ICAR-Central Institute for Cotton Research

Weekly Advisory for Cotton Cultivation from 29th September to 4th October 2015

(46th Standard Week)

"The advisory is based on inputs received from the State Agricultural Universities of the respective state

WEATHER ADVISORY

	Rainfall (mm) Sep/Oct 2015						
Date	29	30	1	2	3	4	ADVISORY
PUNJAB							The crop is at reproductive and boll formation stage. The recent rains brought down whitefly populations. Mean population of whitefly adults and leaf hopper were below economic thresholds except in a few fields. Though the population of leafhopper is increasing, it is still below ETL. Whitefly incidence is increasing and the second flush /peak of whitefly is expected in the next week and farmers are advised to spray buprofezin or diafenthiuron wherever required. Mealy bug incidence was observed only in traces in few fields. Incidence of leaf curl virus disease was observed upto 3 grade severity in Hisar, Sirsa, Fatehabad, Jind and Bhiwani district. No incidence of Bacterial leaf blight disease. Fungal foliar diseases were observed in traces in some fields. Weeding and picking have been started in Desi *Gossypium arboreum* cotton at few places. Severe parawilt has been noticed at many locations after irrigation. For parawilt, spray Cobalt chloride @10ppm (1g/100 litres of water). Keep the fields free from weeds. Spotted bollworm incidence has been noticed in *G.arboreum* cotton at few places. Do not irrigate the field after one third opening of the bolls in the field. Dry the kapas before storage to avoid micro organism damage.
Batinda	0	0	0	0	0	0	
Ferozepur	0	0	0	0	0	0	
Muktsar	0	0	0	0	0	0	
Mansa	0	0	0	0	0	0	
HARYANA							
Sirsa	0	0	0	0	0	0	
Hissar	0	0	0	0	0	0	
Fatehabad	0	0	0	0	0	0	
RAJASTHAN							
Hanumangarh	0	0	0	0	0	0	
Sri Ganganagar	0	0	0	0	0	0	
Banswara	0	0	0	0	0	0	
ORISSA							The crop is boll development and maturity stage. Incidence of sucking pest, Spodoptera and bollworm was noticed but only leaf hopper (jassid) populations were above economic threshold levels. Incidence of Bacterial leaf blight was noticed in some patches. To control sucking pest population, spray Buprofezin or Difenthiuron. Wilt and leaf reddening problems may be managed with the recommendations described in the annexure. Application of DAP and micronutrients and this stage pf peak flowering and boll formation stage will help the crop to retain bolls for higher yields.
Koraput	4	8	9	22	33	36	
Kalahandi	0	3	0	4	16	27	
Balagir	0	0	0	0	8	11	
GUJARAT							The crop is in flowering and boll formation stage. Sucking pests such as leaf hoppers, thrips and whiteflies were found to have crossed economic threshold levels in some fileds. Recommended management practices as described in the annexure of this advisory may be taken up. Farmers are also advised to continue use of pheromone traps (5 traps/ha) to monitor pink bollworm, spotted bollworm and Helicoverpa incidence. PINK BOLLWORM: Infestation is expected to start from the last week of September, reach initial damaging levels by end of October and intensify in November-December. Farmers are advised to install pheromone traps @ 5-6 /ha to monitor pink boll worm. At economic threshold levels of 8 moths per trap per night for three consecutive nights and/or 10% damaged bolls with grown-up larvae, spray quinalphos or thiodicarb once in October and pyrethroid preferably 'lambda-cyhalothrin' once in November. Thiodicarb is sprayed more
Amreli	0	0	0	0	0	0	
Bhavnagar	0	0	0	0	0	0	
Jamnagar	0	0	0	0	0	0	
Rajkot	0	0	0	0	0	0	
Baruch	0	0	0	0	0	0	
Sabarkantha	0	0	0	0	0	0	

Surendranagar	0	0	0	0	0	0	than once can cause leaf reddening in rainfed farms. If unattended, pink bollworm can cause heavy damage in October and November. Strictly avoid pyrethroids until the end of October. Never use any insecticide mixtures. This can result in whitefly infestation. Farmers are advised to terminate cotton crop in December without extending it any further into 2016. This is necessary to reduce pink bollworm incidence and bollworm resistance to Bt-cotton. Cotton stalks of last year have been observed lying on the bunds. They must be destroyed immediately. Old cotton seed stored in go-downs or homes serve as a carryover for pink bollworm moths. If the seeds are infested, these may be destroyed immediately.
Ahmedabad	0	0	0	0	0	0	
Vadodara	0	0	0	0	0	0	
Patan	0	0	0	0	0	0	
Mehsana	0	0	0	0	0	0	
MP							
Khargaon	0	0	0	0	0	0	The crop condition is good. Summer sown crop is in fruiting stage while normal sown crop is in vegetative stage. There are no reports of insect pest or disease incidence, If sucking pests are observed to reach economic thresholds in any fields, 2.0% neem oil emulsion in soap may be sprayed. Strictly avoid excessive nitrogen and chemical insecticides.
Dhar	0	0	0	0	0	0	
Khandwa	0	0	0	0	0	0	
MAHARASHTRA							
Nagpur	0	0	0	0	3	0	Pre monsoon cotton is in boll bursting stage, Monsoon cotton in boll development stage and July sown cotton in flowering initiation stage. Parawilting was noticed in some pockets where more than 150mm rainfall was received resulting in water stagnation in field. Square dropping was seen in all species of cotton. Excess water should be removed from field. To control parawilt, recommended practices as described in the annexure of this report may be followed. To avoid further dropping of squares, Planofix 5ml +100 g urea in 10 litre of water may be sprayed. Repeat spray after seven days. Flubendamide for bollworm in non Bt cotton can be sprayed. Jassids and White fly incidence was noticed in some pockets. Weeding may taken up to avoid competition. Yellow sticky traps may be installed wherever whiteflies are noticed in Bt cotton fields. Wherever soil moisture is adequate, application of DAP at this stage will help the plants in boll setting and retention for high yields. Otherwise, 2% urea or 2% DAP spray at flowering stage. 1% urea and 1% Magnesium sulphate spray at Boll development stage should be given. Jassid infestation was still continuing above ETL in districts- Akola (61.13 %) and Jalna (53.89%). Jassid infestation was above ETL in the range of 10-30% villages were Chandrapur (27.63%), Nanded (14.97%), and Yeotmal (10.95%) whereas, comparatively less number of villages were recorded in districts Nagpur (9.82%), Beed (7.82%) and Parbhani (7.65%). Thrips infestation was in trace (<2%) in Akola and Jalna. Attention also required in Amravati district where whitefly population crossed ETL in 33.80 % villages. Increased leaf reddening was observed in Ahmednagar (34.41% villages) followed by Nagpur (26.33%), Chandrapur (25%), Parbhani (14.04%), Beed (9.86%) and Dhule (9.37%). Recommended measures may be initiated as per the annexure of this advisory.
Wardha	0	0	0	0	3	0	
Chandrapur	0	0	0	0	4	6	
Yavatmal	0	0	0	0	0	3	
Amravati	0	0	0	0	0	0	
Akola	0	0	0	0	0	0	
Buldhana	0	0	0	0	0	0	
Parbhani	0	0	0	0	0	0	
Nanded	0	0	0	0	0	0	
Beed	0	0	0	0	0	0	
Washim	0	0	0	0	0	0	
Dhule	0	0	0	0	0	0	
Jalgaon	0	0	0	0	0	0	
Jalna	0	0	0	0	0	0	
Aurangabad	0	0	0	0	0	0	
TELANGANA							The crop is at vegetative, Square formation, flower stage and boll formation stages. Post-emergence of selective weedicides may be taken up as described in the annexure of this advisory. For the control of rhizoctonia blight and other fungal leaf spot diseases, spraying with Propiconozole @ 1.0 ml/l or Mancozeb + Carbendazim 2.0 g/l of water is recommended. Due to high temperatures and high relative humidity, sucking pests and Spodoptera were observed. For the control of leafhoppers and whitefly, spray recommended doses as per the advisory. Due to wide spread rain forecast, water logging may occur in low laying areas, hence farmers are advised to take-up necessary remedial measures for water
Adilabad	0	3	0	5	13	7	
Warangal	0	10	4	7	27	26	
Khammam	0	13	3	8	23	48	
Karimnagar	0	10	3	7	27	26	
Nalgonda	0	17	4	10	28	32	

AP							logging like draining of water from the fields, Working with plough to form ridges and furrows, Foliar spray of 2% Urea or 2% KNO3 and application of 25 to 35kg of Urea + 15kg MOP per acre as booster dose. There will be no need of any insecticides in view of the continuous rains during the peak vegetative and early-mid reproductive phase.
Guntur	0	14	0	4	7	25	
Prakasam	0	18	0	9	22	29	
KARNATAKA							Farmers are advised to install pheromone traps @ 5-6 /ha to monitor pink boll worm. At economic threshold levels of 8 moths per trap per night for three consecutive nights and/or 10% damaged bolls with grown-up larvae, spray quinalphos or thiodicarb once in October and pyrethroid preferably 'lambda-cyhalothrin' once in November. Spray the crop with Copperoxychloride @ 3 g /lit and Streptocycline @ 0.5 gm/lit of water to control boll rotting. Grey mildew disease is reported in desi and non Bt cotton for which it is suggested to spray the crop with Carbendazim 50 WP @ 1g/lit of water for effective control. Along with these sprays it is advised to tank mix 1% of 19:19:19 soluble fertiliser along with 1% MgSO4 to reduce square dropping and leaf reddening. Spraying of Curacron @ 2 ml/lit is advised to manage the midge incidence. Field sanitation is to be maintained by collecting the dropped diseased leaves and squares from the field and to be buried in the soil or to be burnt. Drain out the excess water under heavy rainfall conditions to avoid boll dropping due to water stagnation.
Dharwad	4	0	19	25	12	11	
Haveri	5	4	11	25	7	11	
Mysore	13	35	22	18	5	0	
TAMILNADU							The crop is in vegetative stage. Weed infestation noticed for which appropriate weedicides have been sprayed. Aphid infestation noticed but below ETL. Drenching of Chlorpyriphos @750 ml/ha along with Bavistin @ 750 g/ha may be done as a prophylactic measure against stem weevil and root rot. Sucking pests like leaf hoppers, aphid,whitefly and thrips were noticed. For the control of sucking pests, management practices as described in the annexure of this advisory may be followed.
Perambalur	15	26	9	18	0	0	
Salem	13	28	22	28	8	0	
Trichy	34	18	32	18	4	0	
Virdhunagar	34	13	32	27	14	0	

Legend					
Rainfall in mm	< 5	5-20	20-50	50-80	> 80

MANAGEMENT STRATEGIES RECOMMENDED BY CICR

The strategies recommended in this brief note are based on results of experiments conducted by CICR and developed in consonance with various ecologically compatible guidelines issued by various National and Global agencies.

GENERAL CROP HEALTH MANAGEMENT PRACTICES

1. **Early maturing varieties or Bt-cotton hybrids** may be preferred in rain-fed regions.
2. **Early sowing** is preferred in rain-fed regions immediately after receiving the first showers of 80 mm rainfall.
3. **Sowing on ridges in rain-fed regions** especially in high density planting systems is most preferred.
4. **Bt-cotton hybrids** may be sown at 90 x 30 cm in rain-fed regions and at wider spacing under irrigation
5. **Non-Bt varieties** Suraj such as (CICR) NH 615 (VN-MAU, Parbhani), AKH 081 (Dr PDKV Akola), Phule Dhanwantari (MPKV Rahuri) and Anjali (LRK 516) are early maturing. If these varieties are sown before 15th June in high density planting at 60x10 cm (40x10cm for Phule Dhanwantari), the crop will escape drought stress and bollworms.
6. **Intercropping in high density non-Bt cotton varieties** can be taken up with soybean (seed treated with *Bradyrhizobium japonicum*), cowpea or blackgram in alternate rows at 45 cm row to row and 10 cm plant to plant.
7. **Intercropping in Bt hybrids** can be taken up with soybean (seed treated with *Bradyrhizobium japonicum*), cowpea or blackgram as one row between two Bt-hybrid rows
8. **Border rows (2-3 rows) of pigeonpea** around cotton fields will prevent infestation of mealy bugs and serve as refugia.
9. **Farm Yard Manure** @ 5 to 10 t/ha or compost should be applied just after the first rain.
10. **Azatobacter and PSB** @ 25 g each / kg seed should be used for nutrients fixation.
11. **Optimize nutrient management** for macro and micronutrients. Foliar spray of MgSO4, 2% Urea followed by 2% DAP, to ensure proper Cry1Ac expression and also to reduce problems of leaf reddening. Sprays of 1% cobalt chloride and soil drenching with Bavistin 1 % in the initial stage of wilt was found to help in the recovery of plants.
12. **Prevention of Leaf Reddening:** Spray 2 % urea, 0.5% Zinc Sulphate and 0.2 % Boron, twice at 15 days interval on 90 days old crop.
13. **Retention of squares and flowers:** Spray Planofix 4.5 SL (NAA) hormone @ 21 ppm (7 ml per 15 litres of water).

INSECT PEST MANAGEMENT

General recommendations

DOs

1. **Select sucking pest resistant varieties/hybrids**. Sucking pest resistant Bt hybrids may require very few insecticide interventions.
2. **Inter-crop with cowpea or sorghum or soybean or blackgram** to encourage predators of sucking pests.
3. **Imidacloprid** (8 g), **Vitavax** or **Thiram** (3 g) per kg seed will protect varieties against sucking pests and diseases.

4. **Use nitrogenous fertilizers to the minimum** especially for sucking pest susceptible varieties.
5. **Maintain field sanitation** (weed free)
6. **Remove and destroy mealy bug infested plants.**
7. **Use Neem preparations and biological control options** for least disruptive pest management.
8. **Pheromone traps** are efficient for pest monitoring of Pink bollworm.
9. **Stem application or soil application** (near the root zone) of Imidacloprid, Dimethoate or Acephate at 30-40 DAS and 50-60 DAS for effective eco-friendly control of thrips, mirid bugs, mealy bugs and other sucking pests.

DON'Ts

10. **Avoid late sowing beyond 15th May in North India** to prevent aggravation of cotton leaf curl virus.
11. **As far as possible avoid chemical insecticides during the first two months of the crop** to conserve naturally occurring biological control. Ladybird grubs and beetles, *Chrysoperla* grubs and adults, Syrphid flies, *Geocoris* grubs and bugs, *Aenasius* spp., *Aphilinus* grubs and wasps, mirid bugs and Spiders are the most important naturally occurring predators and parasitoids that effectively control aphids, jassids, thrips, mirids, whiteflies and mealybugs.
12. **Do not spray against minor lepidopteran insects** such as the cotton leaf folder, *Sylepta derogata* and cotton semilooper, *Anomis flava*. The larvae cause negligible damage to cotton but serve as hosts for parasitoids such as *Trichogramma* spp., *Apanteles* spp and *Sysiropa formosa*, that attack *H. armigera* and other bollworms.
13. **Do not spray Bt-formulations on Bt cotton** to avoid further selection pressure.
14. **Avoid foliar application of neonicotinoid insecticides** such as Acetamiprid, Imidacloprid, Clothianidin and Thiomethoxam which are likely to aggravate insect resistance, since hybrid cotton seeds are treated with imidacloprid.
15. **Do not use WHO Class-I (Extremely Harzardous category) insecticides** such as Phosphamidon, Methyl parathion, Phorate, Monocrotophos, Dichlorvos, Carbofuran, Methomyl, Triazophos and Metasystox.
16. **Avoid Fipronil and Pyrethroids** to prevent whitefly outbreaks.
17. **Avoid insecticide mixtures.** Mixtures severely disrupt eco-systems thereby leading to pest outbreaks.

SUCKING PEST MANAGEMENT

Economic Threshold Level (ETL): If whitefly and/or leafhopper damage reaches economic threshold levels of grade-II damage of curling and crinkling of lower leaves and yellowing of margins in 25% plants or more, any one of the following pest control measures as suggested below can be used.

a. Neem oil 1.0% + Neem Seed Kernel Extract 5.0% + 0.05-0.1% detergent
b. *Verticillium lecanii* 10gms/lit of water, wherever good formulations are available from reliable manufacturers
c. Diafenthiuron 50WP 800g /ha,
d. Flonicamid 50 WG 200g a.i/ha or
e. Buprofezin 25% SC 200 g a.i/ha.

Insecticides such as Dimethoate or Acephate or Ethion can also be used but may be considered as alternatives only, in view of factors that relate to ecological and environmental safety, efficacy and resistance.

If mirid bugs are observed to cause economic damage to squares, it is advised to spray Acephate 75 SP @ 1 g/lit or Dimethoate.

BOLLWORM MANAGEMENT

Bt cotton is effective in controlling bollworms.

The following strategies are being recommended for non-Bt cotton
At Economic Threshold Levels (ETLs) of 50% infested plants (plants having flared squares with entry hole) **for *Helicoverpa armigera*.**

1. **Use *Ha*NPV** (*Helicoverpa armigera* Nuclear Polyhedrosis Virus) on Bt-cotton followed by the application of **5% Neem Seed Kernel Extract (NSKE)** a week later**. OR, use Phosalone** at ETL for the management of bollworms, *Spodoptera* or whitefly.
2. ***Trichogramma***, if available, can be used on non-Bt genotypes at 70-80 DAS. Avoid *Trichogramma* egg parasitoid releases on Bt-cotton since maximum neonates get killed on Bt-cotton and with *Trichogramma* application becoming superfluous.
3. **Insecticides effective on Bollworms,** especially *Helicoverpa armigera*.
   a. Chlorantraniliprole,
   b. Flubendiamide,
   c. Spinosad,
   d. Emamectin benzoate and
   e. Indoxacarb

   These insecticides have a high selective toxicity towards the target pests while being less toxic to many beneficial insects in the cotton ecosystem. These insecticides are ideally suited in eco-sustainable insecticide resistance management programmes.
4. **Pink bollworm and Spotted bollworms:** ETL level of one live larva in 10 green bolls or 8 moths per night for three consecutive nights. Spray Quinalphos 25 EC Profenophos 50 EC @ 2 ml/lit of water / Spray of Thiodicarb 75 WP @ 20 g or any pyrethroid.

OTHER PESTS

1. ***Spodoptera litura*:** Collection of egg masses or application of *Sl*NPV (*Spodoptera litura* Nuclear Polyhedrosis Virus) @ 500 LE/ha or Spray 200 ml Novaluron 10 EC or 250g Thiodicarb 75WP in 250 litres of water per acre
2. To minimize **shoot weevil** damage, spray Profenofos @ 2 ml/lit
3. **Snail incidence in heavy rainfall areas**: baiting with 2% Metaldehide (Snail kill) @ 12.5 kg/ha has to be taken up and it is to be applied at the hideouts of the snails, on the bunds and to the soil around the crop where the damage is seen

DISEASE MANAGEMENT

Parawilt or Sudden drying (New wilt) or **Wilt / Root rot:** Symptoms are noticed in some fields after drought followed by rains or irrigation. Spray cobalt chloride @10mg/litre (10ppm) on affected plants within few hours of onset of symptoms and/or Drench plants

with a mixture of Copper-Oxy-Chloride 25g and 200g Urea in 10 ltr of water or Carbendazim 1g/L.

Boll Rot: Generally early formed lower bolls rot due to cloudy and drizzling conditions. Spray Mancozeb 75 WP + Chlorothalonil 70 WP each @ 2 g/lit of water. For better results, mix 10g Selvet 99 or 50 ml Triton in 100 litres of fungicide solution.

***Alternaria* blight:** spray Mancozeb@2.5 g per one litre of water.

Myrothecium leaf spot disease and/or Bacterial blight: Spray Streptomycin sulphate (15-20 g/ha) plus Copper oxychloride (1500-2000 g/ha) in 200-250 L of water.

WEED MANAGEMENT

Application of Pre-emergence weedicide Stomp 30EC or Basalin @45EC 2.5 lt/ha and harrow immediately to prevent degradation.

Herbicides are most effective on younger weeds.
Post emergence herbicides (application rate 50 to 75 g ai/ha)
Grasses: Spray Quizalofop-ethyl or Fenoxaprop ethyl or Fluazifop butyl,
Sedges and grasses: Spray Propaquizafop ethyl
Broadleaf weeds: Spray Pyrithiobac sodium

Post-emergence weedicides would provide effective and timely control especially when interculture operations or manual weeding becomes difficult in wet soils. Weedicides are effective against younger (less than 10-15 days old) weeds, especially grasses. For grassy weeds, Quizalofop ethyl, Fenoxaprop ethyl, fluazifop butyl, can be used. For sedges and grasses, Propaquizafop ethyl is effective. Pyrithiobac sodium is effective on broad leaf weeds. Farmers may consult the technical experts of the Agricultural Universities for further details.

WATER LOGGING MANAGEMENT

Cotton is very sensitive to excess water. In many parts of Central and South India, water logging can be problematic due to excess rains. Cotton grown on deep black soils and ill drained conditions is worst affected due to water logging. Provide adequate drainage channels or water ways (particularly in heavy soils) along the slope of the land for draining excess water under heavy rainfall situations. For better soil moisture conservation, preferably in areas where rainfall is 700-900mm, the land can be reshaped into ridges and furrows with the help of a ridge plough or a bund former. This technique and sowing cotton on ridges would conserve rainwater and the furrows acts drainage channels whenever heavy rains are received particularly in heavy clays.

Drainage channels must be opened up along the field borders so that excess water is removed from the fields. If sowing hasn't yet been completed, it is strongly recommended that to take up sowing immediately on ridges and furrows by planting on top of ridges. Heavy rains will not affect the crop because the furrows will drain away excess water. Apply fertilizers if the crop becomes pale due to water logging. If heavy rains are forecast, fertilizer application may be postponed so as to prevent losses due to surface run-off.

Foliar sprays with 0.5 to 1.0% DAP or 19:19:19 (soluble complex of Nitrogen) at weekly intervals will help the plants to recover from the effect of water logging.

Weekly weather Advisory Report Coordinating Team

Scientists	Address
Dr K R Kranthi	Director, CICR, Nagpur
Dr A H Prakash	PC and Head, CICR, Regional station, Coimbatore
Dr. D Monga	Head, CICR, Regional station, Sirsa
Dr. S. B. Singh	Head, Division of Crop Improvement, CICR, Nagpur
Dr Sandhya Kranthi	Head, Division of Crop Protection, CICR, Nagpur
Dr Blasé De souza	Head, Division of Crop Production, CICR, Nagpur
Dr. Isabell Agrawal	Sr. Scientist CICR, Coimbatore
Sh. M.Sabesh	Scientist, CICR, Coimbatore
Dr. N Anuradha	Scientist, CICR, Nagpur

Scientists in-charge for weather report (AICRP centres)

Scientists	Address	Phone Nos.	E-mail id
Dr. Pankaj Rathore	Punjab Agricultural University, Faridkot, Punjab	09464051995	pankaj@pau.edu
Dr (Ms) Suneet Pandher	Punjab Agricultural University, Faridkot, Punjab	09814513681	suneet@pau.edu
Dr.Sanjeev Kumar Kataria	Punjab Agricultural University, RRS, Bhatinda		k.sanjeev@pau.edu
Dr. Jagdish Beniwal	CCS-Haryana Agricultural University, Hisar Haryana	09416325420	jbeniwal2016@gmail.com
Dr. Rishikumar.	CICR Regional Station,Sirsa, Haryana	09729106299	rishipareek70@yahoo.co.in
Dr. Roop Singh Meena	Swami Keshwanand Rajasthan Agricultural University, Sriganganagar, Rajasthan	09413024080	rsmeenars@gmail.com
Dr.B.S.Nayak	Orissa University of Agriculture & Technology, Bhubaneshwar, Orissa	09437321675	bsnayak2007@rediffmail.com
Dr. Gofaldu	Navsari Agricultural University, Navsari, Gujarat	09662532645	girishfaldu@rediffmail.com
Dr A. N Paslawar	Panjabrao Deshmukh Krishi Vidyapeeth, Akola , Maharashtra	09822220272	adinathpaslawar@rediffmail.com
Arvond D. Pandagale	Marathwada Agricultural University, Nanded, Maharashtra	07588581713	arvindpandagale@yahoo.co.in
Dr. Satish Parsai	RVS Krishi Vishvwa Vidhyalaya, Gwalior, Madhya Pradesh	09406677601	aiccipkhandwa@gmail.com
Dr.S.Bharathi	Acharya N. G. Ranga Agricultural University, LAM, Guntur, AP	0949072341	bharathi_says@yahoo.com
Dr.Aladakatti	University of Agricultural Sciences, Dharwad , Karnataka	09448861040	yraladakatti@rediffmail.com
Dr. M.Y.Ajaykumar	University of Agricultural Sciences Raichur, Karnataka	09880398690	dr.my.ajay@gmail.com
Dr. S. Somasundaram	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	09965948419	rainfed@yahoo.com
Dr.M.Gunasekaran	Tamil Nadu Agricultural University, Cotton Research Station,Srivilliputhur, Tamil Nadu	09443631359	gunasekaran.pbg@gmail.com