mumbai for fibre quality evaluation in HVI mode.

Br-03 b – PVT - Rainfed

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 5

Entries promoted	Entries retained	Location	Local Check
AKH 2013-2	NDLH – 2057-1	Bharuch	GN.Cot.26
CNH 1134	ZC (NH 615)	Akola	AKH 8828
TVH 007	LC	Nanded	NH 545
	Quality Check (Suraj)	Banswara	Wagad Kalyan
		Nagpur	AKH 8828

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Surat / Mumbai for fibre quality evaluation in HVI mode.

Br-04 b – CVT - Rainfed

Design: RBD; Reps: 4; Rows: 8 (6 m length); Seed qty: 400 g X 4

Entries promoted	Entries retained	Location	Local Check
BS 3-17		Bharuch	GN.Cot.26
NDLH – 2035-5	Local Check	Akola	AKH 8828
ZC (NH 615)	Quality Check (Suraj)	Nanded	NH 545
		Banswara	Wagad Kalyan

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Surat / Mumbai for fibre quality evaluation in HVI mode.

Br-06b – CVT Compact Cultures - Rainfed

Design: RBD; Reps: 3; Rows: 8 (6 m length); Seed qty: 500 g X 3

Spacing: 60. X 15 cm (CZ)

Entries promoted	Entries retained	Location	Local Check
GTHV 18/19	GISV 312	Akola	AKH 8828
RAHC 1901	DSC 1851	Nanded	NH 615
RHC-HD 1312	AKH 1302	Surat	G.Cot.16
RHC-HD 1405	RAHC 1029		
CNH 1133	Local Check		
TVH 002	ZC (Suraj)		
CNH 09-77			
CNH 19-4			

One popular BG II hybrid (without coding) should be included with recommended spacing as local check

Data to be recorded:

1. Seed cotton yield (kg/ha) at 130 DAS
2. Seed cotton yield (kg/ha) at 160 DAS
3. Total Seed cotton yield (kg/ha) at 160 DAS (1+2 above)
4. No. of bolls/m^2
5. Plant height (cm)
6. Days to 1st boll bursting
7. No. of monopodia / plant
8. No. of sympodia / plant
9. Sympodial length (cm)
10. Boll weight (g/boll)
11. Lint index (g)
12. Seed index (g)
13. Ginning outturn (%)
14. Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Surat / Mumbai for fibre quality evaluation in HVI mode.
15. Pest and disease incidence by entomologists / pathologists before spraying

Br-24 b CVT – G. arboreum

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 6

Entries promoted	Entries retained	Location	Local Check
NDLA 3116-3	DWDa 1802	Amreli	G Cot 19
NDLA 3104-4	JLA-1207	Akola	AKA 8
AKA 2013-8	MDL 2667	Jalgaon	JLA 505
CNA 2035	MDL 2663	Parbhani	PA 740
CNA 2036	ZC (AKA 7)	Khandwa	JK 5
	LC	Nagpur	AKA 8

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Surat / Mumbai for fibre quality evaluation in HVI mode.

Br-24 b CVT – Long linted G. arboreum

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 7

Entries promoted	Entries retained	Location
CINA 1069	CNA 1065	Amreli
CINA 1068	PAIG 379	Akola
CINA 1067		Jalgaon
PA 869		Parbhani
PA 873		Khandwa
QC (PA 255)		Nagpur
		Viramgam

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Surat / Mumbai for fibre quality evaluation in HVI mode.

Br-24b – CVT Coloured Cotton - Arboreum

Design: RBD; Reps: 4; Rows: 4 (6 m length); Seed qty: 200 g X 5

New Entries	Entries promoted	Entries retained	Location	Local Check
DDCC 2001	DDCC 1902	CNA 17522	Khandwa	JK 5
CNA 1092	CNA 18562	DDCC 1801	Surat	G. Cot 19
CNA 19475	CNA 18563	CNA 1091	Nanded	PA 255
	DDCC 1901	DDCC 1802	Nagpur	AKA 8
AKA 7 (Zonal Check)	Local Check		Parbhani	PA 740

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Surat / Mumbai for fibre quality evaluation in HVI mode.

Br-25 b (Trial not formulated)

SOUTH ZONE TRIAL

Br-03 a – PVT - Irrigated

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 4

Entries promoted	Entries retained	Location	Local Check
TSH 383		Arabhavi	ARBH 813
RAH 1046		Lam	NDLH 1938
CPD 1902		Srivilliputhur	SVPR 6
RHC 1409	ZC (Suraj)	Raichur	BGDS1063
CCH 19-2	LC		

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Coimbatore for fibre quality evaluation in HVI mode.

Br-03 a/b (CC) – PVT Colour Cotton - Irrigated

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 5

Entries Promoted	Entries Retained	Location	Local Check
CCHC 19-2	DHCC 1802	Coimbatore	CCH 2623
CNH 18529	CNH 17395	Raichur	BGDS1063
DHCC 1901	DHCC 1801	Dharwad	ARBH 813
CCHC 19-1	LHCC 3	Lam	Sivanandi
CNH 18528	Suraj (Zonal Check)	Nandyal	Sivanandi
DHCC 1902	Local Check		

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Coimbatore for fibre quality evaluation in HVI mode.

Br-04a – CVT - Irrigated

Design: RBD; Reps: 4; Rows: 8 (6 m length); Seed qty: 600 g X 4

Entries promoted	Entries retained	Location	Local Check
RAH 1075	CPD 1702	Arabhavi	ARBH 813
CPD 1701	TSH 325	Lam	NDLH 1938
	ZC (Suraj)	Srivilliputhur	SVPR 6
	LC	Raichur	BGDS1063

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Coimbatore for fibre quality evaluation in HVI mode.

Br-05a – CHT HXH

Design: RBD; Reps: 4; Rows: 4 (6 m length); Seed qty: 150 g X 5

New Entries	Sponsor	Location	Local Check
DHH 2001	UAS, Dharwad	Raichur	SHH 818
RAHH 2011	UAS, Raichur	Lam	LAHH 5
RAHH 2012	UAS, Raichur	B' Gudi	SHH 818
BGDHH 2013	UAS, B'Gudi	Srivilliputhur	SHH 818
ZC (SHH 818)		Dharwad (KSSC)	DHH 11
LC			

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Coimbatore for fibre quality evaluation in HVI mode.

Br-06a – CVT Compact Cultures - Irrigated

Design: RBD; Reps: 3; Rows: 8 (6 m length); Seed qty: 500 g X 5

Spacing: 60. X 15 cm (SZ)

Entries promoted	Entries retained	Location	Local Check
RHC-HD 1312	RHC-HD 1438	Srivilliputtur	Suraj
CCH 19-2	RAHC 1028	Arabhavi	ARBH 813
CCH 19-4	LHDP 5	Lam	L 604
	Local Check	Raichur	Sujay
	Zonal Check (Suraj)	Mudhole	L 604

One popular BG II hybrid (without coding) should be included with recommended spacing as local check

Data to be recorded:

1. Seed cotton yield (kg/ha) at 130 DAS
2. Seed cotton yield (kg/ha) at 160 DAS
3. Total Seed cotton yield (kg/ha) at 160 DAS (1+2 above)
4. No. Of bolls/m^2
5. Plant height (cm)
6. Days to 1st boll bursting
7. No. Of monopodia / plant
8. No. Of sympodia / plant
9. Sympodial length (cm)
10. Boll weight (g/boll)
11. Lint index (g)
12. Seed index (g)
13. Ginning outturn (%)
14. Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Coimbatore for fibre quality evaluation in HVI mode.
15. Pest and disease incidence by entomologists / pathologists before spraying

Br – 13 a PVT *G. barbadense*

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 150 g X 3

New Entries	Entries promoted	Entries retained	Location
CCB 6	DB 1901	CCB 51	Coimbatore (TNAU)
CCB 15	CCB 141	CCB 29	Dharwad
	CCB 142	CCB 64	Chamraj Nagar
	CCB 64B	CCB 26	
	SBSD 5-6	ZC (Suvin)	

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Coimbatore for fibre quality evaluation in HVI mode.

Br – 14 a CVT *G. barbadense*

Design: RBD; Reps: 5; Rows: 8 (6 m length); Seed qty: 500 g X 3

Entries promoted	Entries retained	Location
DB 1801	CCB 51-2	Coimbatore (TNAU)
ZC (Suvin)	CCB 129	Dharwad
		Chamraj Nagar

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Coimbatore for fibre quality evaluation in HVI mode.

Br-15 a CHT H X B

Design: RBD; Reps: 3; Rows: 8 (6 m length); Seed qty: 200 g X 5

New Entry	Entries promoted	Entries retained	Location	Local Check
DHB 2001	DHB 1902	RHB 1624	Coimbatore (TNAU)	DCH 32
DHB 2002	DHB 1901	RHB 1623	Dharwad	DHB 915
DHB 2003	RHB 1401	Phule Dhara (CC)	Lam	DCH 32
	LAHB 2	Local Check	Dharwad (KSSC)	DHB 915
			Chamraj Nagar	DHB 915

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Coimbatore for fibre quality evaluation in HVI mode.

Br-03b – PVT - Rainfed

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 3

Entries promoted	Entries retained	Location	Local Check
NDLH 2051-3	BGDS 1033	Dharwad	ARBH 813
NDLH 2056-4		Nandyal	Sivanandi
CNH 1134	LC	Perambalur	KC 3
CNH 09-119	QC (Suraj)		
TSH 375	ZC (Sahana)		
CCH 19-2			
TVH 007			

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Coimbatore for fibre quality evaluation in HVI mode.

Br-04b – CVT - Rainfed

Design: RBD; Reps: 4; Rows: 8 (6 m length); Seed qty: 500 g X 3

Entries promoted	Entries retained	Location	Local Check
GBHV-193		Dharwad	ARBH 813
NDLH – 2035-5		Nandyal	Sivanandi
RAH 1075	QC (Suraj)	Perambalur	KC 3
LC	ZC (Sahana)		

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Coimbatore for fibre quality evaluation in HVI mode.

Br-05b – CHT HXH

Design: RBD; Reps: 4; Rows: 4 (6 m length); Seed qty: 200 g X 3

Entries	Sponsor	Location	Local Check
DHH 2051	UAS, Dharwad	Dharwad	DHH 11
RAHH 2011	UAS, Raichur	Nandyal	LAHH 5
RAHH 2012	UAS, Raichur	Perambalur	RAHH455
BGDHH 2013	UAS, B'Gudi		
ZC (RAHH455)			
LC			

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Coimbatore for fibre quality evaluation in HVI mode.

Br-06b – CVT Compact cultures - Rainfed

Design: RBD; Reps: 3; Rows: 8 (6 m length); Seed qty: 500 g X 4; Spacing: 60 X 15 cm

Entries promoted	Entries retained	Location	Local Check
DSC 1951	RAHC 1029	Perambalur	Suraj
GTHV 18/19	AKH 1302	Nandyal	Siva Nandi
RAHC 1901	DSC 1851	Dharwad	ARBH 813
CNH 2046	CNH 1128	Mudhole	L 604
CCH 19-4	Local Check		
TVH 002	Zonal Check (Suraj)		
CNH 09-77			

One popular BG II hybrid (without coding) should be included with recommended spacing as local check

Data to be recorded:

1. Seed cotton yield (kg/ha) at 130 DAS
2. Seed cotton yield (kg/ha) at 160 DAS
3. Total Seed cotton yield (kg/ha) at 160 DAS (1+2 above)
4. No. of bolls/m^2
5. Plant height (cm)
6. Days to 1st boll bursting
7. No. of monopodia / plant
8. No. of sympodia / plant
9. Sympodial length (cm)
10. Boll weight (g/boll)
11. Lint index (g)
12. Seed index (g)
13. Ginning outturn (%)
14. Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Coimbatore for fibre quality evaluation in HVI mode.
15. Pest and disease incidence by entomologists / pathologists before spraying

Br-24 b: CVT – G. arboreum

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 3

Entries promoted	Entries retained	Location	Local Check
NDLA 3116-3	DWDa 1802	Dharwad	AKA 235
NDLA 3104-4	CNA 1031	Nandyal	Yaganti
CNA 2035	JLA-1227	Kovilpatti	K 12
JLA 1102	CNA 1054		
ZC (DLSa 17)	LC		

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Coimbatore for fibre quality evaluation in HVI mode.

Br-24 b: CVT – Long linted G. arboreum

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 4

Entries promoted	Entries retained	Location
PAIG 396	PA 807	Dharwad
CINA 1069	PA 806	Nandyal
CINA 1068	PAIG 384	Kovilpatti
PA 880	CNA 1065	Mudhole
CINA 1067	PA 833	
ZC (DLSa 17)		

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Coimbatore for fibre quality evaluation in HVI mode.

Br24a/b – CVT Arboreum (CC) - Rainfed

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 5

New Entries	Entries Promoted	Entries Retained	Location	Local Check
DDCC 2001	DDCC 1902	CNA 1091	Dharwad	AKA 235
CNA 1092	CNA 18562	CNA 17522	Nandyal	Yaganti
CNA 19475	DDCC 1901	DDCC 1801	Kovilpatti	K 12
	CNA 18563	DDCC 1802	Raichur	AKA 235
	Local Check	DDCC 1 (CC)	CICR, Coimbatore	K 12

Data to be recorded: Seed cotton yield (kg/ha); Lint yield (kg/ha), Ginning outturn (%), Boll number/plant; Boll weight (g); Biological yield (t/ha); Seed oil (%)

Consolidated lint samples may be prepared and sent to ICAR-CIRCOT, Coimbatore for fibre quality evaluation in HVI mode.

ENTRIES PROPOSED FOR AGRONOMY TRIAL

Zone	Species	Variety / Hybrid	Irrigated / Rainfed	Entries
Central Zone	*G. hirsutum*	Variety	Irrigated	TCH 1828, SIMA 5
		Compact variety	Irrigated	RHC HD 1406, TCH 1897
	G. hirsutum	Variety	Rainfed	NDLH 2051-1 CNH 11-11
		Compact variety	Rainfed	RHC HD 1433, RHC HD 1406
	G. arboreum	Variety	Rainfed	CNA 1054, CNA 1031
	Desi Hybrid	Hybrid	Rainfed	NACH 556
South Zone	*G. hirsutum*	Variety	Irrigated	RHC 1217 SIMA 5
	G. hirsutum	Variety (Coloured Cotton)	Irrigated / Rainfed	16301 DB
	G. hirsutum	Compact variety	Irrigated	RHC HD 1433
	G. barbadense	Variety	Irrigated	DB 1701, CCB 143B
	Hir x Barb	Hybrid	Irrigated	RHB 1002
	G. hirsutum	Variety	Rainfed	NDLH 20511
	G. hirsutum	Compact Variety	Rainfed	CNH 1128
	G. arboreum	Variety	Rainfed	PA 837, PAIG 380
	G. arboreum	Variety (Coloured Cotton)	Rainfed	DDCC 1, CNA 405

All the breeders of the above varieties / hybrids are requested to submit 1.0 kg (variety)/0.5 kg (hybrid) of **seeds directly to the concerned agronomists (and not to Project Coordinator)** and to keep track with the agronomists for getting the data on agronomy trial and to submit the lint samples to CIRCOT from concerned location. The agronomists are requested to submit **6 kg of lint samples for full scale spinning directly to Director, CIRCOT, Mumbai (Door Delivery only).** Further, agronomists are requested to send the agronomic trials data to the concerned breeder in addition to the Principal Investigator (Agronomy) in time to facilitate the breeder to submit the release proposals before due date.

TECHNICAL PROGRAMME OF ICAR-Bt COTTON TRIALS: 2020-21

Last date for submission of seeds at CICR, Coimbatore: 02/06/2020 before 4.00 PM

Issue of coded seeds: 06/06/2020 after 3.00 PM

Private R & D (for deregulated Bt event only) – Please pay the prescribed testing fee (as detailed below) through online in State Bank of India, Branch = Ramdaspeth, Nagpur Current A/c no. 011072609110, IFSC code no. SBIN0001633 in favour of the ICAR UNIT – CICR Nagpur. Please send payment details with a subject line ICAR-BT COTTON TESTING FEE by mail to finance.cicr@gmail.com with a copy to cicrcbe@gmail.com. No entry shall be entertained without the submission of testing fee and hard copy of all the documents as per the ICAR Test Guidelines (available in official website).

Fees Payable per entry as per number of locations:

S. No.	Particulars	Per entry for 5 locations	Per entry for 4 locations
1	Testing fee	Rs. 5,00,000	Rs. 4,00,000
2	GST @ 18%	Rs. 90,000	Rs. 72,000
3	Total	Rs. 5,90,000	Rs. 4,72,000

S. No.	Particulars	Per entry for 3 locations	Per entry for 2 locations
1	Testing fee	Rs. 3,00,000	Rs. 2,00,000
2	GST @ 18%	Rs. 54,000	Rs. 36,000
3	Total	Rs. 3,54,000	Rs. 2,36,000

GENERAL POINTS TO BE NOTED

- The seeds sponsored for the trials should be acid delinted without any seed treatment and 200 g (or prescribed quantity for trial) seeds to be packed individually and **each packet of seed must be labelled with the name of the sponsoring company, name of the entry, trial name, etc.**
- No seeds shall be accepted after the due date as mentioned above for coding.
- The list of entry as per the trial given below is final, and no addition / modification will be entertained.
- M/s. Mahyco Pvt. Ltd., Rasi Seeds Pvt. Ltd., Kaveri Seeds Pvt. Ltd., Nuziveedu Seeds Pvt. Ltd., Pravardhan Seeds Pvt. Ltd., and M/s. Seed works are requested to send requisite seeds of check hybrids as indicated in each trial**.**

Issues raised by Private Sector Representatives during video conferencing:

- More data points may be created in each trial by adding more number of locations so that over two years we can generate good data instead of three years of testing as per approved guidelines.
- Due to unfavourable weather during the last two years, which is not conducive for cotton cultivation, because of extended intermittent dry spell, the yield levels of test hybrids in various trials were not

upto expected level. Hence, during identification of Bt hybrid / variety, numerical superiority over zonal check hybrid may be considered for recommendation by Variety Identification Committee.

In response to the above, Dr. R. K. Singh, ADG (CC) informed that the concerns of private industry will be put upto the competent authority in the Council for taking suitable decision.

CENTRAL ZONE TRIAL Bt trials

Initial Evaluation Trial of Intra-Hirsutum Hybrids – Irrigated
Seed requirement: 200 g x 4
Number of Rows: 4 (Protected) / 2 (Unprotected) Replications: 3
Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	ATCH 1365 BG II	Agri Top Seeds Pvt Ltd	JAU, Junagadh	PCH 4599 BG II
2.	ACH 981-2 BG II	Ajeet Seeds Pvt Ltd	SDAU, Talod	PCH 4599 BG II
3.	ARCH 3079 BG II	Ankur Seeds Pvt Ltd	MPKV, Rahuri	NCS 854 BG II
4.	ARCH 3181 BG II	Ankur Seeds Pvt Ltd	RVSKVV, Khandwa	RCH 659 BG II
5.	JAIHO BG II	Eldora Agri Tech Pvt Ltd		
6.	ASRCH 108 BG I	ASR Seeds Pvt Ltd		
7.	ASRCH 306 BG I	ASR Seeds Pvt Ltd		
8.	SRIKAR GOLD BG II	Eldora Agri Tech Pvt Ltd		
9.	GANDEEVAM BG II	Eldora Agri Tech Pvt Ltd		
10.	GBCH 7777 BG II	Green Gold Seeds Pvt Ltd		
11.	JKCH 9502 BG II	J K Agri Genetics Ltd		
12.	JKCH 18503 BG II	J K Agri Genetics Ltd		
13.	C 9335 BG II	Mahyco Pvt Ltd		
14.	C 9336 BG II	Mahyco Pvt Ltd		
15.	MC 5460 BG II	Rallis India Ltd.		
16.	RCH 981 BG II	Rasi Seeds Pvt Ltd		
17.	RCH 989 BG II	Rasi Seeds Pvt Ltd		
18.	US 707 BG II	Seed Works International Pvt Ltd		
19.	US 708 BG II	Seed Works International Pvt Ltd		
20.	BIO GHH 101 BG II	Shriram Bioseed Genetics		
21.	Solar 112 BG II	Solar Agrotech Pvt Ltd		
22.	Solar 115 BG II	Solar Agrotech Pvt Ltd		
23.	VSCH 414 BG II	Veda Seed Sciences Pvt Ltd		
24.	**MRC 7351 BG II (ZC)**			
25.	**BG II Local Check**			

Advanced Evaluation Trial of Intra-hirsutum Hybrids-I - Irrigated

Seed requirement: 200 g x 4

Number of Rows: 4 (Protected) / 2 (Unprotected) Replications: 3

Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	ATCH 118 BG II	Agri Top Seeds	JAU, Junagadh	PCH 4599 BG II
2.	ACH 151-2 BG II	Ajeet Seeds Pvt Ltd	SDAU, Talod	PCH 4599 BG II
3.	ARCH 3001 BG II	Ankur Seeds Pvt Ltd	MPKV, Rahuri	NCS 854 BG II
4.	ARCH 3106 BG II	Ankur Seeds Pvt Ltd	RVSKVV, Khandwa	RCH 659 BG II
5.	ASRCH 108 BG I	ASR Seeds Pvt Ltd		
6.	ASRCH 306 BG I	ASR Seeds Pvt Ltd		
7.	SP 7679 BG II	Bayer Biosciences		
8.	JAI HO BG II	Eldora Agri Tech Pvt Ltd		
9.	BHAROSA BG II	Eldora Agri Tech Pvt Ltd		
10.	JKCH 161042 BG II	J K Agri Genetics Ltd		
11.	KCH 9292 BG II	Kaveri Seeds Pvt Ltd		
12.	C 9334 BG II	Mahyco Pvt Ltd		
13.	MC 5441 BG II	Metahelix Life Sciences Ltd		
14.	MC 5444 BG II	Metahelix Life Sciences Ltd		
15.	RHH 0622 BG II	MSSCL, Akola		
16.	NBG 1951 BG II	Nath Biogenes		
17.	NBG 1952 BG II	Nath Biogenes		
18.	G COT HY 10 BG II	NAU, Surat		
19.	G COT HY 12 BG II	NAU, Surat		
20.	GSBHH 32 BG II	NAU, Surat		
21.	GBBHH 15/4 BG II	NAU, Bharuch		
22.	GBBHH 15/5 BG II	NAU, Bharuch		
23.	NCS 2727 Bt 2	Nuziveedu Seeds Pvt Ltd		
24.	RCH 971 BG II	Rasi Seeds Pvt Ltd		
25.	RCH 979 BG II	Rasi Seeds Pvt Ltd		
26.	Solar 109 BG II	Solar Agrotech Pvt Ltd		
27.	C 364 BG II	Sungro		
28.	VSCH 369 BG II	Veda Seed Science Pvt Ltd		
29.	**MRC 7351 BG II (ZC)**			
30.	**BG II Local Check**			

Advanced Evaluation Trial of Intra-hirsutum Hybrids-II - Irrigated

Seed requirement: 200 g x 4

Number of Rows: 4 (Protected) / 2 (Unprotected) Replications: 3

Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	ACH 900-2 BG II	Ajeet Seeds Pvt Ltd	JAU, Junagadh	PCH 4599 BG II
2.	ARCH 045 BG II	Ankur Seeds Pvt Ltd	SDAU, Talod	PCH 4599 BG II
3.	ARCH 888 BG II	Ankur Seeds Pvt Ltd	MPKV, Rahuri	NCS 854 BG II
4.	INDAM 1739 BGII	Indo-American Hybrid Seeds (I) Pvt Ltd	RVSKVV, Khandwa	RCH 659 BG II
5.	JBG 3 BG II	JAU, Junagadh		
6.	KCH 305 BG II	Kaveri Seeds Pvt Ltd		
7.	MC5431 BGII	Metahelix Life Sciences Ltd		
8.	NBC 1821	Nath Biogenes		
9.	NCS 2778 Bt2	Nuziveedu Seeds Pvt Ltd		
10.	PCH 3455 Bt2	Prabhat Agrotech		
11.	PRCH 755 Bt2	Pravardhan Seeds Pvt Ltd		
12.	RCH 947 BGII	Rasi Seeds Pvt Ltd		
13.	RCH 953 BGII	Rasi Seeds Pvt Ltd		
14.	Solar 106 BG II	Solar Agrotech Pvt Ltd		
15.	Solar 108 BG II	Solar Agrotech Pvt Ltd		
16.	ZCH 1439 BG II	Pancha Ganga Seeds Pvt Ltd (Zuari)		
17.	**MRC 7351 BG II (ZC)**			
18.	**BG II Local Check**			

Initial Evaluation Trial of Hirsutum Varieties - Irrigated

Seed requirement: 300 g x 4

Number of Rows: 4 (Protected) / 2 (Unprotected) Replications: 4

Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	CICR Bt 20-31	CICR, Nagpur	JAU, Junagadh	GN. Cot 22
2.	CICR 18 Bt	CICR, Nagpur	SDAU, Talod	GN. Cot 22
3.	GISV 267 Cry1Ac	NAU, Surat	MPKV, Rahuri	Phule 688
4.	CICR 20 Bt	CICR, Nagpur	RVSKVV, Khandwa	JK 4
5.	**Suraj Bt (ZC Bt)**			
6.	**Phule Yamuna (ZC Non-Bt)**			
7.	**Local Check**			

Advanced Evaluation Trial of Hirsutum Varieties - Irrigated

Seed requirement: 400 g x 4

Number of Rows: 4 (Protected) in normal spacing/ 2 in normal spacing (Unprotected)

Number of Rows: 4 (Protected) in closer spacing

Replications: 3

Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	CICR 19 Bt	CICR, Nagpur	JAU, Junagadh	GN. Cot 22
2.	CICR 21 Bt	CICR, Nagpur	SDAU, Talod	GN. Cot 22
3.	CICR 22 Bt	CICR, Nagpur	MPKV, Rahuri	Phule 688
4.	G. COT 10 Cry 1Ac	NAU, Surat	RVSKVV, Khandwa	JK 4
5.	G. COT 16 Cry 1Ac	NAU, Surat		
6.	NC 369 Bt2	Nuziveedu Seeds Pvt Ltd		
7.	NC 729 Bt2	Nuziveedu Seeds Pvt Ltd		
8.	**Suraj Bt (ZC Bt)**			
9.	**Phule Yamuna (ZC Non-Bt)**			
10.	**Local Check**			

Combined Evaluation Trial of Interspecific H X B Hybrids - Irrigated

Seed requirement: 200 g x 2

Number of Rows: 4 (Protected) / 2 (Unprotected) Replications: 3

Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
	New Entries		AAU, Anand	G. Cot Hy 101
1.	C 7928 BG II	Mahyco Pvt Ltd	MPKV, Rahuri	Bahubali
2.	C 7938 BG II	Mahyco Pvt Ltd		
3.	MC 5500 BG II	Rallis India Ltd.		
	Promoted Entries			
4.	Indam 1634 BG II	Indo-American Hybrid Seeds (I) Pvt Ltd		
5.	JKCHB 13146 BG II	J K Agri Genetics Ltd		
6.	MC5516 BGII	Metahelix Life Sciences Ltd		
7.	NBHB 1851	Nath Biogenes		
8.	NBHB 2205	Nath Biogenes		
9.	**MRC 7918 BG II (ZC)**			
10.	**DCH 32 (Non Bt ZC)**			
11.	**BG II Local Check**			

Initial Evaluation Trial of Intra-Hirsutum Hybrids - Rainfed

Seed requirement: 200 g x 4
Number of Rows: 4 (Protected) / 2 (Unprotected) Replications: 3
Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	ARCH 3079 BG II	Ankur Seeds Pvt Ltd	NAU, Surat	MRC 7347
2.	ARCH 3181 BG II	Ankur Seeds Pvt Ltd	NAU, Bharuch	MRC 7347
3.	SP7680 BG II	Bayer Biosciences Pvt Ltd	PDKV, Akola	MRC 7347
4.	SP7688 BG II	Bayer Biosciences Pvt Ltd	ICAR-CICR, Nagpur	MRC 7347
5.	CICR HH Bt 11	ICAR-CICR, Nagpur		
6.	Indam 2092 BG II	Indo-American Hybrid Seeds (I) Pvt Ltd		
7.	C 9393 BG II	Mahyco Pvt Ltd		
8.	Neo 1636 BG II	Neo Seeds		
9.	MC 5461 BG II	Rallis India Ltd.		
10.	RCH 990 BG II	Rasi Seeds Pvt Ltd		
11.	RCH 996 BG II	Rasi Seeds Pvt Ltd		
12.	US 707 BG II	Seed Works International Pvt Ltd		
13.	US 708 BG II	Seed Works International Pvt Ltd		
14.	BIO AMBHH 511 BG II	Shriram Bioseed Genetics		
15.	**Jadoo BG II (ZC)**			
16.	**BG II Local Check**			

Advanced Evaluation Trial of Intra-hirsutum Hybrids-I - Rainfed

Seed requirement: 200 g x 4
Number of Rows: 4 (Protected) / 2 (Unprotected) Replications: 3
Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	ACH 981-2 BG II	Ajeet Seeds Pvt Ltd	NAU, Surat	MRC 7347
2.	ARCH 3001 BG II	Ankur Seeds Pvt Ltd	NAU, Bharuch	MRC 7347
3.	ARCH 3106 BG II	Ankur Seeds Pvt Ltd	PDKV, Akola	MRC 7347
4.	SP 7675 BG II	Bayer Biosciences	ICAR-CICR, Nagpur	MRC 7347
5.	SP 7686 BG II	Bayer Biosciences		
6.	KCH 9289 BG II	Kaveri Seeds Pvt Ltd		
7.	C 9392 BG II	Mahyco Pvt Ltd		
8.	MC 5450 BG II	Metahelix Life Sciences Ltd		
9.	MC 5459 BG II	Metahelix Life Sciences Ltd		
10.	G COT HY 12 BG II	NAU, Surat		
11.	GBBHH 15/4 BG II	NAU, Bharuch		
12.	GBBHH 15/5 BG II	NAU, Bharuch		
13.	NBG 1921 BG II	Nath Bio Genes		
14.	NBG 1922 BG II	Nath Bio Genes		
15.	Neo 1656 BG II	Neo Seeds		
16.	NCS 2727 Bt2	Nuziveedu Seeds Pvt Ltd		
17.	RCH 962 BG II	Rasi Seeds Pvt Ltd		
18.	RCH 969 BG II	Rasi Seeds Pvt Ltd		
19.	Solar 111 BG II	Solar Agrotech Pvt Ltd		
20.	VSCH 234 BG II	Veda Seed Science Pvt Ltd		
21.	**Jadoo BG II (ZC)**			
22.	**BG II Local Check**			

Advanced Evaluation Trial of Intra-hirsutum Hybrids-II - Rainfed

Seed requirement: 200 g x 4
Number of Rows: 4 (Protected) / 2 (Unprotected) Replications: 3
Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	ACH 909-2 BG II	Ajeet Seeds Pvt Ltd	NAU, Surat	MRC 7347
2.	ARCH 777 BG II	Ankur Seeds Pvt Ltd	NAU, Bharuch	MRC 7347
3.	ARCH 501 BG II	Ankur Seeds Pvt Ltd	CRS, Nanded	MRC 7347
4.	KCH 306 BG II	Kaveri Seeds Pvt Ltd	ICAR-CICR, Nagpur	MRC 7347
5.	MC5401 BGII	Metahelix Life Sciences Ltd		
6.	NBC 1811 BG II	Nath Bio Genes		
7.	NCS 2778 Bt2	Nuziveedu Seeds Pvt Ltd		
8.	PCH 3455 Bt2	Prabhat Seeds Pvt Ltd		
9.	PRCH 755 Bt2	Pravardhan Seeds Pvt Ltd		
10.	RCH 942 BGII	Rasi Seeds Pvt Ltd		
11.	RCH 956 BGII	Rasi Seeds Pvt Ltd		
12.	BIOGHy 256-2	Shriram Bioseed Genetics		
13.	BIOGHH 102	Shriram Bioseed Genetics		
14.	BIOAHH 341-2	Shriram Bioseed Genetics		
15.	**Jadoo BG II (ZC)**			
16.	**BG II Local Check**			

Initial Evaluation Trial of Hirsutum Varieties - Rainfed

Seed requirement: 200 g x 4
Number of Rows: 4 (Protected) in normal spacing/ 2 in normal spacing (Unprotected)
Replications: 3
Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	CICR 18 Bt	CICR, Nagpur	NAU, Surat	G Cot 16
2.	CICR 19 Bt	CICR, Nagpur	NAU, Bharuch	G Cot 16
3.	CICR Bt 1141	CICR, Nagpur	PDKV, Akola	AKH 8828
4.	CICR Bt 1142	CICR, Nagpur	ICAR-CICR, Nagpur	AKH 8828
5.	CICR Bt 20-31	CICR, Nagpur		
6.	NH 1901 Bt	VNMKV, Nanded		
7.	NH 1902 Bt	VNMKV, Nanded		
8.	NH 1903 Bt	VNMKV, Nanded		
9.	NH 1904 Bt	VNMKV, Nanded		
10.	ARCV 33 Bt	Ankur Seeds Pvt Ltd		
11.	ARCV 55 Bt	Ankur Seeds Pvt Ltd		
12.	**Suraj Bt (Zonal Check)**			
13.	**NH 615 (Zonal Check NBt)**			
14.	**Local Check NBt**			

Advanced Evaluation Trial of Hirsutum Varieties - I – Rainfed

Seed requirement: 400 g x 4
Number of Rows: 4 (Protected) in normal spacing/ 2 in normal spacing (Unprotected)
Number of Rows: 4 (Protected) in closer spacing
Replications: 3
Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	CICR 24 Bt	CICR, Nagpur	NAU, Surat	G Cot 16
2.	CICR Bt 19-32	CICR, Nagpur	NAU, Bharuch	G Cot 16
3.	CICR Bt 19-33	CICR, Nagpur	PDKV, Akola	AKH 8828
4.	Bt 183059-4	CICR, Nagpur	ICAR-CICR, Nagpur	AKH 8828
5.	Bt 183059-5	CICR, Nagpur		
6.	G. COT 10 Cry 1Ac	NAU, Surat		
7.	G. COT 16 Cry 1Ac	NAU, Surat		
8.	Rasi 66 Bt	Rasi Seeds Pvt Ltd		
9.	Rasi 99 Bt	Rasi Seeds Pvt Ltd		
10.	**Suraj Bt (Zonal Check)**			
11.	**NH 615 (Zonal Check NBt)**			
12.	**Local Check NBt**			

Advanced Evaluation Trial of Hirsutum Varieties - II – Rainfed

Seed requirement: 400 g x 4
Number of Rows: 4 (Protected) in normal spacing/ 2 in normal spacing (Unprotected)
Number of Rows: 4 (Protected) in closer spacing
Replications: 3
Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	CICR 20 Bt	CICR, Nagpur	NAU, Bharuch	G Cot 16
2.	CICR 21 Bt	CICR, Nagpur	PDKV, Akola	AKH 8828
3.	CICR 22 Bt	CICR, Nagpur	ICAR-CICR, Nagpur	AKH 8828
4.	NC 369 Bt2	Nuziveedu Seeds Pvt Ltd	VNMKV, Nanded	NH 615
5.	NC 729 Bt2	Nuziveedu Seeds Pvt Ltd		
6.	**Suraj Bt (Zonal Check)**			
7.	**NH 615 (Zonal Check NBt)**			
8.	**Local Check NBt**			

SOUTH ZONE TRIAL

Initial Evaluation Trial of Intra-Hirsutum Hybrids – Irrigated

Seed requirement: 200 g x 5

Number of Rows: 4 (Protected) / 2 (Unprotected) Replications: 3

Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	ACH 909-2 BG II	Ajeet Seeds Pvt Ltd	Warangal	MRC 7351
2.	ARCH 3079 BG II	Ankur Seeds Pvt Ltd	Lam	NCS 245
3.	ARCH 3181 BG II	Ankur Seeds Pvt Ltd	Raichur	NCS 864
4.	ASRCH 108 BG I	ASR Seeds Pvt Ltd	B'Gudi	NCS 864
5.	ASRCH 306 BG I	ASR Seeds Pvt Ltd	Coimbatore	MRC 7351
6.	CCH 777	Crystal Crop Protection Ltd		
7.	25D51 BG II	Dhanlaxmi Crop Science Pvt.Ltd		
8.	JAIHO BG II	Eldora Agri Tech Pvt Ltd		
9.	SRIKAR GOLD BG II	Eldora Agri Tech Pvt Ltd		
10.	GANDEEVAM BG II	Eldora Agri Tech Pvt Ltd		
11.	JKCH 9502 BG II	J K Agri Genetics Ltd		
12.	JKCH 18503 BG II	J K Agri Genetics Ltd		
13.	C 9335 BG II	Mahyco Pvt Ltd		
14.	C 9336 BG II	Mahyco Pvt Ltd		
15.	MC 5460 BG II	Rallis India Ltd.		
16.	RCH 981 BG II	Rasi Seeds Pvt Ltd		
17.	RCH 989 BG II	Rasi Seeds Pvt Ltd		
18.	US 707 BG II	Seed Works International Pvt Ltd		
19.	US 708 BG II	Seed Works International Pvt Ltd		
20.	BIO GHH 074 BG II	Shriram Bioseed Genetics		
21.	**RCH 659 B II (ZC)**			
22.	**BG II Local Check**			

Advanced Evaluation Trial of Intra-hirsutum Hybrids-I - Irrigated

Seed requirement: 200 g x 5

Number of Rows: 4 (Protected) / 2 (Unprotected) Replications: 3

Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	ACH 52-2 BG II	Ajeet Seeds Pvt Ltd	Warangal	MRC 7351
2.	ARCH 3001 BG II	Ankur Seeds Pvt Ltd	Lam	NCS 245
3.	ARCH 3106 BG II	Ankur Seeds Pvt Ltd	Raichur	NCS 864
4.	SP 7679 BG II	Bayer Biosciences	B'Gudi	NCS 864
5.	CCH 639 BG II	Crystal Crop Protection Ltd	Coimbatore	MRC 7351
6.	CCH 711 BG II	Crystal Crop Protection Ltd		
7.	JAI HO BG II	Eldora Agri Tech		
8.	BHAROSA BG II	Eldora Agri Tech		
9.	JKCH 161042 BG II	J K Agri Genetics Ltd		
10.	KCH 9292 BG II	Kaveri Seeds Pvt Ltd		
11.	C 9356 BG II	Mahyco Pvt Ltd		
12.	MC 5444 BG II	Metahelix Life Sciences Ltd		
13.	MC 5450 BG II	Metahelix Life Sciences Ltd		
14.	G COT HY 12 BG II	NAU, Surat		
15.	NBG 1951 BG II	Nath Biogenes		
16.	NBG 1952 BG II	Nath Biogenes		
17.	NCS 2727 Bt 2	Nuziveedu Seeds Pvt Ltd		
18.	RCH 971 BG II	Rasi Seeds Pvt Ltd		
19.	RCH 979 BG II	Rasi Seeds Pvt Ltd		
20.	Solar 106 BG II	Solar Agrotech Pvt Ltd		
21.	C 376 BG II	Sungro		
22.	VSCH 369 BG II	Veda Seed Science Pvt Ltd		
23.	**RCH 659 B II (ZC)**			
24.	**BG II Local Check**			

Advanced Evaluation Trial of Intra-hirsutum Hybrids-II - Irrigated

Seed requirement: 200 g x 5

Number of Rows: 4 (Protected) / 2 (Unprotected) Replications: 3

Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	ACH 900-2 BG II	Ajeet Seeds Pvt Ltd	Warangal	MRC 7351
2.	ACH 171-2	Ajeet Seeds Pvt Ltd	Lam	NCS 245
3.	ARCH 045 BG II	Ankur Seeds Pvt Ltd	Raichur	NCS 864
4.	ARCH 888 BG II	Ankur Seeds Pvt Ltd	B'Gudi	NCS 864
5.	INDAM 1739 BGII	Indo-American Hybrid	Coimbatore	MRC 7351
6.	KCH 305 BG II	Kaveri Seeds Pvt Ltd		
7.	MC5456 BGII	Metahelix Life Sciences Ltd		
8.	MC5431 BGII	Metahelix Life Sciences Ltd		
9.	NBC 1821	Nath Biogenes India Ltd.		
10.	NCS 2778	Nuziveedu Seeds Pvt Ltd		
11.	RCH 953 BGII	Rasi Seeds Pvt Ltd		
12.	RCH 947 BGII	Rasi Seeds Pvt Ltd		
13.	**RCH 659 B II (ZC)**			
14.	**BG II Local Check**			

Initial Evaluation Trial of Hirsutum Varieties - Irrigated

Seed requirement: 300 g x 5

Number of Rows: 4 (Protected) / 2 (Unprotected) Replications: 4

Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	CICR 20 Bt	CICR, Nagpur	Warangal	Sivanandi
2.	CICR 61 Bt	CICR, Nagpur	Lam	Sivanandi
3.	CICR 1002 Bt	CICR, Nagpur	Raichur	Sujay
4.	CICR Bt 20-31	CICR, Nagpur	B'Gudi	Sujay
5.	**Suraj (ZC)**		Coimbatore	CCH 2623
6.	**Local Check**			

Advanced Evaluation Trial of Hirsutum Varieties - Irrigated

Seed requirement: 500 g x 5

Number of Rows: 4 (Protected) in normal spacing/ 2 in normal spacing (Unprotected)

Number of Rows: 4 (Protected) in closer spacing

Replications: 4

Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	CICR 25 Bt	CICR, Nagpur	Warangal	Sivanandi
2.	CICR 26 Bt	CICR, Nagpur	Lam	Sivanandi
3.	NC 369 Bt1	Nuziveedu Seeds Pvt Ltd	Raichur	Sujay
4.	**Suraj (ZC)**		B'Gudi	Sujay
5.	**Local Check**		Coimbatore	CCH 2623

Combined Evaluation trial of Interspecific H X B Hybrids (New + Promoted Entries)- Irrigated

Seed requirement: 200 g x 3

Number of Rows: 4 (Protected) / 2 (Unprotected) Replications: 3

Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
	New Entries		Lam	Bahubali BG II
1.	DHB 1071 BG II	KSSC	Dharwad	DCH 32 BG II
2.	C 7928 BG II	Mahyco Pvt Ltd	Coimbatore	RCHB 708 BG II
3.	C 7938 BG II	Mahyco Pvt Ltd		
4.	MC 5500 BG II	Rallis India Ltd.		
	Promoted Entries			
5.	Indam 1634 BG II	Indo-American Hybrid Seeds (I) Pvt Ltd		
6.	KCH 9494 BG II	Kaveri Seeds Pvt Ltd		
7.	MC 5504 BG II	Metahelix Life Sciences Ltd		
8.	MC 5516 BG II	Metahelix Life Sciences Ltd		
9.	**MRC 7918 BG II (ZC)**			
10.	**BG II Local Check**			

Initial Evaluation Trial of Intra-Hirsutum Hybrids – Rainfed

Seed requirement: 200 g x 5
Number of Rows: 4 (Protected) / 2 (Unprotected) Replications: 3
Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	ARCH 3079 BG II	Ankur Seeds Pvt Ltd	Mudhole	NCS 854
2.	ARCH 3181 BG II	Ankur Seeds Pvt Ltd	Adilabad	NCS 854
3.	SP7680 BG II	Bayer Biosciences Pvt Ltd	Nandyal	NCS 245
4.	SP7688 BG II	Bayer Biosciences Pvt Ltd	Dharwad	NCS 954
5.	CCH 888	Crystal Crop Protection Limited	Perambalur	NCS 954
6.	Indam 2092 BG II	Indo-American Hybrid Seeds (I) Pvt Ltd		
7.	C 9393 BG II	Mahyco Pvt Ltd		
8.	MC 5461 BG II	Rallis India Ltd.		
9.	RCH 990 BG II	Rasi Seeds Pvt Ltd		
10.	RCH 996 BG II	Rasi Seeds Pvt Ltd		
11.	US 707 BG II	Seed Works International Pvt Ltd		
12.	US 708 BG II	Seed Works International Pvt Ltd		
13.	BIO AHH 804 BG II	Shriram Bioseed Genetics		
14.	60 SS 66 BG II	Sri Sathya Agri Biotech Pvt Ltd		
15.	VSCH 414 BG II	Veda Seed Sciences Pvt Ltd		
16.	**Jadoo BG II (ZC)**			
17.	**BG II Local Check**			

Advanced Evaluation Trial of Intra-hirsutum Hybrids-I - Rainfed

Seed requirement: 200 g x 5
Number of Rows: 4 (Protected) / 2 (Unprotected) Replications: 3
Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	ACH 909-2 BG II	Ajeet Seeds Pvt Ltd	Mudhole	NCS 854
2.	ARCH 3001 BG II	Ankur Seeds Pvt Ltd	Adilabad	NCS 854
3.	ARCH 3106 BG II	Ankur Seeds Pvt Ltd	Nandyal	NCS 245
4.	SP 7686 BG II	Bayer Biosciences Pvt Ltd.	Dharwad	NCS 954
5.	DHH 11 BG II	KSSC	Perambalur	NCS 954
6.	C 9304 BG II	Mahyco Pvt Ltd		
7.	MC 5441 BG II	Metahelix Life Sciences Ltd		
8.	MC 5459 BG II	Metahelix Life Sciences Ltd		
9.	G COT HY 12 BG II	NAU, Surat		
10.	NBC 1921 BG II	Nath Bio Genes		
11.	NBC 1921 BG II	Nath Bio Genes		
12.	NCS 2727 BG II	Nuziveedu Seeds Pvt Ltd		
13.	RCH 962 BG II	Rasi Seeds Pvt Ltd		
14.	RCH 969 BG II	Rasi Seeds Pvt Ltd		
15.	C 342 BG II	Sungro		
16.	VSCH 234 BG II	Veda Seed Science Pvt Ltd		
17.	**Jadoo BG II (ZC)**			
18.	**BG II Local Check**			

Advanced Evaluation Trial of Intra-hirsutum Hybrids- II - Rainfed

Seed requirement: 200 g x 5

Number of Rows: 4 (Protected) / 2 (Unprotected) Replications: 3

Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	ARCH 501 BG II	Ankur Seeds Pvt Ltd	Mudhole	NCS 854
2.	Ankur Hemang BG II	Ankur Seeds Pvt Ltd	Adilabad	NCS 854
3.	ARCH 777 BG II	Ankur Seeds Pvt Ltd	Nandyal	NCS 245
4.	BIOGHY 256-2	Shriram Bioseed Genetics	Dharwad	NCS 954
5.	BIOGHH 102	Shriram Bioseed Genetics	Perambalur	NCS 954
6.	CCH 666 BG II	Crystal Crop Protection Ltd		
7.	CCH 333 BG II	Crystal Crop Protection Ltd		
8.	KCH 306 BG II	Kaveri Seeds Pvt Ltd		
9.	MC 5448 BGII	Metahelix Life Sciences Ltd		
10.	NBG 1811 BGII	Nath Biogenes		
11.	NCS 2778	Nuziveedu Seeds Pvt Ltd		
12.	RCH 956 BGII	Rasi Seeds Pvt Ltd		
13.	RCH 942 BGII	Rasi Seeds Pvt Ltd		
14.	**Jadoo BG II (ZC)**			
15.	**BG II Local Check**			

Initial Evaluation Trial of Hirsutum Varieties - Rainfed

Seed requirement: 200 g x 5

Number of Rows: 4 (Protected) / 2 (Unprotected) Replications: 3

Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	CICR Bt 1141	CICR, Nagpur	Mudhole	Sivanandi
2.	CICR Bt 1142	CICR, Nagpur	Adilabad	Sivanandi
3.	CICR 20 Bt	CICR, Nagpur	Nandyal	Sivanandi
4.	CICR Bt 20-31	CICR, Nagpur	Dharwad	ARBH 813
5.	CICR 61 Bt	CICR, Nagpur	Perambalur	KC 3
6.	CICR 1002 Bt	CICR, Nagpur		
7.	CPDBt 2051	UAS, Dharwad		
8.	ARCV 33 Bt	Ankur Seeds Pvt Ltd		
9.	ARCV 55 Bt	Ankur Seeds Pvt Ltd		
10.	**Sahana (Non Bt Zonal Check)**			
11.	**Local Check**			

Advanced Evaluation Trial of Hirsutum Varieties - I – Rainfed

Seed requirement: 400 g x 5

Number of Rows: 4 (Protected) in normal spacing/ 2 in normal spacing (Unprotected)

Number of Rows: 4 (Protected) in closer spacing

Replications: 3

Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	CICR Bt 19-31	CICR, Nagpur	Mudhole	Sivanandi
2.	Bt 183059-2	CICR, Nagpur	Adilabad	Sivanandi
3.	CPD Bt 1952	UAS, Dharwad	Nandyal	Sivanandi
4.	CPD Bt 1951	UAS, Dharwad	Dharwad	ARBH 813
5.	Rasi 66 Bt	Rasi Seeds Pvt Ltd	Perambalur	KC 3
6.	Rasi 99 Bt	Rasi Seeds Pvt Ltd		
7.	**Sahana (Non Bt Zonal Check)**			
8.	**Local Check**			

Advanced Evaluation Trial of Hirsutum Varieties - II – Rainfed

Seed requirement: 500 g x 5

Number of Rows: 4 (Protected) in normal spacing/ 2 in normal spacing (Unprotected)

Number of Rows: 4 (Protected) in closer spacing

Replications: 4

Design: Completely Randomized Block Design

S. No.	Entries	Sponsored by	Location	Local Check
1.	CICR 24 Bt	CICR, Nagpur	Mudhole	Sivanandi
2.	CICR 25 Bt	CICR, Nagpur	Adilabad	Sivanandi
3.	CICR 26 Bt	CICR, Nagpur	Nandyal	Sivanandi
4.	NC 369 Bt1	Nuziveedu Seeds Pvt Ltd	Dharwad	ARBH 813
5.	**Sahana (Non Bt Zonal Check)**		Perambalur	KC 3
6.	**Local Check**			

Data to be recorded in all the above trials:

Biometric evaluation

1. Germination percentage
2. Plant stand at harvest
3. Plant height (cm) at harvest
4. Number of monopodia
5. Number of sympodia
6. Number of bolls / plant
7. Number of bolls / sq.m.
8. Lint Index (g)
9. Seed Index (g)
10. Ginning outturn (%)
11. Upper Half Mean Length (mm) under HVI Mode
12. Uniformity index under HVI Mode
13. Micronaire under HVI Mode
14. Tenacity under HVI Mode
15. Seed Cotton Yield (q/ha)
16. Qualitative presence of Cry Protein @ 30 days after sowing (DAS) following standard protocol (in leaf) and @ 90 days after sowing (DAS) following standard protocol (in square & boll tissues) in Initial Evaluation Trial and Advanced Evaluation Trial – I.

    Quantity of Cry Protein @ 30, 60, 90 & 120 days after sowing (DAS) following standard protocol (in leaf, square & boll tissues) in Advanced Evaluation Trial – II.

    Cry protein data to be generated at ICAR-CICR, Nagpur & NAU, Surat for rainfed trials, MPKV, Rahuri & JAU, Junagadh for irrigated trials of Central Zone.

    Cry protein data to be generated at ICAR-CICR, Coimbatore & UAS, Raichur for irrigated trials, UAS, Dharwad & ANGRAU, Guntur for rainfed trials of South Zone.
17. Bio-efficacy data to be generated at ICAR-CICR, Nagpur for rainfed trials, MPKV, Rahuri for irrigated trials of Central Zone and at ICAR-CICR, Coimbatore for irrigated trials, UAS, Dharwad for rainfed trials of South Zone against insect pests. (under laboratory conditions in Advanced Evaluation Trial – II during the third year of evaluation against lepidopteron insect pests of cotton)

Evaluation under Protected Condition for Insect pests & Diseases incidences

1. Jassids (average of 3 leaves/plant)
2. Thrips (average of 3 leaves per plant)
3. Whitefly (average of 3 leaves/plant)
4. Bollworms (No. of larvae/5 plants)
5. Percent locule damage
6. Percent open boll damage
7. Percent Disease Index for major diseases

Evaluation under unprotected condition for insect pests and diseases:

Insect pests:

1. Jassids (average on 3 leaves/plant)
2. Thrips (average of 3 leaves per plant)
3. Spotted bollworms (mean of counts/5 plants)
4. Bollworms (mean of counts/5 plants)
5. Percent Locule damage
6. Percent Open boll damage
7. Population of natural enemies of insect pests of cotton
8. Number of sprays for sap sucking pests – Protected

Plant Pathology observations

1. Percent Disease Index (PDI) of Grey Mildew
2. Percent Disease Index(PDI) of Bacterial Leaf Blight
3. Percent Disease Index (PDI) of Alternaria Leaf Spot
4. Percent Disease Index (PDI) of CLCuD (in North Zone only)
5. Incidence of any other diseases/ disorders

Note: The standard operating protocols for recording data on yield attributes, yield, insect pest and disease incidences as per ICAR-AICRP on Cotton shall be followed.

Suggestions and discussions:

Dr Kulkarni (Mahyco): Regarding the promotion of entries can numerical superiority be considered for yield.

Dr. Manikam: As per the guide lines there should be ten per cent increase in yield compared to the check, if that criteria is followed most of the hybrids will not qualify. Hence if the hybrid is having the potential the company can sponsor it for one more year and check the yield of hybrid. To consider numerical superiority that has to be decided by chairman and committee member of VIC.

Chairman: If the hybrid is equivalent to the check with value added character like sucking pest tolerance and others, the entry can be considered for promotion.

Vipin (Bayer): For entire SZ znd CZ rainfed which cover 25-30% area we have ten locations but for the entire 70 to 75 % cotton area we have just five locations per zone which could be increased to have more data points.

Chairman: If the location numbers are increased the company has to be ready to pay the fees. It is possible if the proposal comes from private sectors

Milind challawar: If the location number is increase the number of years could be reduced to two years. As both 2018-19 and 2019-2020 were under adverse condition and unusual crop growing season can numerical superiority could be consider for approving the hybrid.

ADG: This has been represented to the council by the private companies and it will be recorded in the proceeding and presentation will be made.

Session V: Technical programme- Agronomy panel (2020-21)

Chairman: Dr. A.R. Sharma, Director of Research, RLBCAY, Jhansi
Co- Chairman: Dr. Blaise D'souza, Head, Crop Improvement
Dr K. Shankarnarayanan PI Agronomy made presentation on the various trials of agronomy, plant physiology and biochemistry to be conducted during the coming season.
Dr. R. Raja, Principal Scientist, ICAR-CICR RS, Coimbatore acted as a Rapporteur.

Technical Programme of Agronomy, Physiology & Biochemistry- ICAR-AICRP (Cotton), Coimbatore (2020-21)

The research experiments were formulated based on the following thematic areas:

- Agronomic requirements of promising pre-release/recently released *hirsutum/ arboreum/ barbadense* genotypes including compact / hybrids of both interspecific and desi hybrids of *cotton*
- Augmenting ELS cotton production
- Technology for organic Cotton Production
- Conservation agriculture
- Moisture Stress management in Bt cotton
- Soil crust management in North Zone
- Packages for Bt varieties
- Input use pattern & cost of cultivation
- Multi-tier intercropping
- Physiological and biochemical aspects in cotton production

TECHNICAL PROGRAMME FOR 2020-21-AGRONOMY

Agronomy IA	Agronomic requirements of promising pre-release/recently released *hirsutum/ arboreum/ barbadense* genotypes including compact / hybrids of both interspecific and desi hybrids of *cotton*
Agronomy 1B	Evaluation of compact culture under HDPS with different nutrient levels.
Agronomy II	Augmenting ELS cotton production
Agronomy IV	Technology for Organic Cotton Production.
Agronomy V	Conservation agriculture.
Agronomy VII	Input use pattern & cost of cultivation
Agronomy VIII	Strategies to mitigate/minimize soil crust formation in cotton in North zone
Agronomy IX	Standardisation of geometry for Bt varieties
Agronomy X	Multi-tier intercropping

TECHNICAL PROGRAMME FOR 2020-21-PHYSIOLOGY and BIOCHEMISTRY

PHY 1	PGR for optimum morpho frame and enhanced yield
PHY2	Preparing for climate change - Growth and development of *arboreum* cotton in response to growth regulators
PHY 3	Moisture Stress management through use of different Osmo-protectants
BIO CHEM1	Screening of Cotton genotypes for abiotic stress tolerance and estimation of seed oil, gossypol and protein
BIO CHEM1A	Screening of Cotton genotypes for drought and salinity tolerance
BIO CHEM1B	Estimation of seed oil, gossypol and protein

BIO.CHEM.2	Bio Chem.2. Biochemical basis of tolerance/susceptible of pest and disease
BIO.CHEM.2A	Bio Chem.2 A. Evaluation of Bt hybrids for biochemical basis of susceptible/tolerance of sucking pests
BIO.CHEM.2B	Bio Chem.2B. Evaluation of Biochemical basis of resistance against CLCuD
BIO.CHEM.2C	Bio Chem.2C. Evaluation of Biochemical basis of Tobacco streak virus

The details of Technical Programme formulated under Agronomy are presented as under:

Status: Mandatory trial

Agronomy IA: Agronomic requirements of promising pre-release/recently released *hirsutum/ arboreum/ barbadense* genotypes including compact / hybrids of both interspecific and desi hybrids of *cotton*

Preamble: Growth and development of a plant is the result of the interaction of two major components viz. genetic potential of individual and environment. Among the improved agronomic practices, important yield contributing agro techniques are spacing and fertilizer application. Optimization of spacing and fertilizer requirement is the pre requisite for releasing of promising genotypes. The field experiments are conducted with graded levels of nutrients and spacing levels as per the required environment in multi location at different AICRP (cotton) centres.

Under this project, the pre-released varieties/hybrids developed and suggested by the breeding panel under irrigated/rainfed conditions shall be tested at respective centres in the zone for their response to optimum fertilizer levels and crop geometry requirements (applicable to both public & private sector varieties/hybrids). All the participating centers shall invariably conduct these trials incorporating the new genotypes/hybrids against the local check for determining the optimum spacing and fertilizer requirements. In addition, Centres can take up agronomic requirements of any promising entry as per local requirements/needs after obtaining prior approval from the Project Coordinator, CICR, Coimbatore.

Objective: To find out geometry and nutrient requirement of pre-released genotypes

Note: Different spacing and N levels (75, 100 & 125% N) only to be simulated and recommended levels of P & K should be kept as constant for various treatment combinations in agronomic requirement study of pre -eleased conventional and compact genotypes.

North Zone

Centres	*Hirsutum* varieties		*Arboreum*	
	Varieties	Hybrids	Varieties	Hybrids
Faridkot(I)				
Bhatinda(I)	F 2662, PBH 116			
Hisar(I)	F 2662, PBH 116			
Sriganganagar (I)				

Central Zone

Centers	Hirsutum		Barbadense Varieties	Hirsutum x Barbadense	Arboreum Varieties	Desi Hybrid
	Varieties	Hybrids				
Surat (I)						
Junagarh (I)	TCH 1828, SIMA 5					
Rahuri (I)						
Akola (R)	TCH 1828, SIMA 5				CNA 1054, CNA 1031	NACH 556
Nanded (R)	NDLH 20511, CNH 11-11					
Bhawanipatna (R)						NACH 556
CICR, Nagpur	NDLH 20511 CNH 11-11				can 1054,CNA 1031	

South Zone

Centers	Hirsutum Varieties	Hirsutum x Barbadense	Barbadense Varieties	Arboreum Varieties	
Raichur(I)	RHC 1217 SIMA 5				
Lam (I)		RHB 1002	DB 1701, CCB 143B		
Coimbatore(I)		RHB 1002	DB 1701, CCB 143B		
Srivilliputhur(I)	RHC 1217 SIMA 5				
Dharwad(R)	DB16301 NDLH 20511			PA 837 PAIG 380	DDCC1, CNA 405
Chamarajanagar(R)					
Nandyal (R)	DB16301 NDLH 20511			PA 837 PAIG 380	DDCC1, CNA 405

Observations to be recorded (Replication wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) No. of bolls/m^2
5) Boll weight (g)
6) Final plant population (no. /net plot)
7) Seed cotton yield at 140 and 160 DAS (kg/ha), For H x B use 160 and 190 DAS depending on the duration of the crop
8) Duration of the crop

Statistical Analysis:

1) Standard error of difference
2) Critical difference
3) Coefficient of variation

Note: Data should be reported in interaction tables with above-said parameters to find out optimum spacing and fertilizer level requirement of each entry, which is warranted for submitting release proposal.

Arboreum pre-released genotypes of white (PA 837, PAIG 380) and colour (DDCC 1 &CAN 405) cotton trial to be conducted separately.

Reporting: Data sheet of IA is to be followed.

Status: Mandatory trial

Agronomy 1B: Evaluation of compact culture under HDPS with different nutrient levels

Preamble: High-density planting with compact genotypes proved, as high potential system of cotton cultivation in many situations. Many cotton producing countries like Brazil, China, Australia, Spain Uzbekistan, Argentina and Greece tested, proved and adopted high planting system of cotton as tool to achieve higher productivity. Previously, there were no exclusive genotypes for high density planting system. Keeping this in view, development of compact genotypes is prioritised. The agronomic requirement studies are undertaken for pre-released compact culture.

Objective: To find out geometry and nutrient requirement of compact pre released genotypes

Note: Different spacing and N levels (75, 100 & 125% N) only to be simulated and recommended levels of P & K are should be kept as constant for various treatment combinations in agronomic requirement study of pre-released conventional and compact genotypes.

	North Zone		**Central Zone**		**South Zone**	
	Irrigated	**Irrigated**	**Irrigated**	**Rainfed**	**Irrigated**	**Rainfed**
Locations	Faridkot	Sriganganagar	Surat & Rahuri	Nanded & Akola	Coimbatore & Raichur	Dharwad, & Nandyal
Entries	PBH 115	PBH 115	RHC HD 1406	RHC HD 1433, RHC HD 1406	RHC HD 1433	CNH1128
Spacing (cm)	67.5 x 10 67.5 x 15 67.5 x 20 RD spacing	67.5 x 10 67.5 x 15 67.5 x 20 RD spacing	60 x 10 75 x 10 90 x 10 RD spacing	45 x 10 60 x 10 75 x 10 RD spacing	60 x 10 75 x 10 90 x 10 RD spacing	45 x 10 60 x 10 75 x 10 RD spacing
Fertilizer levels (RDF)	125% and 150% RDN (based on soil-test)					
Design	Split plot/FRBD					

Observation to be recorded (Replication-wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) Sympodial length (cm)
5) No. of bolls/m^2
6) Boll weight (g)
7) Final plant population (no. /net plot)
8) Seed cotton yield (kg/ha)
9) Architectural changes due to spacing (LAI, Plant height, No of monopodia and its length, No of sympodia and its length)

Statistical Analysis:

1) Standard error of difference
2) Critical difference
3) Coefficient of variation

- **Note:** Data should be reported in interaction tables with above said parameters to find out optimum spacing and fertilizer level requirement of each entry and also to submit release proposal

- Conventional spacing (fourth spacing) of respective region will be included for evaluation to assess the architectural changes (LAI, Plant height, no. of monopodia and its length, no. of sympodia and its length) due to spacing and should be mentioned in the results.

- Statistical analysis of the data needs improvement. Data should be interpreted based on the ANOVA. The parameters such as SEd±, CD at 5% and CV(%) should be given in all the tables. Avoid reporting of SEm and SD values.

- For all experiments on AGR and other nutrient studies, blanket recommendation should be avoided. Kindly arrive at RDN and different level RDN based on soil test values.

- Basic soil parameters including pH, OC, EC, available N, P, K etc. should be given at the bottom of the Table as a foot note so as to understand the kind of response and the yield expected under the conditions in agronomic requirement and other nutrient related experiments.

- Nitrogen levels (75 , 100 & 125% N) only need to be simulated and recommended levels of P & K based on soil-test values should be kept uniform for various treatment combinations..

For AGR 1 A and 1 B All the breeders of the above varieties/hybrids are requested to submit 1.0 kg (variety)/0.5 kg (hybrid) and 2.0 kg seed for variety HDPS and 1.0 kg for hybrids HDPS of **seeds directly to the concerned Agronomists (not to Project Coordinator)** and to keep track with the Agronomists for getting the data on agronomy trial and to submit the lint samples to CIRCOT from concerned location. Agronomists are requested to submit 6 kg lint samples directly for micro-spinning to Director, CIRCOT, Mumbai (**Door Delivery only and not by Railway Parcel**). Further, agronomists are requested to send the

agronomic trials data (interaction tables) to the concerned breeder in addition to the Principal Investigator (Agronomy) in time to facilitate the submission of release proposals before due date.

Action to be taken:

- These varieties/hybrids have been recommended by the Breeding panel after ascertaining their performance.
- Concerned Breeders shall send the required seeds directly to the Agronomists of respective Centers without delay for taking up experiments.
- The center, where experiment is conducted, should send lint samples for full scale spinning.
- Entomology & Pathology data will be collected from the concerned Principal Investigator.

Reporting: Data sheet of 1B is to be followed

Status: ongoing (second year)

Agronomy II: Augmenting ELS cotton production

AGR IIA. Standardization of sowing window in cotton for Southern Dry Zone of Karnataka

Preamble: The demand for the textile products made out of ELS cotton (32 mm and above) is growing exponentially. Despite of good harvest, there is mismatch between demand and supply of different staple groups of cotton particularly in ELS cotton. The country is still importing ELS cotton annually from Egypt, Sudan, U.S.A and others. The demand for ELS cotton in India is about 9 lakh bales against the availability of only about 4 lakh bales. Chamarajanagar station is recently established under AICRP (cotton) to address the region-specific problem of ELS cotton cultivation. The rainfall pattern observed is continuous rains from April to December and multi-sowing dates are commonly followed by farmers. Hence, time of sowing experiment is proposed to find out optimum time of sowing of ELS cotton.

Objectives:

- Identification of season and to find out sowing window of ELS cotton in newly-established ELS center at Chamarajanagar
- Influence of different times of sowing on yield and economic returns of ELS cotton.

Implementing Centres	South zone-Chamarajanagar

Treatments Schedule

T_1: March-2nd fortnight
T_2: April-1st fortnight
T_3: April-2nd fortnight
T_4: May-1st fortnight
T_5: May-2nd fortnight

T_6: June-1st fortnight
T_7: June- 2nd fortnight
T_8: July-1st fortnight
T_9: July-2nd fortnight
T_{10}: August -1st fortnight
T_{11}: August- 2nd fortnight
T_{12}: September 1st fortnight

Design: RBD; Replications: 3

Observation to be recorded (Replication wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) No. of bolls/m^2
5) Boll weight (g)
6) Final plant population (no./net plot)
7) Seed cotton yield (kg/ha)
8) Rainfall and effective rainfall
9) GDD, RTD & RHD
10) Correlation analysis of yield with weather parameters
11)Pink boll worm

Statistical Analysis:

1) Standard error of difference
2) Critical difference
3) Fibre quality parameters

Economics Parameters:

1) Cost of cultivation
2) Gross returns

- Note :
- Since the study is specifically on ELS, the quality parameters of cotton as influenced by sowing dates should be examined.

➢

➢ A more critical analysis of the rainfall pattern and other weather variables vis-a-vis the crop growth stages should be made for times of sowing experiment.

Reporting: Data sheet of AGR II A is to be followed

Status: Proposed

AGR II B Developing package for interspecific ELS Bt hybrid

Objective: To find out geometry and nutrient requirement of ELS Bt hybrid

Implementing Centres	South zone – Chamarajanagar & Coimbatore

Treatments Schedule

Genotypes

G1.DCH 32 Bt

G2.DCH 32 non Bt

Spacing

S1. Recommended spacing

S2. 25% less recommended spacing

Nutrient Levels

N_0. Control (only P & K is applied)

N_1. 100 % RDN (P & K are constant)

N_2. 125% RDN (P & K are constant)

N_3. 150% RDN (P & K are constant)

Design: FRBD; Replications: 3

Observations to be recorded (Replication-wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) No. of bolls/m^2
5) Boll weight (g)
6) Final plant population (no. /net plot)
7) Seed cotton yield (kg/ha)
8) Rainfall and effective rainfall
9)Pink boll worm

Statistical Analysis:

1) Standard error of difference
2) Critical difference
3) Fibre quality parameters

Economics Parameters:

1) Cost of cultivation
2) Gross returns

Reporting: Data sheet of AGR II B is to be followed

Status: Ongoing (Fifth year)

Agronomy IV: Technology for Organic Cotton Production

Preamble: India is the largest producer of organic cotton in the world. India's contribution to global organic cotton production is about 51 per cent. Evolving organic nutrient management strategy is very much required to support our organic production system. Market prices of organic manures are costly. Hence, low-cost organic nutrient management strategy is proposed by integrating different sources of organic nutrients.

Objectives:

- To find out low-cost nutrient management techniques for organic cotton production in different domains
- To assess soil organic carbon status , nutrient availability and economic returns of selected organic nutrient management techniques

Implementing Centres	**North Zone (Sriganganagar)** **All Central Zone Centres** **All South Zone Centres (except Chamrajnagar)**

Treatments Schedule

T_1 Absolute control (no organic & inorganic)
T_2 Control (STCR-based inorganic)
T_3 RD of Nutrient through organic-based on P equivalent basis
T_4 Seed treatment and soil application of recommended biofertilisers and foliar application of PPFM
T_5 Neem cake 250 kg/ha
T_6 Raising of sunhemp / fodder cowpea between rows and incorporation before flowering
T_7 Intercropping with greengram/blackgram/ groundnut/soybean
T_8 $T_4 + T_5$
T_9 $T_4 + T_6$
T_{10} $T_4 + T_5 + T_6$
T_{11} $T_4 + T_5 + T_7$

Design: RBD; Replications: 3

Observations to be recorded (Replication-wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) No. of bolls/m^2
5) Boll weight (g)
6) Final plant population (no. /net plot)
7) Seed cotton yield (kg/ha)

Statistical analysis:

1) Standard error of difference
2) Critical difference
3) Coefficient of variation

Economics parameters:

1) Cost of cultivation
2) Gross returns
3) Net returns
4) Benefit : Cost ratio
5) Cost of treatments & BCR

Analysis: Nutrient availability at planting and harvest, & uptake; organic carbon content (before sowing and after harvest)

Important Note:

1. Long-linted a*rboreum* or *hirsutum* resistant to sucking pests should be selected. Raichur has to select arboreum in the place of herbaceum.
2. This expertiment is to be conducted on the fixed site and plant protection management should be done with organic pesticides.
3. PPFM culture will be supplied by TNAU, Coimbatore.
4. Pest and disease observations to be taken by respective Entomologist & Pathologist of AICRP (Cotton) centre.
5. Use of organics / green manures – biomass and N addition should be quantified. The contribution of leaf fall in cotton is also appreciable – its effect on soil fertility and on the following crop also need quantification in organic cotton experiment.
6. Organic carbon analysis for organic cotton experiments is mandatory. If any abnormality noticed, reanalysis of the samples is must to ensure true value.

- There were serious ambiguities in the data of organic farming experiment conducted in 2019-20. Data on yield, organic carbon, economics under different treatments as well as statistical analysis require a more critical examination.

Reporting: Data sheet of AGR IV B is to be followed

Status: Ongoing (Third Year)

Agronomy V: Conservation agriculture in cotton-based cropping system

Preamble: Conservation agricultural practices protect the soil from erosion, conserve water and nutrients, promote soil biological activity and contribute to integrated pest management (IPM), diversification of crops in associations, sequences and rotations to enhance system resilience and controlled traffic. Thus, CA avoids straw burning, improves soil organic carbon (SOC) content, enhances input-use efficiency, and has the potential to reduce greenhouse gas emissions.

Objectives:

- To identify suitable conservation strategies in cotton-based cropping system
- To assess the impact of conservation strategies on soil properties , nutrient availability and economic return of cotton-based cropping system.

Implementing Centres	Central Zone (Junagadh & Rahuri) South Zone (Srivilliputtur & Chamarajanagar)

Treatments (Design: RBD); (Replications: 3) Plot size: (9 x 8 m)

T_1 Conventional tillage + no residue
T_2 Zero tillage + no residue
T_3 Zero tillage + 50 % residue management
T_4 Zero tillage + 100 % residue management

T_5 Permanent bed system + zero tillage + no residue
T_6 Permanent bed system + zero tillage + 50% residue management
T_7 Permanent bed system + zero tillage + 100% residue management

Conditions

Central zone	Irrigated	Cotton – maize/ sorghum (One year rotation)
	Rainfed	Cotton - soybean (Two year rotation)
South zone	Irrigated	Cotton – maize (One year rotation)
	Rainfed	Cotton + pulses – maize/ sorghum (Two year rotation)

Method of imposing treatments

Sl.No	Details	Bed system	Tillage	Residue
T_1	Conventional tillage + no residue	-	Conventional	-
T_2	Zero tillage + no residue	-	Zero	-
T_3	Zero tillage + 50% residue management	-	Zero	50%
T_4	Zero tillage + 100% residue management	-	Zero	100%
T_5	Permanent bed system + zero tillage + No residue management	Bed system	Zero	-
T_6	Permanent bed system + zero tillage + 50% residue management	Bed system	Zero	50%
T_7	Permanent bed system + zero tillage + 100% residue management	Bed system	Zero	100%

Observations to be recorded (Replication-wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) No. of bolls/m^2
5) Boll weight (g)
6) Final plant population (no. /net plot)
7) Seed cotton yield (kg/ha)
8) Weed population

Statistical Analysis:

1) Standard error of difference
2) Critical ifference
3) Coefficient of variation

Economics Parameters:

1) Cost of cultivation
2) Gross returns
3) Net returns
4) Benefit : Cost ratio

Effect on soil properties

1) Bulk density at 0-15 cm and at 15-30 cm at sowing and at harvest
2) Quantity of residues applied
3)Labour used
4) Quantity of irrigation water used

Note: The experiment is semi-permanent to be conducted on the fixed site with same layout

Reporting: Data sheet of AGR V is to be followed

Note:

- CA-based experiments carried out during 2019-20 at Rahuri, Junagarh, Chamrajnagar and Srivilliputhur showed that at all the locations, the yields and economics were either equal or even better than conventional system. Also there was significant improvement in the soil parameters.
- These are significant findings and must be carried forward. These results based on a number of years of experimentation are really important in the present context.
- It is essential to develop a technology package based on these research findings for the production of cotton under CA-based management in different locations and outscale it through FLDs, trainings, Kisan Days etc.

Status: Ongoing (Survey)

Agronomy VII: Input use pattern & cost of cultivation

Preamble: The objective of collecting data on input-use pattern and cost of cultivation in different region with existing cotton type is to create CICR database and also to understand input use pattern.

Sl.No	State	Centre	Species	Type
1	Punjab	Faridkot	Hirsutum	H x H
			Arboreum	Variety
2	Haryana	Hisar	Hirsutum	H x H
			Arboreum	Variety
3	Rajasthan	Sriganganagar	Hirsutum	H x H
			Arboreum	Variety
4	Maharashtra	Nanded	Hirsutum	H x H
		Akola (Vidarbha)	Hirsutum	H x H
		Rahuri	Hirsutum	H x H
5	Gujarat	Junagadh	Hirsutum	H x H
		Surat	Hirsutum	H x H
6	Madya Pradesh	Khandwa	Hirsutum	H x H
7	Odisha	Bhawanipatna	Hirsutum	variety
8	Karnataka	Raichur	Hirsutum	H x H
		Dharwad	Hirsutum	H x H
			Hirsutum	H x B
		Chamrajnagar	Hirsutum	H x B
9	Andrapradesh	Nandyal	Hirsutum	H x H
		LAM	Hirsutum	H x H
10	Tamil Nadu	Coimbatore	Hirsutum	H x H
			Hirsutum	H x B
		Srivilliputhur	Hirsutum	H x H
		Coimbatore (CICR)	Barbadense	Variety
			arboreum	variety

Note: Methodology: Farm survey will be conducted for each case and the relevant questionnaire will be provided from AICRP, Coimbatore. The survey will be concentrated on major environment of the domain.

Note:

- The cost of cultivation in on-stations trials should be worked out on a more realistic basis and uniformly across locations. A structured proforma for economic analysis based on that used for the survey on the farmers' fields should be prepared for working out the cost of cultivation and net returns in on-station trials.

Reporting: Data sheet of AGR VII is to be followed

Status: Ongoing (Second Year)

Agronomy VIII: Strategies to mitigate/minimize soil crust formation in cotton in North zone

Preamble: Crust formation after sowing following irrigation or rain is a common problem in north zone. Soil aggregates are easily dispersed in soils of low organic matter under the impact of rain drops, thus forcing a thin layer of dispersed soil (clay) on the soil surface which on drying develops high strength and forms crust.. This reduces the exchange of gases between soil and atmosphere and also injures the tips of emerging seedlings. This resulting in drastic reduction in plant population and often forces the farmers for resowing. The repeated sowing and irrigation favoures high weed infestation. Hence, breaking of soil crust is attempted here.

Objectives:

- To identify strategies to manage soil crust formation in cotton
- To work out economics of different soil crust management strategies

Implementing Centres	Hisar, Faridkot, Bathinda, Sriganganagar & Sirsa

Treatments Schedule

T_1: Absolute control (without soil crust)
T_2: Control (with soil crust)
T_3: Super absorbent polymer @12.5 kg/ha-1
T_4: Super absorbent polymer @25 kg/ha-1
T_5: Super absorbent polymer @50 kg/ha-1
T_6: Farmyard manure @ 3 t/ ha in seed rows
T_7: Chopped crop residue/wheat bhusa @ 3 t/ha
T_8. Running of peg/spike tooth weeder (two days after crust))
T_9: Gaund Kathira @ 12.5 Kg/ha
T_{10}: Gaund Kathira @ 25 Kg/ha
T_{11}: Gaund Kathira @ 50 Kg/ha

Design: RBD; Replications:3

Methodology

- The treatments (T3, T4, T5, T6, T7, T9, T10 & T11) to be imposed after sowing but before making soil crust. The treatments (T8) to be imposed after formation of soil crust.
- Sowing will be undertaken by following weather forecast to create soil crust naturally or water spray equivalent to 10-15 mm rainfall 3-4 DAS to simulate soil crust. Rainfall simulator-simulated rainfall of 15 mm in 3 minutes after two days after sowing may be followed.
- A narrow drench will be dug out around each plot and plastic sheet kept vertically to prevent lateral flow of water from one plot to another.
- Buffer channel will be followed to avoid irrigation drift .
- Using of moveable shelter to prevent against the anticipated rainfall / simulation of soil crust in absolute control plot.
- Gaund Kathira should be mixed with DAP for application.

Observation to be recorded (Replication wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) No. of bolls/m^2
5) Boll weight (g)
6) Final plant population (no. /net plot)
7) Seed cotton Yield (kg/ha)
8) Germination percentage, shoot length and seedling vigor
9) Quantity of water (mm/ha) used for simulation of soil crust
10) Bulk density & porosity/penetrometer
11) Soil moisture at germination, crust formation stage and after treatment
12) Soil texture

Statistical Analysis:

1) Standard error of difference
3) Critical difference
4) Coefficient variation

Economics Parameters:

2) Cost of cultivation
2) Gross returns
3) Net returns

Note: Economics of different soil crust management treatments should be worked out.

- Technologies based on locally-available organic materials like FYM, crop residues and mechanical implements need to be perfected for mitigating the problem of crust formation as the chemicals like super absorbent polymer and goond katira may not be cost effective and also not available in the required quantity. Sprinkler irrigation can be advocated wherever it is possible.
- In the CA-based management, land is not disturbed and the crop residues are spread as mulch on the soil surface. Therefore, there is likely to be less crust formation under the CA-based management.

Reporting: Data sheet of AGR VIII is to be followed. Germination and seedling vigor to be reported with photographs at 20 DAS

Status: Ongoing (Second Year)

Agronomy IX: Standardisation of geometry for Bt varieties

Preamble: Bt-cotton technology is expected to protect the cotton crop from bollworms. Clearly the yield benefits should come from the hybrids or varieties. For best yields, it is important that the hybrids or varieties must be ideally suited for specific agro-eco-zones. For example, the best options for rainfed regions would be early-maturing short-duration straight varieties, which are amenable for high-density planting system also. The newly released Bt varieties are taken for evaluation and suitability and geometry requirement.

Objectives:

- To standardize geometry of released Bt varieties
- To assess seed cotton yield and economic performance of Bt varieties

Implementing Centres	North zone (Hisar, Faridkot, Bathinda, Sriganganagar), Central zone (Nagpur, Surat , Junagadh , Rahuri ,Akola ,Nanded & Khandwa), South zone (Dharwad & Nandyal)

Treatments (Design: Split); (Replications: 3)

North Zone (irrigated)	**Central Zone (rainfed)**	**South Zone (rainfed-Genotype-CICR Bt 23)**
Main plot (spacing)	Main plot (spacing)	Main plot (spacing)
S1. 67.5 X 15 cm	S1. 60 X 15 cm	S1. 60 X 15 cm
S2. 67.5 X 30 Cm	S2. 60 X 30 Cm	S2. 60 X 30 Cm
S3. 80 X 15 cm	S3. 90 X 15 cm	S3. 90 X 15 cm
S4. 67.5 X 60 cm	S4. 90 X 60 cm	S4. 90 X 60 cm
Sub plot (Genotypes)	Subplot (Genotypes)	Sub plot (Nutrient levels)
G1. PAU1Bt	G1. Suraj Bt	N1. 100% RDN (P & K are constant)
G2. PAU2Bt	G2. PKV 081 Bt	N2. 125% RDN (P & K are constant)
G3. PAU 3 Bt	G3. Rajat Bt	N3. 150% RDN (P & K are constant)
G4. CICR Bt 6	G4. GJHV374 Bt	N4. Control (No N , only P & K is to be applied)
	G5. CICR Bt 14	
	G6. CICR Bt 9	
Control: Existing Bt hybrid with recommended spacing and nutrients	Control: Existing Bt hybrid with recommended spacing and nutrients	Control: Existing Bt hybrid with recommended spacing and nutrients

Observations to be recorded (Replication-wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) Sympodial length (cm)
5) No. of bolls/m^2
6) Boll weight (g)
7) Final plant population (no /net plot)
8) Seed cotton yield (kg/ha)
9) Architectural changes due to spacing (LAI, plant height, no. of monopodia and its length, no. of sympodia and its length)

Statistical Analysis:

1) Standard error of difference
2) Critical difference
3) Coefficient of variation

Note: Control plot will be kept for comparison purpose. The design and layout will be planned for main and subplot treatments only.
Bt seeds of 2 kg /each of CICR genotype will be provided by Seed Section of CICR, Nagpur.
RDN - based on soil test value, different levels of N to be simulated.

Reporting: Data sheet of AGR IX is to be followed

Status: Proposed

Agronomy X : Multi-tier cropping system to enhance resource utilization, profitability and sustainability of *Bt* cotton *(Gossypium hirsutum)* production system

Preamble: Cotton is a crop of relatively longer duration and its slow initial growth offers a vast scope for introduction of suitable intercrops. An ideal cotton-based multi-tier intercropping should aim to produce higher economic returns and yields per unit area, offer greater stability in production, and meet the domestic needs of the farmer. The crops with diverse features (growth habit, root depth and duration) are useful in making multi-tier system with Bt cotton to enhance resource-use efficiency , profitability and sustainability of Bt cotton production system.
Objective: To identify better intercropping system for enhanced resource-use efficiency, profitability and sustainability

Implementing Centres	Surat, Junagadh, Rahuri, Akola, Nanded , Bhawanipatna, Khandwa, Raichur, Dharwad, Chamarajanagar, Nandyal , LAM, Coimbatore & Srivilliputhur

Treatment schedule

Design: RBD Replications: 3

T_1. Sole Bt cotton

T_2. Paired row planting of Bt cotton with two rows of intercrop (A)

T_3. Paired row planting of Bt cotton with two rows of intercrop (B)

T_4. Paired row planting of Bt cotton with two rows of intercrop (C)

T_5. Paired row planting of Bt cotton with one row (A) + one row (B)

T_6. Paired row planting of Bt cotton with one row (B) + one row (C)

T_7. Paired row planting of Bt cotton with one row (C) + one row (A)

T_8. Paired row planting of Bt cotton with one row (A) + one row (B) + one row (C)

T_9. Farmers' practice

T_{10}. Recommended intercropping

Observations to be recorded (Replication-wise data to be reported)

1) Plant height (cm) at harvest	2) No. of monopodia at harvest
3) No. of sympodia at harvest	4) No. of bolls/m^2
5) Boll weight (g)	6) Final plant population (no. /net plot)
7) Seed cotton yield (kg/ha)	8) Weed count(No/M^2) and biomass (g/M^2) before weeding at two times

Statistical Analysis:

1.Relative production efficiency (RPE)
2.Relative Economic efficiency
3.Land equivalent ratio
4.Weed smothering efficiency
5.Diversification index
6.Input use efficiency (water, labour & nutrients)
7.Nutrient analysis (N,P & K uptake and availability)

Economics Parameters:

1) Cost of cultivation
2) Gross returnS
3) Net returnS
4) Benefit : Cost Ratio

Note: Pure crop of intercrops to be raised for analyzing the advantage of intercropping
High performing intercrops (three) of the region will be selected for study.

There are practical difficulties in sowing, interculturing, harvesting etc., and mechanization is also difficult. Such systems are labour intensive and can be practiced only by small-holding farmers.

Reporting: Data sheet of AGR X is to be followed. Photographs/images of intercropping are must for documentation.

COTTON PHYSIOLOGY AND BIOCHEMISTRY

PHY 1	PGR for optimum morpho frame and enhanced yield
PHY2	Preparing for climate change - Growth and development of *arboreum* cotton in response to growth regulators
PHY 3	Moisture Stress management through use of different Osmo-protectants
BIO CHEM1	Screening of Cotton genotypes for abiotic stress tolerance and estimation of for seed oil, gossypol and protein
BIO CHEM1A	Screening of Cotton genotypes for drought and salinity tolerance
BIO CHEM1B	Estimation of seed oil, gossypol and protein
BIO.CHEM.2	Bio Chem.2. Biochemical basis of tolerance/susceptible of pest and disease
BIO.CHEM.2A	Bio Chem.2 A. Evaluation of Bt hybrids for biochemical basis of susceptible/ tolerance to sucking pests
BIO.CHEM.2B	Bio Chem.2B. Evaluation of Biochemical basis of resistance against CLCuD
BIO.CHEM.2C	Bio Chem.2C. Evaluation of Biochemical basis of tobacco streak virus

Status: Ongoing (Second Year)

PHY.1: PGR for optimum morpho frame and enhanced yield

Preamble: Plant growth and development are regulated by natural plant hormones; these processes may be influenced either by altering the plant hormone level or by changing the capacity of the plant response to natural hormones. Bt cotton, the plant morpho frame doesn't develop fully due to early switch over to reproductive phase under resource constraints condition. Modification of morpho frame by agrochemicals could greatly help in dispensing away these limitations

Objectives:

- To assess the effect of growth promoters and retardant on productivity of cotton
- To assess the effect of growth promoters and retardant on architectural changes

Implementing Centres	North Zone (Hisar) Central Zone(Surat, Junagarh & Khandwa) South Zone (Dharwad & Lam)

Treatments Schedule

Main plot

G_1. Bt hybrid of the region

G_2. Hirsutum straight variety of the region

Plant growth regulator

B_1. Ethrel @45 ppm at 40 DAS

B_2. Mepiquat chloride @100ppm at 90 DAS

B_3. Ethrel @45 ppm at 40DAS + Mepiquat chloride @100ppm at 90 DAS

B_4. Control (water spray)

Design: FRBD Replications: Three

Observation to be recorded at 40, 90 and 120 DAS and at harvest

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) No. of Bolls/square meter
5) Boll weight (g)
6) Final Plant population (no. /net plot)
7) Seed cotton Yield (kg/ha)
8) Germination per centage, shoot length and seedling vigor
9) Architectural changes due to spacing (LAI, Plant height, No of monopodia and its length, No of sympodia and its length)

Statistical Analysis:

1) Standard Deviation
2) Critical Difference
3) Coefficient variation

Economics Parameters:

1)Cost of cultivation

2)Gross return

3) Net return

Note:

- Cotton is a sensitive and responsive crop to PGRs. The results of 2019-20 showed that combined application of ethrel + mepiquat chloride gave an additional SCY of 3-5 q/ha in SZ, and 2-4 q/ha in CZ.
- Economics of their application should be worked out, and if profitable, these should be demonstrated and promoted on the farmers' fields as a generalized recommendation.

Reporting: Data sheet of PHY I is to be followed.

Status: Ongoing (Second Year)

PHY 2: Preparing for climate change - Growth and development of *arboreum* cotton in response to growth regulators

Preamble: Desi cotton is known for tolerance of abiotic stress. However, the land races are known for photo and thermo sensitive characters. Delay sowing observed excessive vegetative growth with less or no flowering. However delay sowing by late onset of monsoon is not uncommon by climate change. Hence the experiment is proposed to induce flowering by spraying PGRs in desi cotton under delay sowing situation

Objective: To assess the effect of flower inducing PGRs on performance of late sown arboreum cotton

Implementing Centres	**Surat, Khandwa and Junagarh (Central Zone); LAM and Dharwad (South Zone)**

Treatments Schedule

D. Sowing Time

D_1 Normal sowing of the region

D_2 D_1 + 20 days

D_3 D_2 + 20 days

G. Growth regulator

G_1 Control

G_2 Mepiquat Chloride @ 20 g a.i. / ha at 45 &60 DAS

G_3 Salicylic Acid @ 0.5 mM at 45 &60 DAS

G_4 1-Methyl cyclo propene @10g ai /ha at 45 &60 DAS

G_5 2,3,5, Tri iodo benzoic acid (TIBA) @ 100 ppm at 45 &60 DAS

G_6 Triacontanol @0.1 mg/l at 45 &60 DAS

Design: FRBD; Replications: 3

Observation to be recorded (Replication wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) No. of Bolls/square metre
5) Boll weight (g)
6) Final Plant population (no. /net plot)
7) Seed cotton Yield (kg/ha)
8) Days to first squaring
9) Days for 50 % squaring
10) Days for first flowering
11) Days for 50 % flowering
12) No of days for first boll bursting
13) No of days for 50 % boll bursting
14) No of flowers at 50 % flowering and subsequently every 30 days after 50% flowering

Reporting: Data sheet of PHY 2 is to be followed

Status: Ongoing (Third Year)

PHY 3. Moisture stress management through use of different Osmo-protectants

Objective: To study the effect osmo-protectants on moisture stress management under different moisture regimes condition

Implementing Centers	Sriganganagar (I), Faridkot (I), Bathinda (I), Hisar (I) Surat (R), Khandwa (R), Dharwad (R) and Lam (R) (Physiology)

Treatments schedule

Moisture Stress

M1.RD Irrigation (control)

M2. One supplementary irrigation with sowing irrigation

M3.No supplementary irrigation after sowing irrigation

Osmo-protectants (Treatments imposed 60-80 DAS for North Zone and 75% depletion of soil moisture for rainfed condition of other Zones)

1.Control (water spray)

2.Foliar application of Urea-4 sprays@ 2% at weekly intervals

3.Foliar application of KNO_3- 4 sprays @ 2% at weekly intervals
4.Foliar application of Thio urea –Single spray @ 500 ppm
5.Foliar application of Salicylic acid @50 ppm-Single spray
6.Foliar application of Glycine Betaine @100 ppm-Single spray
7.Foliar application of Salicylic acid @ @ 100 ppm-Single spray
8.Foliar application of PPFM@1 % -3 spray at 10 days interval

Design: Split Plot Replications: 3

Observation to be recorded (Replication wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) No. of Bolls/squaremetre
5) Boll weight (g)
6) Final Plant population (no. /net plot)
7) Seed cotton Yield (kg/ha)
8) Man days/ha

Statistical Analysis:
Standard error of difference
Critical Difference
Coefficient variation

Economics Parameters:
1) Cost of cultivation
2) Gross return
3) Net return
4)Benefit Cost Ratio

Physiological observation: RWC, Chlorophyll stability index, Proline content, SLW, nutrient uptake, Stress indices (PHSI, DMSI, YSI and S etc.), Monitoring of Periodic soil moisture profile.

Note: Sub plot treatments only imposed under rainfed condition in rainfed trial
TNAU, CBE will supply PPFM culture.
Buffer channel will be followed under irrigated condition
Reporting: Data sheet of PHY 3 is to be followed.

Status: Ongoing regular programme

Bio Chem 1. Screening of Cotton genotypes for abiotic stress tolerance and estimation of for seed oil, gossypol and protein
Bio Chem1A: Screening of Cotton genotypes for drought and salinity tolerance
Bio Chem1B: Estimation of seed oil, gossypol and protein
Preamble: Pre released cultures are screened for abiotic stress tolerance and estimation of for seed oil, gossypol and protein. The information is useful if released as variety otherwise utilized as pre breeding materials
Objectives:

- To identify genotypes known for tolerance to drought and salinity
- Estimation of seed oil, gossypol and protein content of different genotypes /advanced materials

Implementing Centres	Hisar, Surat , Dharwad and Junagarh

- **Genotypes: Pre-released cultures +Zonal Check +Local Check**
- **Action**: Data should be given in every monthly report.

Observations to be recorded:

- Seed Cotton Yield and ancillary data
- Phenology
- RWC, Chlorophyll stability index, Proline content, SLW, nutrient uptake
- Stress indices (PHSI, DMSI, YSI and S etc.)
- Monitoring of Periodic soil moisture profile
- Oil estimation, gossypol and protein
- Monitoring of soil salinity at initial and final stages
- Leaf Na and K content at peak flowering stage

Note: All the breeders are requested to provide 200 g of pre released genotypes of varieties/hybrids/local check/zonal check including compact cultures directly to Bio chemist of the respective zone with communication to PC & Head, and PI of agronomy and plant breeding

Reporting: Data sheet of Bio Chem.1 is to be followed.

Status: Ongoing (Second Year)

Bio Chem.2 . Biochemical basis of tolerance/susceptible of pest and disease

Bio Chem.2 A. Evaluation of Bt hybrids for biochemical basis of susceptible/ tolerance to sucking pests

Preamble: **S**everal Bt-cotton hybrids, most of which are susceptible to insect pests has resulted in increased damage by sucking pests such as leafhoppers, whiteflies , thrips and mirid bug . Genetic makeup of the plant is very much important to overcome the adversaries of biotic stress due to sucking pests.

Objective: To estimate primary and secondary metabolite/ defensive compounds of Bt hybrids to find out susceptibility of sucking pest attack

Implementing Centers	Hisar, Surat & Dharwad

Technical Programme

Design : RBD

Treatments: Genotypes (Promising 10 Bt hybrids of the region and corresponding non Bt hybrids may be used)

Bio chemical Analysis

- Estimation of primary metabolites (carbohydrates, proteins) for food preference of sucking pests before and after incidence of sucking pest.
- Estimation of biochemical parameters such as tannins, phenols, flavonoids and gossypol before and after incidence of sucking pest.
- Pest count, trichome density and length and leaf thickness by AICRP entomologist

Observation to be recorded

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) No. of Bolls/squaremetre
5) Boll weight (g)
7) Seed cotton Yield (kg/ha)

Statistical Analysis:

1) Standard error of difference
2) Critical Difference
3) Coefficient variation

Note: Principal investigator (Entomology) will give necessary instructions to entomologists for making pest observation

Reporting: Data sheet of Bio Chem.2A is to be followed.

Status: Proposed

Bio Chem.2B. Evaluation of Biochemical basis of resistance against CLCuD

Preamble: Cotton Leaf Curl Disease (CLCuD) is one among the most devastating diseases infecting the cotton plants. The plants have developed inherent, consecutive and induced defense mechanism against the diseases like pre-existing physical and chemical barriers, such as inducible defense responses that interfere with pathogen establishment.

Objective: To assess Biochemical basis of resistance/susceptibility of CLCuD

Implementing Centre	Hisar

Technical Programme

Main Factor: sucking Pest control

P_1 - Protected (recommended control measures for sucking pest)
P_2 - Unprotected (insecticide-NOT sprayed)

Sub factor A: Genotypes (2)

G_1 - Resistant (CLCuD GVS -8 & GVS-9 (CICR, Nagpur)
G_2 -Susceptible (CLCuD HS-6 & F 846 (CCS HAU, Hisar and PAU, Faridkot/Bhatinda)

Sub Factor B :Times of sample analysis (2)

T1.Before incidence
T2.After incidence

Bio chemical Analysis

- Estimation of primary metabolites for different treatment combinations
- Estimation of secondary metabolites/defensive compounds for different treatment combinations

Observation to be recorded (Replication wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) No. of Bolls/squaremetre
5) Boll weight (g)
6) Grading of disease incidence
7) Seed cotton Yield (kg/ha)

Statistical Analysis:

1) Standard error of difference
2) Critical Difference1
3) Coefficient variation

Note: If incidence is not noticed in planned experiment; kindly collect the samples from other experiments/farmers fields of both infected and healthy plants for analysis. Sufficient population of recommended genotypes will be raised for the study.

Principal investigator (Pathology) makes necessary instruction to pathologist for grading of disease incidence

Raise two genotype for each category; which is showing expected results will be selected for analysis

Reporting: Data sheet of Bio Chem.2A is to be followed.

Status: Proposed

Bio Chem.2C. Evaluation of Biochemical basis of Tobacco streak virus

Preamble: Tobacco streak virus is new emerging disease in cotton. Bio chemical basis of tolerance / susceptible of the disease is aimed here

Objective: To assess Biochemical basis of resistance/susceptibility of Tobacco streak virus

Implementing Centers	Surat & Dharwad

Technical Programme

Main Factor: sucking Pest control

P_1 - Protected (recommended control measures for sucking pest)
P_2 - Unprotected (insecticide-NOT sprayed)

Sub factors: Genotypes (2)

G_1 - Resistant (MCU 7, MCU 13 & MRC 7918 BG II)
G_2 -Susceptible (RCH 659 BG II, Ankur 3034, Suvin & MCU 12)

Sub Factor B :Times of sample analysis (2)

T1.Before incidence
T2.After incidence

Bio chemical Analysis

- Estimation of primary metabolites for different treatment combinations
- Estimation of secondary metabolites/defensive compounds for different treatment combinations

Observation to be recorded (Replication wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) No. of Bolls/squaremetre
5) Boll weight (g)
6)Grading of necrosis
7) Seed cotton Yield

Statistical Analysis:

4) Standard error of difference
5) Critical Difference
6) Coefficient variation

Note: If incidence is not noticed in planned experiment; kindly collect the samples from other experiments/farmers fields of both infected and healthy plants for analysis. Sufficient population of recommended genotypes will be raised for the study. If optimum plot size is not followed for genotypes, report the yield data of different entries per plant basis

Principal investigator (Pathology)/PC & Head make necessary instruction to pathologist for grading of disease incidence

Raise two genotype for each category; which is showing expected results will be selected for analysis

Reporting: Data sheet of Bio Chem.2 is to be followed.

The following points were emanated during the discussion:

- In augmenting ELS cotton production trial for finalizing optimal sowing window, the experiment should be conducted for 3-4 years continuously and the performance of crop and fiber quality under varying rainfall conditions should be assessed to finalize the optimal date of sowing for that region.
- In organic cotton trial, emphasis should be made to quantify residue produced and incorporated including cotton leaf fall, biomass, and biomass of sunnhemp and other intercrops attempted in the experiment.
- Considering the long duration and wider spacing adopted for cultivation, good canopy cover, leaf litter fall, availability of suitable herbicides, etc., cotton is a good candidate crop for conservation agriculture.
- In the strategies to mitigate/minimize soil crust formation in cotton in North zone trial, the cost effectiveness of the chemicals recommended is very important. If it is costlier, then alternatives like zero-till sowing, surface application of crop residues, use of pressurized irrigation (drip and sprinkler) systems, permanent bed system, companion cropping with sunnhemp, etc. should be

tried. The economics should be worked out for all treatments and economically viable one will be promoted.

- In standardizing of agronomic requirement trials, three treatments *viz*., absolute control (for working out use efficiencies), local farmers practice and existing recommendation should find a place along with the new treatments so that comparison can be made and conclusions can be arrived at whether the new treatments are really beneficial or not. In the proposed new experiment, the treatments are included as per the above said suggestion.
- Since AICRP trials are of multi-year and multi location in nature, quality publications can be made by properly analyzing the data using appropriate statistical tools.
- While presenting the results of trials, for each experiment some conclusion should be made at the end, so that within 3-4 years, a technology package will be ready for on-station demonstration followed by farmer's field demonstration.
- If possible, the routine agronomic experiments (like date of sowing, intercropping, dose / split of N application, foliar spraying, etc. for which lot of information is already available) should be discouraged and emphasis should be given for increasing the resource (soil, water, nutrient) use efficiency, mechanization for reducing the cost of cultivation, emerging fields like Drone technology and Artificial Intelligence.
- All the agronomic trials should aim at reducing the cost of cultivation, increasing the net profit, and maintaining soil health.
- The treatments of the trial "Evaluation of Biochemical basis of resistance against CLCuD" need to be fine tuned in consultation with the collaborating centre.
- Newly released Bt varieties should be included in development of packages of practices for Bt varieties
- In multi-tier cropping system to enhance resource utilization, profitability and sustainability of Bt cotton (*Gossypium hirsutum*) production system trial, flexibility in selecting the number of intercrop (either one or two or three) should be given to the collaborating centres.

Chairman:

Dr. A.R. Sharma made the following points on the Technical Programme of Agronomy:

- Planting geometry and fertilizer requirements of cotton genotypes change with growth habit, growth duration, yield potential as well as with soil type and native soil fertility. Accordingly, the location-specfic results should be interpreted based on the interaction data of spacing x genotypes, and fertilizer rates x genotypes, instead of making general / sweeping statements as in the report of 2019-20 like '*All genotypes gave the highest yield with fertilizer dose of 125% RDN and spacing of 60 x 10 cm'despite the significant 2-factor interactions.*

- Studies on optimizing the sowing time for specialty cotton in a given region should be based on mutli-season data (at least 4-5). A critical analysis of the rainfall pattern and other weather variables vis-a-vis the growth stages should be made. Quality characteristics of specialty cotton as influenced by sowing time should be worked out.

- Cotton is a nutrient demanding crop. For organic cotton production to be economically-viable, the organic matter must be produced and recycled *in situ* besides the use of biofertilizers and PGRs. Intercrop residues, cotton biomass, sequence crop residues wherever possible must be ploughed back to enrich the soil fertility. All efforts should aim at achieving yields nearly equal to the INM practice after the initial period of say 4-5 years.

- Cotton is a very good candidate crop for CA because of its good canopy cover after some slow initial growth, longer duration, litter fall, deep root length, wider row spacing, availability of herbicides for weed control provided suitable machinery for sowing, interculturing, fertilizer application, spraying, and if possible for harvesting as well is perfected. Initial results of different centres are highly encouraging and must be carried forward to develop a technology and make it a reality at the ground level. Introduction of HT-BT cotton can make a big contribution for the promotion of CA in India as it has done in many countries of North and South America.

- Crust formation and inhibited seedling emergence is a localized problem in certain soil types under aberrant weather conditions. Use of chemicals like super absorbent polymer and goond katira is cost prohibitive. The problem can be overcome to a great extent with suitable mechanical implements, CA-based management (zero-till + residue mulch), raised-bed planting, and pressurized irrigation systems (drip and sprinkler).

- In an experiment besides including an absolute control (no weeding, no fertilizer etc.), inclusion of a treatment of current farmer's practice of the area/ region, the recommended practice (based on existing knowledge / technology) is essential so as to compare the new interventions with these standards. It is then only you will be able to quantify the benefit or otherwise of any new practice over the previously recommended and current farmer's practice.

- Innovative methods of data analysis and interpretation like contrast and pooled analysis, working out resource-use efficiency (soil, water, nutrient, weeds, energy) to generate secondary data will lead to greater acceptability of the information for publication in highly-rated journals.

- Each experiment should lead to definite conclusions at the end, and the findings over a period should lead to development of technology package which can be adopted and demonstrated on large areas. Scientists should be the first adopters of the technology developed by them, initially at their own research farms, followed by its replication on the farmers' fields.

- Routine merry-go-round type of research in agronomy for which the results are well known, e.g. intercropping, dose / split N application, foliar application, growth regulators, plant population requirements, flood irrigation etc. should be avoided, except in very specific cases. Innovative approaches aimed at improving resource-use efficiency and reducing cost and drudgery like pressurized irrigation (drip and sprinkler), biomass production and recycling *in situ*, conservation agriculture, and mechanization of farm operations for cotton cultivation should be given emphasis.

- Application of drone technology and artificial intelligence in resource management is likely to be a reality in not so distant future. Expertise in these areas is required to be developed through a multi-disciplinary team of young scientists by providing them training in India and abroad.

Co-Chairman:

- Some of the trials are mandatory as the breeders develop new varieties and a basic agronomy trial has to be conducted. For treatment on farmers practices, it will be difficult as the trials are already in fifth year.
- For the experiments which have completed 4-5 years, pooled analysis can be carried out and the soil analysis has to be done to get clues on whether the resources are getting improved or getting depleted.
- Soil crust trials - super absorbent materials are costlier so the practice of sowing sunhemp and removing it manually can be done. In conservation agriculture, the crust is taken care of by itself itself.
- Doubling of farmers income need not be made as separate area since all the agronomy projects are basically on reducing the cost of cultivation and increasing the farmers income.

Dr. Shankarnarayanan: In the new project managing the biochemical basis of resistance against CLCuD here both susceptible and resistance entries will be grown with and without prophylactic measures and when the disease incidents are found the samples will be collected and the metabolites will be analysed.

Dr. Sharma: Bring out science from the experiments and quality publications. Results of CA experiment in different locations are encouraging as there is no penalty on yield at any of the centres . Therefore, this kind of research should be strengthened and outscaled on larger areas.

Dr. VN Waghmare: The Bt varieties identified can also be included in the programme.

Due Date for submission for Data (Zone wise)

North Zone Centres	December 31, 2020
Central Zone Centres	January 15, 2021
South Zone Centres	January 31, 2021

Session V: Entomology Panel

Chairman	:	**Dr. T.M. Manjunath** Former Director, Monsonto Research Centre, Bengaluru
Co-Chairman	:	**Dr. Nandini Gokte Narkhendkar** Head, Crop Protection, ICAR-CICR, Nagpur
Convener	:	**Dr. (Mrs) B. Dharajothi,** Principal Investigator (Entomology) ICAR- AICRP on Cotton **ICAR-CICR, Regional station, Coimbatore.**
Rapporteurs	:	**Dr. K.Shankarganesh**, Sr.Scientist **ICAR-CICR, Regional station, Coimbatore.**

Chairman: Several genotypes showing tolerance to sucking pests in different zones have been identified.These genotypes have to be exploited as early as possible and combined with Bt so that the farmers can get the benefit of both the traits.

Pink Boll worm has started showing resistance to Bt cotton in several areas for the past two to three years and this is primarily due to non-compliance of refuge planting. To overcome this limitation, the government has approved mixing the non-Bt cotton seeds with Bt cotton seedsand make these available to the farmers from this year (2020). The entomologists can start studying the pros and corns of such 'seed mix'right from the beginning. Several products have been evaluated for integrated pest management and recommendations made, but the cost-benefit ratios are missing and these could be incorporated. The Bt cotton technology developed by Monsanto-Mahyco continues to be used in India for the last two decades as no success has been achieved so farin developing transgenic Bt cotton in India itself. Nevertheless, the research in this direction should be pursued. Further, cotton entomologists and molecular biologists should join together and try to develop transgenic cotton cultivars incorporated with Bt genes or non-Bt genes or a combination of boththat exhibit combined resistance to both boll worms and sucking pest in our country. No technology can lost forever and, therefore, research should be an ongoing process. In case no new technology could be developed indigenously, it can be obtained from outside and made it available to farmers. The chemical insecticides are not given any importance in screening against bollworms. These could be included in future trials so that effective insecticdes thus identified become handy in times of emergency. In IPM,chemicals also form one of the components though as a last resort. Besides *Trichogramma*which is presently recommended for control of bollworms, other biological control agents like Chrysopids, Atthocorids and ladybird beetles may also be considered for controllingsucking and other pests. There is an AICRP on Biological Control.The cotton scientists should interact with them for getting input for IPM. Scientist may focus more on product development instead of laying over-emphasis on publishing papers.

Chairman's remarks/ suggestions:

1. The Chairman remarked that it is very encouraging that several genotypes showing tolerance to leaf hoppers/sucking pests have been identified. Efforts should be made to exploit this trait in combination with Bt so that the cultivar thus developed can give protection against both bollworms and sucking pests.

This need has been felt ever since Bt cotton was first commercialized in 2002 and, therefore, should be made available to our farmers without any undue delay.

2. He mentioned that one of the reasons attributed for development of resistance to Bt cotton by pink bollworm is the non-compliance of refuge planting. In order to overcome this, the government has approved implementation of 'refuge-in-seed-mix' for Bollgard II from this year (2020). Some well-planned studies are required to assess the pros and cons of this approach right from the first season of its introduction. He suggested designing suitable experiments and sampling techniques to obtain some solid data on this aspect (seed-mix) and offered to examine the plans and provide his input if any.

3. He also suggested to evaluate some recommended insecticides against bollworms as these may become handy in times of emergency.

4. Several products have been tested and recommended for IPM. The cost of such package may be indicated along with benefits.

5. New technology: Concerted efforts should be made to develop indigenous new insect resistant transgenic cotton, with Bt genes or non-Bt genesor a combination of both, to gradually replace the prevailing Bt cottons (Bollgard and Bollgard II) if the bollworms develop complete resistance to them. No success seems to have been achieved in the last two decades. Alternatively, the next generation of Bt cotton (say Bollgard III and so on) developed elsewhere may be obtained on a mutually beneficial terms so as to benefit the farmers. Otherwise, a big lacuna is likely to be created, taking us back to the pre-Bt cotton era.

6. Among biological control agents, only *Trichogramma* is presently included under recommendation. Predators like Chrysopids, Anthocorids and ladybird beetles which are very helpful, especially in controlling sap-sucking pests, may also be considered and tested in collaboration with NBAIR.
7. HT-BT Cotton: Farmers in Maharashtra and elsewhere have started cultivating HT-BT cotton on large areas illegally, defying the government order. They argue that this technology is badly needed and beneficial to them. The AICRP on Cotton may examine the merit of this case and make suitable recommendation to Govt. of India. Otherwise, the situation may lead to confrontation with farmers and turn ugly.

8. He also suggested that testing Bt formulation in Bt cotton should be discouraged to avoid the development of resistance by bollworms to Bt cotton. Dr. C.D. Mayee advised to concentrate on fall army worm while evaluating Bt formulations and also to monitor during surveys. Dr.V.N. Wagmare,Director,CICR, Nagpur, suggested includingBt varietiesand non-Bt varieties in the screening trials. Dr. V.S.Nagrare advised that in the future insecticide evaluation trials, the banned insecticides are not to be considered. Dr.Chinna Babusuggested to include other species of *Trichogramma* in the IPM trials.

Dr.B. Dharajothi, PI, AICRP Entomology, presented the details of the experiments to be conducted during 2020-21 and the changes to be incorporated in various experiments. During the session, each and every trial of the technical programme was thoroughly discussed and the suggestions and changes from the participants and panel members were incorporated and finalized as under.

AICRP-ENTOMOLOGY TECHNICAL PROGRAMME for CENTRAL AND SOUTH ZONES-2020-21

Sl. No.	Title of the Experiment	Participating Centers
Ent 1a	Screening of breeding material for resistance to insect pests (National and Zonal Trials)	All centers of south & central zone
Ent 1b	Advanced screening of promising entries for development of repository for sucking pests	Central Zone : Surat, Nanded, Junagadh, Rahuri. South Zone : Dharwad and Raichur
Ent 2	Seasonal dynamics to develop suitable forecasting model	All centers of south & central zone
Ent 3	Survey for key and emerging pests in cotton in farmers fields for weekly advisory	All centers of south & central zone
Ent 4	Management of sucking pests in cotton.	All centers of south & central zone
Ent 5	Validation of IPM module for cotton insect pests	
Ent 6	Evaluation of new microbial formulations against bollworm complex of cotton	Central Zone : Surat, Nanded, Junagadh, Rahuri South Zone : Nandyal, Warangal, Dharwad, Raichur

TECHNICAL PROGRAMME DETAILS

Ent. 1a: Screening of breeding material for resistance to insect pests (National & Zonal Trials) (All Centres of Central and South Zones)

Check entries for the different zones:

Central Zone: NDLH-1938 (jassid resistant); DCH 32, (susceptible to Leaf hopper) & Suraj susceptible bollworms) Ajeet 155BG II (bollworm resistant).

South Zone: NDLH-1938 (Leaf hopper tolerant); DCH 32(susceptible to Leaf hopper) & Suraj (susceptible to bollworms), Jadoo BGII (bollworm resistant)

(Action: Seeds supply – Sr Cotton breeders of their respective centres, Dr.Rishi Pareek (Suraj),DR. Hugar-DCH 32, Dr Shivarama krishna NDLH-1938 (Sri Rama). will supply the respective seeds.

Note: Include check entries without seed treatment as that of coded entries
Find out resistant/tolerant entries (reference to varieties)
Shortlist resistant/ tolerant entries-based on only grading as tolerant/susceptible.
Collect seeds for advanced screening trial

Besides the zonal trials, entomologists of all centres should observe the National Trials (Breeding/ Pathology) for healthy plants from point of sucking pests up to 70 DAS and at harvest and tag them, report them and collect seeds for further screening in the next year.

Ent. 1b: Advanced screening of promising entries for development of repository for sucking pests
Centres: South zone (Dharwad, Raichur) Central zone (Surat, Junagadh, Rahuri & Nanded)

S.No	Central	South zone
1.	AKH 09-5(Akola)	AKH 09-5 (Akola)
2.	AKH 2006-2(Akola)	AKH 13-01(Akola)
3.	DCH 32 (SC)(Dharwad)	AKH 13-52(Akola)
4.	GJHV 497(Junagadh)	AKH 2012-84(Akola)
5.	GJHV 516(Junagadh)	BGDS 1033 (Raichur)
6.	GSHV 173(Surat)	CNH 09-62 (Nagpur)
7.	GISV 310(Surat)	CPD 1652 (Dharwad)
8.	GISV 319(Surat)	DCH 32 (Dharwad)
9.	JK 4 (CICR, Nagpur)	GBHV 195 (Bharuch)
10.	JK 5 (CICR, Nagpur)	GISV 272 (Surat)
11.	Khandwa 2 (RC)	GISV 319 (Surat)
12.	LHDP 1 (ANGRAU, Lam)	GJHV 523 (Junagadh)
13.	NDLH 1938(Nandiyal)	GSHV 185 (Surat)
14.	NDLH 2010(Nandiyal)	NDLH 1938 (Nandiyal)
15.	TSH 0499(TNAU Svpr)	RAHC 1039 (Rahuri)
16.	BGDS 1063(Raichur)	RAHC 1040 (Rahuri)
17.	GISV 267(Surat)	TCH 1897 (TNAU CBE)
18.	GISV 272(Surat)	TSH 332 (TNAU Svpr)
19.	Phule 388 (Rahuri)	KC 3 (TNAU Kovilpatti) Shasi kumar
20.	Phule 492 (Rahuri)	
21.	Phule 688 (Rahuri)	
22.	Phule Yamuna (Rahuri)	

- Protocols for testing morphological and biochemical aspects will be provided by PI Entomology.
- **Centres mentioned against the respective genotypes have to supply the seeds to the six centres where the trial will be conducted.**
- Above selected entries have to be screened in common trialand evaluate further. The large scale testing (3 rows) will be carried out in two replications along with the susceptible and resistant checks.

Ent. 2: Seasonal dynamics of insect population to develop suitable forecasting model ----(All Central and South zone centres)

Data should be taken for both sucking pests and bollworms from and DCH32 and BG-II for Central and South India.

S.No	States	Genotypes for sucking pests	Genotypes Bollworm		Centres
			Non BT	BG-II hybrids	
1.	Rajasthan	DCH 32	SURAJ	RCH-2BG-II	Banswara
2.	Gujarat	DCH 32	SURAJ	RCH-2BG-II	Surat (I), Junagadh, Bharuch
3.	MP	DCH 32	SURAJ	RCH-2 BG-II	Khandwa
4.	Maharashtra	DCH 32	SURAJ	Ajeet 155 BG II	Nanded, Akola, Rahuri
5.	Odisha	DCH 32	SURAJ	----------	Bhawanipatna
6.	Karnataka	DCH 32	SURAJ	Jadoo BG II Bahubali BG II	Dharwad, Raichur, Chamarajnagara
7.	AP	DCH 32	SURAJ	Jadoo BG II	Guntur, Nandyal
8.	Tamil Nadu	DCH 32	SURAJ	Jadoo BG II	Coimbatore, Srivilliputhur

- ***Experimental layout:*** At least 3000-4000 sq. meter plots (as per availability) be sown for the studies on seasonal dynamics. Divide the plot into 2 half each (both under protected and unprotected condition Keep one half untreated (for sucking pests) and apply required sprays of neonicotinoids (imidacloprid/ acetamiprid/ thiamethoxam/ clothianidin) in the other half as per requirement to keep the population of leafhopper under control, along with Gaucho seed treatment so that the observations for the bollworm can be taken. Collect 150 bolls from each variety and hybrid at 120, 140 and 160 DAS and send the bolls to CICR, Sirsa (North) and CICR, Nagpur (Central) for further recovery of bollworms, particularly the PBW.
- Monitor for the presence of dead pink bollworm larvae beginning 90 DAS to 150 DAS record the egg parasitism of PBW and percentage of parasitism and observe for the emergence of endoparasitoids at each centre.
- Observations to be recorded: Weekly observations for aphid, jassid, whitefly, thrips (3 leaves/plant), mealy bug, ABW, SBW, PBW and associated natural enemies after one month of sowing (Natural enemies to be recorded species wise).
- Any unusual survival and higher levels of infestation must be notified to PI immediately by mail or phone. The surviving bollworms (*Helicoverpa armigera* and *Pectinophora gossypiella*) larvae both from Bt and conventional cotton will be brought to the laboratory. From North Zone the larvae shall be sent to Dr. Rishi, Sirsa, Central Zone to Dr. Chinna Babu, Nagpur for carrying out resistance monitoring bioassays.
- Dr. S V Hugar, Dharwad will supply the untreated seed of DCH 32 to the concerned centres directly.
- Monitoring of bollworms across the country, through Pherosensor-TM Sleeve-SP traps and lures uniformly sourced from concerned company (pheromonechemicals@gmail.com 9440897918 Mr Raghu Nath Kaja) source may be carried out during the season and off season and data may be recorded. Care must be taken to change lures at recommended frequency.
- Use of sleeve cages to study parasitoids of whitefly (Sirsa, Faridkot, Hisar, Nagpur and TNAU Coimbatore)

Ent. 3: Survey and surveillance for key and emerging pests in cotton in Farmers Field for weekly advisory (All Centers).

All the centers are requested to collect weekly information on the infestation of the pest on farmers fields and inform through mail to the PI, Entomology for further publishing the information through weekly advisory. The centre Co-PI are requested to send the raw data also as per the seasonal dynamics experiment proforma.

Ent 4 : Management of sucking pests in cotton.

S.NO	Name of the insecticide/ Treatment	g.a.i /ha	Dosage in ml /ha
1	Spinetoram11.7%	50	420
2	Pyriproxyfen 10% EC	100	1000
3	Dinotefuran20%SG	30	150
4	Spiromesifen 240 SC (22.9%)	144	600
5	Diafenthiuron 50WP	300	600
6	Flonicamide 50% WG	75	150
7	Imidaclopride 200 SL (17.8%)	25	125
8	Control	--	----

Relpications : Three

Bt Hybrids recommended for the trial

- South zone: **Jaadoo(KCH-14K59)**
- Central zone: **Ajit 155 or Ajit 199**

Observations:

- **Population of Leafhopper, Aphids, Whitefly, Thrips and any other sucking pests,** natural enemies, damage and phytotoxicity symptoms before spray and 3, 7 and 14 days after each spray to be recorded.
- Seed cotton yield at the end of the trial to be recorded.
- Percentage of yield loss over control to be calculated.

Ent 5 : Evaluation of new microbial formulations against bollworm complex of cotton

Central Zone : Surat, Nanded, Junagadh, Rahuri

South Zone : Nandyal, Warangal, Dharwad, Raichur

S.No	Treatments
1	Bt-127 SC formulation @2.0 ml/litre
2	Bt-127 SC formulation @3.0 ml/litre
3	Bt-127 SC formulation @4.0 ml/litre
4	Brigade-B (WP formulation) @ 3 gm/litre
5	Brigade-B (WP formulation) @ 5 gm/litre
6	Brigade-B (WP formulation) @ 7 gm/litre
7	Chlorantraniliprole 18.5 SC @ 0.3 ml/litre
8	Untreated check

Variety : Local popular non Bt hybrid susceptible to bollworms

Time and No. Spray: First spray after observation of 10% of fruiting body damage followed by 3 sprays at 15 days interval.

Replications -3

Observations:Observations: Larval, natural enemy populations, fruiting body damage and phytotoxicity symptoms before as well as 3, 7 and 14 days after each spray and seed cotton yield at the end of the trial to be recorded.

Ent 6 : Validation of IPM module for Bollworms(*H.armigera*,*Earias sp*,*P.gossypiella* and *Spodoptera litura*

Centres: All South and Central zone centres.

1.	Timely sowing	
2.	Installation of pheromone traps at 45 DAS	5 per ha
3.	Neem based formulation	1500 ppm
4.	Release of ***Trichogramma bactarae*** *and* ***Trichogramma chilonis***(thrice at weekly intervals) starting 50 DAS (at least one week after S. # 3). Release again in Oct- Nov when trap catches reaches 10/trap for continuously 2-3 days) ***Release of Chrysopids*, and ladybird beetles**	1.5 lakh/ ha ****as per recommendation from NBAIR**
5.	ETL (10 % fruiting body damage or) based application of recommended insecticides	Thiodicarb spraying at 60 DAS, Chloropyriphos spraying at 90 DAS and Lambda- Cyhalothrin at 120 DAS)
6.	Timely termination of crop	
7.	Use of Yellow sticky traps at 30 DAS @8 per acre,	
8.	Stem application of Flonicamid 1:20 at 30, 45 DAS	
9.	For sucking pests apply Flonicamid/ Dianoteferon, Diafenthurion in recommended doses at ETL	

Restrict the use of SPs 120 DAS

Check: Farmer's practice
Observations:

- Record of infestation of **all the bollworms** and damage , natural enemies population, yield & economics (Net return/ha in Rs.).
- If any bollworm is not occurring nil report to be recorded.
- ** **Principal Investigator to contact NBAIR and ensure the availability of the *Trichogramma bactarae, Trichogramma chilonis, Chrysopids*, and ladybird beetles and also recommendations for time of release, quantity to be released ect and inform the centers accordingly.**
- **Hybrid:** Popular hybrid of the region, same hybrid in IPM module and Farmer's practice.

Attention to The Principal Investigator, Entomology

- **As per the recommendation of the Chairman of the advisory committee a new trial has to be planned next year 2021-22 for 'refuge-in-seed-mix' for Bollgard II including suitable experiments and sampling techniques**.

*Chairman:*Bt formulations are being evaluated, it is recommended that Bt formulation and transgenic bt should not be combined for resistance management.

Dr. B. Dharajothi: This was combined to have a control over pink boll worm

*Dr. VN Waghmare:*For screening for sucking pests, hybrid is used as susceptible check.Instead,variety can be used as check and a resistant line could also be included and this could be changed as and when there are new source of resistant lines. Include varieties instead of hybrids

Include a programme for fall army worm as a seperate programme or as a component in the programme itself and monitor the pest.

*Chairman:*Experiments may be conducted to study whether the Bt proteinsproduced in the commercialized Bt cotton are effective against fall army worm.

Dr. CD Mayee: Survey should include fall army worm as a priority

Dr Chinna babu: Similar to the observations recorded in experimental fields, the observations should also be taken in farmers field.In the validation of IPM trials, in addition to bacteria, other biological control agensts may also be added.

Dr. Nagrare: With thebanning of a few insecticides, is it possible to replace them with other insecticide. It could be changed from the next year

Session V: Pathology Panel

Chair: Dr. C.D. Mayee, Chairman Programme Advisory and Monitoring Committee
Co-Chair: Dr. Dilip Monga, Ex. Head ICAR-CICR Regional Station, Sirsa & PI- Plant Pathology-AICRP on Cotton
Convener: Dr. Satish Kumar Sain, Sr. Scientist (Plant Pathology), AICRP on Cotton
Rapporteur:
Dr. Dr A. Sampath Kumar, Scientist (Plant Pathology), ICAR-CICR Regional Station, Coimbatore

Chairman Remarks:

- Change some of the titles of the project, Epidomology studies is a regular phenomenon, occurrence of diseases with roving survey where ten fields will be selected in all direction and ten plants from each field will be selected, that will be surveyed for three crop stages.
- Occurrences of diseases in research farm, here five stages of crop and all diseases could be surveyed.
- Disease progress curve and infection rate: Here disease progress curve can be worked out in the later stages look for prediction. In North, think of developing prediction for CLCUV not for other disease which is of economical significance.
- In central zone grey mildew and bacterial blight should be concentrated. Racial picture of grey mildew could be worked out by CICR with materials form arboretum and hirsutum.
- In south Zone tobacco streak virus is disease of importance. See the severity and losses caused by TSV, make collaborations with IIHR or IARI and study the virological aspects
- Screening for breeding lines new resistance lines or highly susceptible lines could be reported.
- Artificial screening centers developed like Cotton leaf curl in CICR Sirsa, Bacterial leaf blight in PDKV Akola, Alternaria in MPKV Lahori, Myrothesia in Khandwa, Grey mildew in Dharwad, can it be developed in central zone too as grey mildew is now found in central zone also.
- Mysurium resistant lines need to be maintained identified over years by Pune centre.
- Monitoring of resistance remove the word 'Break down'
- Are the line resistant to whiteflies, lines resistant to whitefly might be susceptible to viruses and vice versa as whitefly is not only a vector but also a pest to cotton crop.
- Soothy mould is not serious but studies on boll rot could be initiated which are already affected by insect pests. Fungicides banned should not be used in the trials.

During introductory remarks Dr. C.D. Mayee Chairman, gave his comments and suggestions to be incorporated in the technical programme.

He suggested that the title of the Path.1. Experiment should be modified as observations on the occurrence of the diseases (in farmer's field and research farms) instead of Epidemiological studies on cotton diseases. He said that generally roving survey should be conducted in the farmers' fields at three crop growth stages (during early, mid and late season). Observations should be recorded from 10 farmers'

fields for each location (10 plants/field). Apart from this disease observations at on-station should also be recorded at five crop growth stages.

For the Experiment Path.1(b) on disease progress in relation to weather factors, he mentioned that focus should be concentrated on CLCuD and some epidemiological model or empirical model to be developed on CLCuD for North Zone using long term data. Dr. D. Monga suggested that already developed prediction models for important diseases in the respective zones must be validated.

Further, Dr. Mayee, accentuated that in Central Zone – emphasis should be given for Grey mildew followed by Bacterial blight, while in South Zone – emphasis should be on Grey mildew specifically on Bt hybrids. Study the real extent of incidence and losses by Grey mildew as it is emerging.

For the experiment Path 1(d) Survey and Epidemiology of TSV, he pointed out that the continuous monitoring of TSV should be continued with more focus in South zone followed by Central and North zone. He also stressed that studies on basic research on TSV -characterization, transmission, vector relationship, host range etc. should be conducted by CICR Nagpur,& CICR RS Coimbatore in collaboration with the experts of other institutes like IIHR, IARI.

For the experiment Path. 2: (a) Screening of breeding lines for disease reaction, he made a point that resistance and susceptibility reactions must be reported clearly with PDI.

For the experiment Path.2 (b) Confirmation and maintenance of disease resistant lines, he stressed that updating of screening facilities are required. Grey mildew artificial screening facility should be established at CICR Nagpur and Fusarium wilt is not a problem nowadays due to negligible desi cotton area so the activity can be kept as halt at Pune and the resistance sources can be maintained.

For the experiment Path 2(c), Dr. Mayee suggested to change the title monitoring of resistance against CLCuD instead of monitoring of breakdown of resistance against CLCuD. He pointed out that whitefly population data should also be recorded so as to know whether the entries are resistant/ tolerant to CLCuD or whitefly. An Entomologists should be attached for this activity to know that entries are resistant/susceptible to virus and or its vector whitefly.

Under the experiment Path.3: Management of Diseases, Dr. C.D. Mayee emphasized that banned fungicides like thiram, mancozeb and carbendazim should be excluded and a new experiment on "Management of boll rot and foliar diseases of Cotton through CIB&RC recommended new chemical pesticides and their combinations" should be formulated for six locations (4-6 chemical fungicides, two location each in North, Central and South Zone) for 2-3 years. He stressed that the experiment should be planned by Dr. Shailesh Gawande in consultation with Dr. Mayee, PC and PI using local popular BG-II hybrids.

As, stressed by Dr. RK Singh, ADG, that there is a need to estimate the extent of disease severity caused by fungal & bacterial foliar diseases and new emerging diseases in cotton and fix the benchmarks for identification and release of hybrids and varieties, modified plan under experiment Path 1(b) was planned.

Dr. D Monga, emphasized that under disease management experiment the best performed bioagent should be registered with CIB&RC and should be available to farmers. He also emphasized that monitoring of *Corynespora leaf* spot and TSV must be continued as these diseases are emerging in cotton.
Dr. Sain, presented the Plant Pathology report 2019-20 and technical programme 2020-21. He highlighted the achievements made from different centres of AICRP and CICR under the AICRP cotton Pathology programme during 2019-20. He explained to house about thematic research programmes under AICRP Plant Pathology program 2020-21.

Path.1: Epidemiological studies on cotton diseases (Long term-continued)

Path. 1(a): Observations on the occurrence of the diseases (in farmer's field and research farms) - (All centers* except ICAR-CICR Sirsa). (Long term)

All information regarding major / minor / new emerging (e.g. Tobacco streak virus disease, *Corynespora,Helminthosporium* Leaf spot and *Cercospora* leaf spot etc) diseases have to be reported.

Locations:

North Zone: (PAU, Faridkot; PAU, Bhatinda; CCSHAU, Hisar; ARS (SKRAU), Sriganganagar)
Central Zone: ARS (MPUAT), NAU, Surat; CRS (JAU), Junagarh; Dr PDKV, Akola; CRS,(VNMKV), Nanded;
South Zone: TNAU, Coimbatore; ANGRAU, Guntur; RARS, Warangal; UAS, Dharwad.

A. Farmer's field observations:

Number of the survey: during early, mid and late season

Observations: Minimum 10 locations each in farmers' fields as per the earlier finalized AICRP standardized protocols. In each location, 10 fields (10 plants in each field) should be observed for disease observations. The disease occurrence in organic cotton and high-density planting trials conducted at different centres should also be recorded and reported by the concerned Pathologists. In representative areas, the names of varieties or hybrids raised under farmer's holdings also need to be recorded. Information on various nematode diseases causing losses in cotton may also be recorded in association with experts of AICRP on nematodes or other university scientists during the surveys.

B. Observations at On-station

Number of Observations: Five times during different plant growth stages

Note: Name of the district surveyed and the approximate cotton area in that district may be added in the table. The centres carrying surveys on the occurrence should mention the jurisdiction of the university along with names of the districts covered.

Path.1(b): Disease progress in relation to weather factors (All centers) (Long Term-Continue with modifications)

The experiment will continue as per the modified procedure suggested. Each centre will focus on the most important disease on a susceptible variety/hybrid or Bt hybrid for correlation. Further, it was decided that the validation of the developed prediction equations has to be confirmed at all respective canter's in central (Gray mildew, Bacterial leaf blight) and South Zone (Gray mildew- *G. arboreum & G. hirsutum*) (Suggested By Dr CD Mayee & Dr D Monga)

Locations for validation of prediction models:
1. CLCuD by Sirsa, Hisar and Faridkot centre, 2. Alternaria bight at Rahuri & Guntur, Akola, Junagarh, Nanded, Dharwad centres, 3. Bacterial blight at Guntur, Surat, Junagarh, Nanded, Dharwad, 4. Rust at Guntur centre and 5. Grey mildew at Parbhani, Nanded, Junagarh, Dharwad& Guntur Centres will be validated in the respective zones by other centres during 2020-21 where the diseases are prevalent, with their existing data. Following centres were requested to develop the prediction models based on the collection and collation of the existing and current data.

Note: To understand the extent of disease severity (PDI%) at the on-station trials 1-2 BG-II hybrids and 1-2 susceptible hybrid/varieties are to be sown at each location (500m^2 each) and the weekly data on disease incidence and severity need to be recorded. The disease severity (PDI) data will be utilized in fixing of bench marks for identification and release of the varieties/hybrids (except CLCuD)

Following centres will also record the data on below mentioned Disease for benchmark purpose :
Tobacco Streak Virus: Guntur, Coimbatore
Corynespora leaf spot: Guntur, CICR-Nagpur
Grey Mildew: CICR-Nagpur
Fungal Foliar Spots: Bhatinda, Sriganganagar, Hisar

1. North Zone - Pool the existing data on CLCuD and develop prediction models for the region. (Action: Dr. Manmohan Singh, CCSHAU, Hisar with the help of Statistician of the University)

Note: Sriganganagar center is required to collect and provide the weekly data of whitefly/ per three leaves along with CLCuD incidence/PDI as it is not being provided during the previous years.

Note: The regression equations developed by few centres and compiled as a bulletin based on long term data. Following regression equations have been developed for below-mentioned diseases by the centres are as follow:
1. *Alternaria* blight, bacterial blight and rust at Guntur centre, and Grey mildew at Nanded & Guntur Centres will be validated in the respective zones by other centres during 2020-21 where the diseases are prevalent, with their existing data.
Following centres were requested to develop prediction models based on the collection and collation of the existing and current data.
1. Central Zone - Akola centre will collect bacterial blight data from the central zone, pool it and develop prediction models for the disease. 2. Dharwad and TNAU Coimbatore will also attempt prediction equations of important diseases with available long-term data.
The exercise will be completed and disease wise regression models will be developed within the next season.
Path.1(c): Studies on the variability of *Alternaria* leaf spot (All centers*)
Two centres in each zone will collect 4-5 isolates and send to TNAU, Coimbatore for morphological characterization.

Centres: Bhatinda, Hisar, Nagpur, Junagardh, Guntur, Dharwad and Coimbatore
All the scientists from different centres should collect the cultures of *Alternaria* isolates from the leaf blight samples (**Atleast 5-10 samples from different locations**). One set of all isolates is to be sent to PI Plant Pathology who will coordinate the identification and further registration process and another set to TNAU, Coimbatore. The pathogenicity and taxonomy for diversity analysis of *Alternaria* at species level will be carried out by Cotton Pathologist at Department of Cotton, Tamil Nadu Agricultural University, Coimbatore – 641 003.
***At least following characteristics may be used for variability study: Morphological studies, Virulence studies – Host range and Biochemical studies**

Path. 1(d) Survey and basic studies of TSV

A. Basic Studies:
Basic studies on characterization, transmission, host range etc are to be conducted by CICR- Nagpur, CICR-RS Coimbatore in collaboration with other institutes IIHR, IARI (Suggested by Dr. CD Mayee Chairman PAMC)

B. Continuous Monitoring
Survey locations: Centers-Lam, Guntur, TNAU, Coimbatore, TNAU, and Dr PDKV, Akola; CRS, Nanded; MPKV, Rahuri,ICAR-CICR (RS), Sirsa and CICR, Nagpur) **(Since 2009-10)**
Survey for occurrence of TSV from major cotton growing tracts of different districts in the states mentioned above will be carried out. Area wide TSV incidence may be recorded to have idea on threat perception.
There are reports on occurrence of TSV in north zone. Cotton pathologists of north zone should be alert and careful to record such observations during the season. Molecular characterization for disease confirmation will be done at ICAR-CICR, RS, Sirsa and CICR, Nagpur.
Tentative disease rating scale (0-4) which was finalised during last Annual Group Meet 2018-19 for TSV will be validated. Rating scale will be devised based on the extent of losses.

Path. 2: Screening of AICRP entries for disease reaction (continued)
Path. 2: (a) Screening of breeding lines for disease reaction (all centers)

North Zone Centres: Both National and Zonal entries*
*Only National entries at CICR, RS, Sirsa

Central and South Zones: National and Zonal entries
Susceptible check for each important disease (Common or individual) should be maintained in each screening trial at all the centres.

Observations:
Observations will be taken for the occurrence of CLCuD at 100 DAS. All the centres will calculate CLCuD PDI by dividing the average grade of the test entry with highest grade i.e. six (6) (0-6 rating scale). In the case of FFS and BLB, the Grade Average of 10 leaves per plant and five plants per replication should be recorded and final grade in two digits after decimals should be based on the average of two replications.

Note: To maintain uniformity in the data, PDI along with Grades should be given in the reports by the concerned Pathologists for all the fungal foliar and BLB diseases.

Note: A PDI of 40 or less will be kept as cut off for the purpose of identification of a variety/hybrid in CLCuD. In case of other diseases, the reaction equal to or less than the local/Zonal check will be the cut off for the above purpose.

Path.2 (b) Confirmation and maintenance of disease-resistant lines (all centers) (Since 2009- 10)
At all centres, scientists will keep the resistant entries (few bolls of selfed seed) from the initial evaluation trials (National trials) like Br. 02a or b for *G. hirsutum* varieties, Br. 22 a/b for *G. arboreum*, Br. 34b for *G. herbaceum* and Br. 14a for *G. barbadense* after screening against important diseases.

Observations and entries:
A maximum of 2-3 important diseases prevailing in the area will be considered. A maximum of five entries will be kept from each trial.
Seed cotton yield and quality aspects will also be recorded keeping resistance as first priority. Those lines will be evaluated again next year by the concerned pathologist at his centre under field conditions and also tested at hot spot for that particular disease under nursery/ artificial inoculation condition at below mentioned centres to have confirmed final reaction.

Artificial Screening Centres:
1. **Cotton leaf curl virus**, CICR, Regional Station, Sirsa
2. **Bacterial leaf blight,** PDKV- Akola, MCRS- NAU Surat
3. ***Alternaria* leaf spot,** MPKV, Rahuri, PDKV-Akola, UAS-Dharwad
4. **Myrothecium leaf spot**, Khandwa, Akola
5**. Grey mildew**, Dharwad, **CICR- Nagpur new centre for artificial screening**
6. **Root rot**, CICR, RS, Sirsa
7. ***Fusarium* wilt**, Pune activities can be at halt and wilt resistant entries should be maintained

Such entries (National Trials) with two years field screening (susceptible check) and one-year artificial screening data (Check should be HS/S during the season) will be kept by plant pathologists for use in developing resistant varieties/ hybrid by that centre.

Note: The field screening will be considered valid only in those years when at least 3 or 4 grade reaction (Susceptible/Highly susceptible) is observed in susceptible checks in screening trials.

Data for confirmation and maintenance of disease-resistant lines must be provided by the concerned Pathologists as per the format given in below table:

Entry Code & Name	Year of Start	First year		Second year		Third year			
		Field trial		Field trial		Field trial		Artificial inoculation trial	
		PDI	Reaction	PDI	Reaction	PDI	Reaction	PDI	Reaction

One set each of confirmed resistant entries (25-50 g seed) may be sent to Head, Division of Crop Protection, CICR, and Nagpur and to PI Plant Pathology, which will serve as a repository.

Path.2 (c) Monitoring of resistance against CLCuD in cotton.
Location/Centres- Hisar, Sriganganagar and Bhatinda) (**Since 2019-20** with new cultivars)
Entries: 8;
Replications: 3;
Design: RBD
Plot Size: 5.4m x 3.75m

Spacing: 67.5 x 30 cm (114 Plants) – For Varieties 67.5 x 60cm (60 Plants) – For Hybrids
Observation: Incidence and severity of CLCuD and Whitefly population should be recorded at the respective center
Varieties: HS6, F846, RST-9 (Susceptible)
H1098 (i), F 2228, CSH-3075(Moderately Resistant),
Hybrids: NSPL-531 (Moderately Susceptible)
RCH 773 (Moderately Resistant)
The seed of varieties to be supplied by respective centres @ 500 g for each variety.

Path.3: Management of Diseases
Path. 3 (f): Management of sooty mould (*Capnodium* spp.) in cotton (From: 2019-20)
Locations:
Field experiment: Junagarh and TNAU, Coimbatore (2019-20), Faridkot, Abohar, Hisar (2020-21 onwards)
Screen house: CICR, Sirsa and TNAU, Coimbatore (2019-20 onwards)
Treatment details of the experiment: Prophylactic sprays

1. Copper oxychloride (COC) 50 WP @ 1.25 g/litre of water- prophylactic spray followed by two sprays when sooty mold crosses Grade 1 of the rating scale.
2. Copper oxychloride (COC) 50 WP @ 2.50 g/litre of water- prophylactic spray followed by two sprays when sooty mold crosses Grade 1 of the rating scale.
3. Propiconazole 25 EC@ 1 ml / litre of water - prophylactic spray followed by two sprays when sooty mold crosses Grade 1 of the rating scale.
4. Mancozeb 50 WP @ 2.0 g /litre of water - prophylactic spray followed by two sprays when sooty mold crosses Grade 1 of the ratting scale.
5. Neem oil 1500 ppm @ 5ml / litre of water – I, II and III spray should be repeated when whitefly crosses ETL.
6. Insecticide (Flonicamid) – I, II and III spray should be repeated when whitefly crosses ETL.
7. Control

Spray schedule: **Prophylactic sprays to be started when whitefly crosses ETL.**
Spacing - 1.0 x 0.6 m
Plot size –50 M^2
Replications - 3
Design - RBD
Spray: Total three sprays will be applied at the fortnightly interval.

Observations: Prior to spray treatment, 7 days after spray (DAS) and 15 DAS observations on the severity of sooty mould.
To work out severity, observations will be recorded according to the rating scale (0 to 4) as follows:
Where: 0=Free from the sooty mould, 1- 25 percent leaf area covered with sooty mould, 2- 50 percent leaf area covered with sooty mould, 3-75 percent leaf area covered with sooty mould and 4-100 percent leaf area covered with sooty mould.

Path 3 g: Management of parawilt of cotton (Since: 2018-19)
Locations:Field experiment: Bathinda, Hisar, Akola, Nanded and Junagarh
A. Treatment details:

1. Cobalt chloride foliar spray 10 ppm foliar spray immediately after occurrence of disease
2. Sodium benzoate foliar spray 50ppm foliar spray immediately after occurrence of disease
3. Salicylic acid (Commercial grade) @ 250ppm foliar spray immediately after occurrence of disease
4. Foliar spray of *Pseudomonas fluorescens@* 10gm or ml/litre of water (University strain/commercial preparation)
5. Drench plants with a mixture of Copper oxychloride 25g and 200g Urea in 10 ltr of water
6. Drench plants with Carbendazim 1g/L
7. Control

Design: RBD
Replications:3
Plot size: around 50m^2 or minimum 10 tagged plants

B. Observations: Recovery of the plants will be assessed by using the following scale

- 0=No recovery
- 1=25% recovery
- 2= 50% recovery
- 3=75% recovery
- 4= 100% recovery

C. Observations: Data on plant vigour parameters like: (120 DAS**)**

- Root length density
- Shoot length
- Total root mass
- Plant height and density,
- Number of fruiting branches per plant.
- Number of open bolls per plant.
- Boll weight gm.
- Seed cotton yield

Path 3 (h). Evaluation of efficacy of bioagents against cotton diseases (From 2019-20)
Location/Centres: CICR, Nagpur, PDKV, Akola, Nanded and Surat
Treatment details:
T1- Seed and soil application of *Bacillus aryabhattai*
T2- Seed and soil application of *Bacillus tequeilencis*
T3- T1+T2
T4- Seed and soil application of Commercial product *Bacillus subtilis*
T5- Seed and soil application *Pf* CICR
T6- Chemical seed treatment (Vitavax power @ 0.2%)
T7- Foliar application of Pyraclostrobin@0.1%
T8- Control

Note: All the bioagents will be supplied by CICR, Nagpur to different centres including the commercial product to maintain the uniformity of the trial.

- Seed application: 10^8cfu/g @10g per kg of seed
- Soil application: 2.5kg/ha (30 & 60 DAS)

Diseases: Wilt, root rot, fungal leaf spots.
Observations to be recorded: Percent Incidence, PDI and seed cotton yield
Plot size: 60 plants/plot
Replications: 3

Path.3(i). Integrated Management of CLCuD through its vector management (2020-21) (New Experiment)
Locations: Bathinda, Faridkot, Sriganganagar, Hisar and ICAR-CICR, Sirsa,
Treatments: 9
Replications: 3
Plot size: 140-150 plants/plot (10 rows), keep 2 meter space between every plot all around
Treatment details:

	IPM/Biomodule	Fist spray based on ETL	Second spray based on ETL	Third spray based on ETL	Forth spray based on ETL	Fifth spray based on ETL
T1	IPM existing module	Neem 300 ppm	Neem 300 ppm	Diafenthiuron /Flonicamid	Spiromesifen/Pyripoxyfen*	Repeat fourth spray treatment of respective module if required
T2	IPM module-1	Neem 300 ppm	Neem 300 ppm	Diafenthiuron /Flonicamid	CICRRS-Ij	
T3	IPM module-2	Neem 300 ppm	Neem 300 ppm	Diafenthiuron / Flonicamid	CICRRS-Bb	
T4	IPM module- 3	Neem 300 ppm	Neem 300 ppm	Diafenthiuron/ Flonicamid	CICRRS Ma	
T5	Biomodule-1	Neem 300 ppm	Neem 300 ppm	CICRRS-Ij	CICRRS-Ij	
T6	Biomodule-2	Neem 300 ppm	Neem 300 ppm	CICRRS-Bb	CICRRS-Bb	
T7	Biomodule-3	Neem 300 ppm	Neem 300 ppm	CICRRS-Ma	CICRRS-Ma	
T8	Biomodule-4	Neem 300 ppm	Neem 300 ppm	*L. lacanii commercial formulation*	*L. lacanii commercial formulation*	
T9	Control	No spray	No spray	No spray	No spray	

*Spray any one alternatively according to whitefly nymphal/adult population

Treatment Doses:

- Foliar spray of neem 300ppm @ 1 litre/per acre in 200 water
- CICRRS-Ij/ CICRRS-Bb/ CICRRS-Ma : 10^8cfu/ml @ 1 litre/per acre 200 water
- Diafenthiuron 200 g / acre if whitefly & thrips incidences is there.
- Flonicamid 80 g/ acre if whitefly & hopper incidences is there and Spiromesifen 200 ml/acre

Observations to be recorded:

- CLCuD should be recorded in all plants at 60, 75, 90 and 115 DAS by the Plant Pathologist.

- Whitefly adult and Nymphal population should be recorded prior to spray and at 5 and 7 days after every spray by Entomologist.
- Observations should be recorded from 10 plants in each plot (adults count from upper, middle and lower strata/ 3leaves/plant; nymphs must be counted from middle and lower strata/ three leaves from each plant).

Data on plant vigour parameters like: (120 DAS**)**

- Plant height and density,
- Number of fruiting branches per plant.
- Seed cotton yield

Note: All the bioagents formulations will be supplied by ICAR-CICR-Regional Station Sirsa, to different centres including the commercial product to maintain the uniformity of the trial.

Path 3(i): Management of boll rot and foliar diseases of Cotton through CIB&RC recommended new chemical pesticides and their Combinations (New Experiment: suggested by Dr. CD Mayee, Chairman PAMC)

Objective: To evaluatenewer group of fungicides against economically important diseases of cotton.

Locations/ Centres: Six centres (two in each Zone)

North zone: Hisar and Bhatinda
Central Zone: Nagpur and Surat
South Zone: Dharwad and Guntur

Treatment detail:

T1 - Kresoxim-methyl 44.3% SC @1 ml/litre of water
T2 - Propiconazole 25% EC @1 ml/litre of water
T3 - Propineb70%WP @ 2.5 g/litre of water
T4 - Fluxapyroxad 167 g/l + Pyraclostrobin 333 g/l SC @ 0.6g/litre of water.
T5 - Metiram 55% + Pyraclostrobin 5% WG @2 g / litre of water
T6 - Azoxystrobin 18.2% w/w + Difenoconazole 11.4% w/w SC @1 ml/ litre of water
T7 – Control (Water spray)

- **Design of experiment:** Randomized block design (RBD)
- **Replications:** Three
- **Total no. plants per plot:** Minimum 60 plants/plot
- **Variety /Hybrid :** Popular BG-II hybrid (Zone wise similar)
- **Spacing:** As per the local recommendation
- **Spraying schedule:** Foliar spray at disease initiation and subsequent 1-2 sprays if the disease severity (PDI) crosses more than 10% PDI.
- **Observations to be recorded:** Disease incidence and severity should be observed on randomly tagged 10 plants in each plot following the respective disease scale at 15 days interval starting from disease initiation .
- **Note:** Percent disease index (PDI) should be calculated for each treatment and replication Disease percent disease severity/intensity (PDI).
- **Seed cotton yield should be recorded.**

Path. 4. Crop loss estimation

Path.4 (e) Crop loss estimation due to CLCuD and distribution pattern of CLCuD in North Zone (Since 2011-12)

Path.4. (1a): To work out relationship between Disease index and yield reduction due to cotton leaf curl virus disease.

Locations: Hisar, Faridkot and Ganganagar
Variety/hybrid: Local Popular Bt hybrids

Treatment details and observations: On research farm 4 local popular hybrids will be sown in half an acre area and diseased and healthy plants will be tagged grade wise and also healthy vs diseased plants and data on Disease Index, yield loss and quality parameters will be recorded and analyzed. **Date must be recorded as per the disease ratting scale: the yield loss (Disease Index, yield loss and quality parameters) must be eastimated corresponding to the respective disease grades.**

Continue with same hybrids for this year (2017-18 to 2020-21)

US51	**RCH 773 BGII**	**NCS 9013 BGII**	**ACH-177-1**

Path 4. (1b): Study on the distribution pattern of cotton leaf curl virus disease on local popular Bt hybrid at farmer's field. (Since 2009-10)

Location: Hisar (Sirsa - Sub Centre to collect data of Sirsa and Fatehabad districts), Faridkot, Ganganagar and Bhatinda

Observations:
CLCuD occurrence (PDI) should be recorded in two villages (minimum 2-3 hybrids in each village) in each block (district wise) will be recorded during the cropping season for popular hybrids. The locations will be evenly spread over the entire state. **At each location, 4 sets of observations (25 plants each, totalling 100 plants) will be recorded in a field.**

Data from farmers' fields and research farm must be recorded during the early, mid and late season as per the earlier finalized AICRP standardized protocols.
GPS location may be used while data recording. The data recording should be uniform at all the centres. While making CLCuD disease maps the following disease scale may be followed: Very severe > 50 %, Severe- 30.1-50 % (combining MS & S of Disease scale), Moderate- 20.1-30 %, Low- 10.1-20 %, Traces-0.1-10 % in place of that presently being followed.

Dr. Gawanda: Trial on bioagents have been conducted at Nagpur and the results were appreciable. Last year fungicide list is updated and can a project be formulated to test the new fungicide for foliar disease and boll rot complex.

Chairman: Four or five new fungicide companies need to be identified and they if they are interested two locations from each zone will be selected and the product might be tested for cotton disease management. Test it on susceptible hybrid or a popular hybrid for reduction of disease incident and yield improvement.

Dr. Dilip Monga: Crop losses estimation experiments were concluded and put in the form of bulletin. Regarding in long term data in correlation with weather factors, some of predictions were made and they are formulated in bulletin. These predictions include cotton leaf curl viruses and other important diseases like alternaria and helminthosporium. These prediction could be validated and if found not accurate long term data could nbe included for further correction of these predictions.

QRT made a recommendation that PIs of AICRP on cotton must arrange for validation of prospective technologies in case of Crop production and crop Protection trials. They should make multi location trials in AICRP. Based on that one trial was formulated last year 'Testing of bioagents of CICR Nagpur' and one this year 'Integrated management of CLCuD through its vector management'. There should be a system of CICRB registration and upscaling and popularizing with the farmers. Soothy mould started as an important disease in North zone after the whitefly attack was found so this trial if permitted it will be carried out.

Chairman: New fungicide can be tried for soothy mould, coupled with chemical with whitefly.

SriLakshmi: TSV is not a problem in farmers field in recent year, it has started in 2005. Last year due to weather from October Conidiaspora leaf spot appeared and reached more than 50 PDI, this is newly emerging disease in Guntur area.

Chairman: Monitor the disease and keep a record of all information of viruses and keep a eye on newly forming diseases

*Dr. Monga:*Chonidospora is increasing these days, so new disease should be monitored

UAS Dharwad: TSV was noticed this year in some pockets of Belgaum and Dharwad district and bollrot has also increase. Rust was not observed even after 120 days.

Chairman: Watch the disease of significance which starts at seedling and causes yield losses. Do not trial diseases which do not cause any significant loss.

All PIs should communicate within eight days to formulate the programme.

Session VII: Transfer of technology front line demonstration

Chairman: Dr. R.P Singh, Director, DCD, GOI, Nagpur

Co- Chairman: Dr. SM. Wasnik, Principal Scientist(Agrl extension),

Dr. Usha Rani presented on the programme on Transfer of technology front line demonstration for the year 2019-2020

Dr Wasnik: Public sector Bt can be tested all over the zones, the farmers could register in e-kapas programme

Chairman:

- This year the production of cotton has given ever highest production 360.48 lakh bales.
- For strengthening the monitoring of FLD it is necessary to construct teams consisting of scientists and officer of AICRP on cotton, crop division and cotton development Nagpur.
- Ten Bt varieties were developed and these has to be popularized and impart training to farmer to multiply Bt variety seeds in their own field and maintaining genetic purity of these varieties.
- Out of ten Bt varieties developed, ELS bt need varieties need to be given more importance as textile industries requires more of ELS fiber.
- Area under Desi ELS cotton has been reduce despite of FLDs from 17.39 per cent 2016-17 to 6.90 2019-20, so it requires some focus.
- Since 2014-15 Union minister of Agrl and Farmer welfare is implementing NFSMCC in 15 states. This year the financial support is about 2171.71lakhs in which the ministry has provide 1821.71 lakhs for states Govt and 250 lakhs for ICAR-CICR for IRM, 77 lakhs FLD in CICR RS Coimbatore and 50lakhs to DCD Nagpur.
- Annual action plans under national food division commercial crops submitted by uttrapradesh, Punjab, Maharashtr, odisa and Tamil Nadu for FLD has been approved for 2020. Regular submission of report of FLD needs to be submitted for release of fund.
- CICR RS coimbatore and CICR Nagpur need to submit the utilization certificate for this year for fund release. The programme for Coimbatore has been approved IRM programme has not yet been approved, the feedback need to be submitted to effectively implementing the programme regularly.

*Director:*Bt varieties need to be popularized through FLD programme

Weekly advisory is being timely sent and these should be included and there should be a good coordination between the centres for giving advisory to the farmers.

Session VIII: Plenary session

Chairman: Dr. T.R. Sharma DDG (Crop Science), ICAR, New Delhi

Co- Chairman: Dr. R.K. Singh ADG (CC), ICAR, New Delhi

Dr. V.N. Waghmare, Director, ICAR-CICR, Nagpur

Dr. S. Manikam presented the proceedings of Plant Breeding Panel and the technical programme of Crop Improvement 2020-21.

Dr. G. Balasubramani: The protein estimation is done in 30, 60, 90, 120 and 150 days. The protein expression is maximum at 30, 60 days and after 90 it is going down and at 150th day even sample collection is becomes difficult. So this estimation of cry protein can be stopped at 30 (too early) and 150 days. The infestation starts only after 45-50 days.

DDG: 30 days was kept to see whether the gene expression starts even before the infection starts so protein estimation could be done at 30, 60, 90 and 120 days and 150 days could be stopped.

Dr Shankarnarayanan presented the proceeding of Agronomy Panel and the technical programme of 2020-21.

Dr B. Dharajothi presented the proceeding of Entomology Panel and the technical programme of 2020-21.

Dr S.K.Sain presented the proceeding of Pathology Panel and the technical programme of 2020-21.

A.H. Prakash: Varietal Identification Committee was held up on 18.05.2020 and informed the house that all 23 proposals were scrutinized and there are no proposals pending.

Dr Usharani presented the technical programme of NFSM- FLD 2020-21.

DDG (CS) suggested that Bt varieties/ hybrids developed through public sectors need to be included under FLD demonstrations

ADG: There was no technical programme on germplasm and Pre Breeding techniques

AICRP cotton will be working on pre-breeding and climate resilient hotspot both are missing in the technical programme.

DDG: The technical programme on how many crosses, who will be attempting what are the parents need to be included in the programme

Dr. A.H. Prakash: Climate resilient hotspot agro ecological survey is underway. Under the Guidence of Resepcted ADG (CC), It was initiated during Annual Group Meeting of AICRP on Cotton during 2019 May at Guntur. Once the data is analyzed, the hotspot research will be initiated. For pre-breeding programme it will be conducted in three to four centres once the information on wild species are received from centres.

DDG: It should be direct approach. Phenotype of wild species is to be analyses. The programme once initiated it needs to be circulated to Director, ADG (CC) and DDG (CS). The programme has to be initiated this year.

To a quaiey from Representative from M/s Daftari Seeds on poor germination in one location leading to lower yield, the DDG (CS) was of the opinion that such deviations from trials need to be removed when data analysis (Low yield due to poor germination)

Dr. BM Kadhi: Need to have a separate meeting for AICRP breeders to plan for bt cotton varieties and hybrids. During the season a discussion can be made with the breeders to plan the breeding programme.

Dr. CD. Mayee: The PC should send the programme to the members of committee which is formed so that the committee may correct and monitor the programme.

ADG: The variety and hybrid release is being done as per guidelines. Technical programme on germplasm and pre-breeding needs to be prepared by Dr AH Prakash and sent within three months for implementation during the current year.

DDG (CS) in his concluding remarks opined that

- Role of mentors:The committee formed will be continuing at least for three years. Their constructive suggestions will be considered and incorporated in the technical programme for 2020-2021.
- Breeding strategy on yield potential which should include all Bt genes as a part of breeding programme.
- Breeding for mechanical harvesting was the key point from private sectors. Breeding for special quality traits like colour cotton, disease resistance, and HDPS should be strengthened.
- In breeding experiments to assess yield potential, important traits such as response to water use, nitrogen use, resistance to disease,etc. are to be considered. Pre breeding should be a direct approach with all latest technologies.
- Cotton has proved to be the best crop for transgenic technologies. Marker Assisted Breeding, genome editing particularly for quality traits, low gossypol varieties, etc. can be taken up.
- Agronomy triails have to be carefully planned to assess the actual potential of the varieties..
- Package of practices based on the trials have to be worked out anda booklet brought out for ready reference.
- Presently, all the experiments and data collection formats are planned at one place and the same are executed all over the country. Everything is available on a platter. This saves a lot of time for scientists. They should utilize their time and knowledge to plan for new studies and collect additional data, and publish their findingsin peer reviewed journals.
- HRD is very important.There will be structured training for Marker Assisted Breeding and quality parameters for breeders.
- More PPP collaboration is needed by signing MoU. Inter institutional collaboration is also required with NBAIR and NIPB for biotechnology. All the latest technologies like drone technologiesshould be used not only in breeding but also in crop production and protection.
- The proceedings of the meetings need to be put up within 15 days and circulated to all stake holders. After 6 months, a review has to be made by the Director to ensure that all the programmes are moving in the right direction.

- About 20 varieties have been released.We should have record whetherthese varieties reaching the right stakeholders. The programmse need to be reoriented based on the demands of the stakeholders.

The meeting was concluded with Vote of thanks by Dr Prakash, Project Coordinator (Cotton).

The video conference has been coordinated by the committee members Dr. M. Sabesh, Dr K. Sundaravadivelu, Sh. N. Ramesh and Sh. Vedavyas.