

Central Institute for Cotton Research, Nagpur
XXXII Weekly Advisory for Cotton Cultivation 29th Dec to 4th Jan '2015

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

Weed management: Wherever weeds have emerged, weedicides would provide effective and timely control. 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 and Pyriithiobac sodium is effective on broad leaf weeds. Farmers may consult the technical experts of the Agricultural Universities for further details.

Water logging: 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 spray with 0.5 to 1.0% DAP at weekly intervals will help the plants to recover from the effect of water logging.

Cotton Sown Area			Area in lakh ha		
S.No.	States	Normal Area (DES)*	Bt	Non Bt	Total
1.	Andhra Pradesh + Telengana	19.83	22.198	1.669	23.867
	Andhra Pradesh (23.95%)	4.749	7.121	0.239	7.360
	Telangana (76.05%)	15.081	15.077	1.430	16.507
2.	Gujarat	26.490	27.13	2.930	30.060
3.	Haryana	5.640	6.310	0.080	6.390
4.	Karnataka	5.270	6.97	0.630	7.600
5.	Madhya Pradesh	6.390	5.503	0.285	5.788
6.	Maharashtra	39.160	40.097	1.822	41.919
7.	Odisha	0.970	0.000	1.250	1.250
8.	Punjab	5.170	4.300	0.200	4.500
9.	Rajasthan	4.000	3.954	0.208	4.162
10.	Tamil Nadu	1.250	0.560	0.140	0.700
11.	Uttar Pradesh	0.010	0.000	0.260	0.260
12.	Others	0.350		0.050	0.050
	All INDIA	114.530	117.022	9.524	126.547

* Directorate of Economics & Statistics, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi
Source: Director, DOCD, Mumbai

Weather forecast for 4th to 9th Jan '2015

Zones/ Weather parameter	Temperature (Min, Max)						Rainfall					
	04/01	05/01	06/01	07/01	08/01	09/01	04/01	05/01	06/01	07/01	08/01	09/01
States												
Punjab	8,20	7,21	6,21	5,22	4,22	4,24	Mist					
Haryana	10,20	9,22	8,23	8,24	7,24	6,25	Mist					
Rajasthan	7,24	7,24	7,24	6,25	6,25	6,25	Fog			Mainly Clear sky		
Gujarat	16,27	15,27	15,28	15,28	15,28	15,28	Light rain		Mainly Clear sky			
Maharashtra	14,24	10,26	11,27	11,28	10,28	11,28	Haze			Light rain		Cloudy sky
M.P.	14,22	14,23	12,24	12,25	12,25	11,25	Partly Cloudy sky		Clear cky			
Odisha	16,26	13,27	13,27	13,27	13,27	13,27	Cloudy sky		Cloudy sky with possibility of rain or thunderstorm			
A.P.	21,32	21,31	20,31	19,31	18,30	17,30	Haze					
Karnataka	18,29	17,29	17,29	16,29	16,29	17,29	Partly cloudy sky					
Tamil Nadu	21,32	20,32	21,32	21,32	21,32	21,32	Partly cloudy sky					

Source: www.imd.gov.in

STRATEGIES FOR MANAGEMENT OF PESTS, DISEASES & WEEDS

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. Seed treatment with Imidacloprid @7gms/Kg of seed.
4. Use nitrogenous fertilizers to the minimum especially for sucking pest susceptible varieties.
5. Maintain field sanitation (weed free) and remove and destroy mealy bug infested plants &.
6. **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

7. **If 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., *Aphelinus* 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.
8. **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.
9. **Do not spray Bt-formulations on Bt cotton** to avoid further selection pressure.

10. **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.
11. **Do not use WHO Class-I (Extremely Hazardous category) insecticides** such as Phosphamidon, Methyl parathion, Phorate, Monocrotophos, Dichlorvos, Carbofuran, Methomyl, Triazophos and Metasystox.

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 Fipronil or 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 Fipronil 5 SC @ 1.0 ml/lit of water

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 HaNPV on Bt-cotton** followed by the application of **5% NSKE** a week later. **Or, use Phosalone** at 50% bollworm infested plants (plants having flared squares with entry hole) or for the management of *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 (Coragen),
 - b. Flubendiamide (Fame),
 - 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.
5. ***Spodoptera litura*:** Collection of egg masses or application of *SNPV* (*Spodoptera litura* Nuclear Polyhedrosis Virus) @ 500 LE/ha or Spray 200 ml Rimon 10 EC or 250g Larvin 75WP in 250 litres of water per acre
6. To minimize **shoot weevil** damage, spray Profenofos @ 2 ml/lit
7. In case of snail incidence in heavy rainfall areas, baiting with 2% Metaldehyde (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

1. **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.
2. **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.
3. ***Alternaria* blight:** spray Mancozeb@2.5 g per one litre of water.
4. **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

Herbicides are most effective on younger weeds.

Post emergence herbicides (application rate 50 to 75 g ai /ha)

1. **Grasses:** Spray Quizalofop-ethyl or Fenoxaprop ethyl or Fluazifop butyl,
2. **Sedges and grasses:** Spray Propaquizafop ethyl
3. **Broadleaf weeds:** Spray Pyriithiobac sodium

GENERAL CROP HEALTH MANAGEMENT

1. **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.
2. **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.
3. **Retention of squares and flowers:** Spray Planofix 4.5 SL (NAA) hormone @ 21 ppm (7 ml per 15 litres of water).

IMPORTANT NOTE: (PEST MANAGEMENT)

Farmers are advised not to spray pyrethroids early in the season singly or in combination against sucking pests such as the whiteflies not only for cotton but also on other *H. armigera* host plants such as soybean, as it may exacerbate bollworm problems in non Bt cotton, wherever cultivated.

COTTON CROP SITUATION

(Based on inputs received from the State Agricultural Universities of the respective States)

CENTRAL INDIA

Gujarat: At Junagadh, the crop is at picking stage. Weather remained cool and bright during the reporting period. Hand picking, irrigation and insecticides' spraying carried out as per requirements. The population of aphids was above ETL and jassids and whiteflies were recorded below ETL & mealy bug were found low to medium. Red cotton bug and dusky cotton bug were found low. The infestation of pink boll worms was found above ETL level in BG-2 and Non Bt cotton throughout the reporting period. Around 15 per cent incidence of Alternaria leaf spot was observed. Due to outbreak of pink bollworm in Bhavnagar, Amreli, Baruch, Vadodara, farmers who have sown cotton under drip irrigation are advised against extending the crop.

Maharashtra : In most of the farmer's field about 60 to 80 per cent cotton has been harvested. At Marathwada, picking of cotton is in progress. Cotton should be picked as far possible in morning hours as dry leaf particles will not stick up to cotton. After picking, cotton should be dried in shade and stored at dry place. Cotton of different picking should be stored in different places. Forced boll opening recorded in rainfed Vidarbha in farmers fields where Bt cotton was raised without irrigation, affecting quality of yield.

Odisha: The crop is at harvesting stage. Picking of the fully open bolls should be done on clear days after drying of the morning dew. Seed cotton should be dried under sun for 2 to 3 days and stored. Seed cotton obtained from first picking should be kept separately. Seed cotton should be sold in "Mandis" operated by the Regulated Market Committees of the districts. When harvesting is completed, the cotton plants should be cut from the ground and used for compost making

SOUTH INDIA

Andhra Pradesh: The crop is at boll maturity to picking stage. Maintain good field sanitation by destroying and removing the crop residues, and weeds. Combination of cultural practices and need based insecticidal applications keep a check of whitefly populations. Repeated applications of insecticides in combination with synthetic pyrethroids lead to resurgence of whiteflies. More than 25% of leaf coverage by the whitefly pupae on the under surface of leaves of middle plant canopy and flight of white adults visible on a single stroke of the plants should be used to decide the insecticidal applications. Proper coverage of underside of the leaves during the insecticidal sprays effectively reduces the whitefly population. For the control of mealy bug, recommended measures can be taken up. Spot application of insecticides is desirable when the infestation is confined to isolated pockets in the field. Removal and destruction by burning of heavily infested dried / dead cotton plants may be taken up to arrest further spread of the pest incidence.. In Coastal A.P., the cotton crop is 160 days old. In Telangana, the cotton crop is in picking stage. Picking should be done from fully opened bolls during dry hours. Care should be taken not to mix infested/ bad opened/ rotten bolls with good kapas. Picked bolls should be shade dried and stored in dry places with good ventilation. .

Karnataka: Lower night temperature with moderate cold weather is prevailing in all the districts. Due to severe cold conditions and increased incidence of jassids, leaf reddening in Bt cotton is more. It is suggested for the foliar application of 19:19:19 @ 1.0 % along with 1% MgSO₄ and Thiomethaxam 25 W.D.G @ 0.2 gm/lit of water added to this spray mixture to control sucking pests. In late sown crop, wherever the incidence of white fly is seen, it is advised to spray Triazophos 40 EC @ 1.5 ml/lit of water. In more than 100 days old Bt cotton crop, it is suggested to spray the crop once with Spinosad @ 0.2 ml/lit of water along with foliar sprays of Copperoxychloride @ 3g/lit and Streptocycline @ 0.5 gm/lit to control boll worm and boll rotting, respectively. In *herbaceum* and *arboretum* desi cotton crop, grey mildew disease is on the increase. It is suggested to spray the crop with Carbendizim 50 WP @ 1g/lit of water for effective control. Wherever irrigation facilities are available, Bt cotton crop is to be irrigated lightly after each kapas picking is over. It is suggested to uproot the cotton stalks immediately wherever the kapas picking is completed so that short duration pulses can be sown as second crop instead of irrigating the crop to get new flush which is undesirable for the cotton ecosystem. Cotton stalks

uprooted have to be used for composting or vermicomposting instead of burning as fuel. Suitable compost making cultures or the crop residue decomposing consortia like *Phenerocheat*, *Pluorotus* and *Trichoderma* can be used in compost making for early decomposition of cotton stalks. Wherever facilities are available, the cotton stalks can be incorporated into the soil with rotoslasher or rotovator.

Tamil Nadu; The crop is 95 to 140 days old at boll maturing and bursting stage. Weed infestation is moderate. Spraying recommended insecticides against bollworm and whitefly has been taken up. Root rot and leaf spot incidence noticed in certain areas.

Weekly 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, Div of Crop Improvement, CICR, Nagpur		
Dr Sandhya Kranthi	Head, Div of Crop Protection, CICR, Nagpur		
Dr Blasé De souza	Head, Div of Crop Production, CICR, Nagpur		
Dr. Isabella Agarwal	Sr. Scientist CICR, Coimbatore		
Sh. M.Sabesh	Scientist, CICR, Coimbatore		
Scientists In-charge for Weather Report (AICCIP Centres)			
Scientists	Address	Mobile No	E Mail ID
Dr. Paramajit Singh	Punjab Agricultural University, Bathinda, Punjab	9463628801	rsmeenars@gmail.com
Dr. Pankaj Rathore	Punjab Agricultural University, Faridkot, Punjab	9464051995	pankaj@pau.edu
Dr. Jagdish Beniwal	CCS-Haryana Agricultural University, Hisar 125 004, Haryana	9416325420	cotton@hau.ernet.in
Dr.S.L.Ahuja	CCS-Haryana Agricultural University, Sirsa, Haryana	9255947380	slahuja2002@yahoo.com
Dr.K.N.Bhatia	Swami Keshwanand Rajasthan Agricultural University, Sriganganagar, Rajasthan	9352700411	bsmeena1969@rediffmail.com
Dr.Harphool Meena	Maharana Pratap University of Agri. & Technology, Udaipur – 313 001, Rajasthan	9460246043	hpagron@rediffmail.com
Dr. Narendra Kumar	CSA University of Agri. & Technology, Kanpur – 208 002, Uttar Pradesh	9335699132	jagdishk64@yahoo.com
Dr. Gofaldu	Navsari Agricultural University, Navsari – 396 450, Gujarat	9662532645	girishfaldu@rediffmail.com
Dr.M.D.Khanpara	Junagadh Agricultural University, Junagadh – 362 001, Gujarat	9426990070	cotton@jau.in
Dr.R.W.Bharud	Mahatma Phule Krishi Vidyapeeth, Rahuri – 413 722, Maharashtra	9850244087	cotton_mpkv@rediffmail.com
Dr. B . R. Patil	Panjabrao Deshmukh Krishi Vidyapeeth, Akola – 444 104, Maharashtra	9657725801	srscottonpkv1@yahoo.co.in
Dr.P.R.Zanwar	Marathwada Agricultural University, Parbhani – 431 402, Maharashtra	7588151244	crsned@indiatimes.com
Dr. Satish Parsai	RVS Krishi Vishwa Vidhyalaya, Gwalior – 474 002, Madhya Pradesh	9406677601	aiccupkhandwa@gmail.com
Dr. B.S.Nayak	Orissa University of Agriculture & Technology, Bhubaneswar – 751 003, Orissa	9437321675	bsnayak2007@rediffmail.com
Dr.S.Bharathi	Acharya N. G. Ranga Agricultural University, LAM, Guntur, AP	949072341	bharathi_says@yahoo.com
Dr. Sharma	Acharya N. G. Ranga Agricultural University,	08514-242296	sharmarars@gmail.com

	Nandyal, AP		
Dr. Aladakatti	University of Agricultural Sciences, Dharwad – 580 005, Karnataka	9448861040	yaladakatti@rediffmail.com
Dr. Bheemana	University of Agricultural Sciences Raichur – 584 102, Karnataka	9448633232	bheemuent@rediffmail.com
Dr. Amala Balu	Tamil Nadu Agricultural University, Srivilliputhur, Tamil Nadu		
Dr. M Gunasekaran	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	9443631359	gunasekaran.pbg@gmail.com

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