

Central Institute for Cotton Research, Nagpur

Sixteenth Weekly Advisory for Cotton Cultivation 8th to 14th September 2014

"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 (As on 11-09-2014)

S.No.	States	Normal Area (DES)*	Area in lakh ha		
			Bt	Non Bt	Total
1.	Andhra Pradesh + Telengana	19.83	21.78	1.669	23.45
	Andhra Pradesh (23.95%)	4.749	6.861	0.239	7.1
	Telangana (76.05%)	15.081	14.92	1.430	16.350
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	39.888	1.822	41.710
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	0.056	0.014	0.070
11.	Uttar Pradesh	0.010	0.000	0.260	0.260
12.	Others	0.350		0.050	0.050
	All INDIA	114.530	115.892	9.398	125.291

* Directorate of Economics & Statistics, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi

Source: Director, DOCD, Mumbai

Weather forecast for 13th to 18th Sep '2014

Zones/ Weather parameter	Temperature (Min, Max)						Rainfall					
	13/09	14/09	15/09	16/09	17/09	18/09	13/09	14/09	15/09	16/09	17/09	18/09
Punjab	25,35	25,35	25,35	25,35	25,35	25,35	Partly cloudy sky with thundery development			Partly cloudy sky		
Haryana	25,34	25,33	25,34	25,34	25,35	25,35				Partly cloudy sky		
Rajasthan	25,37	26,37	26,38	26,38	25,37	25,37	Partly cloudy sky					
Gujarat	26,31	26,31	27,32	27,32	27,32	27,32	Moderate rain	Light rain				
Maharashtra	23,30	23,30	23,31	23,31	23,30	23,30	Partly cloudy sky with thundery development					
M.P.	21,26	22,26	22,26	22,28	22,29	23,31	Light rain	Mainly or Generally cloudy sky with possibility of rain or thunderstorm		Partly cloudy sky		
Odisha	19,26	19,27	19,27	19,27	19,27	19,27	Generally cloudy sky with possibility of rain or thunderstorm					
A.P.	24,34	24,34	24,34	24,33	24,33	23,34	Partly cloudy sky with thundery development					
Karnataka	22,33	22,34	22,32	22,32	20,33	20,33	Light rain	Moderate rain	Light rain		Moderate rain	
Tamil Nadu	23,33	23,33	23,33	23,33	23,33	23,33	Light rain					

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).

DROUGHT MANAGEMENT**Odisha****Mid season drought (long dry spell)**

Condition			Suggested Contingency Measures	
Mid season drought (long dry spell)	Major Farming Situation	Normal Crop / Cropping System	Crop management	Soil nutrient & moisture conservation measures
At flowering/ fruiting stage	Red soil High rainfall Medium elevation	Cotton	Applying of Planofix hormone * spraying the crop with Imidacloprid for controlling of sucking pests	Apply 1250ml micronutrient/ha
	Red and Yellow soil High rainfall Medium elevation	Cotton		
	Black soil High rainfall Medium elevation	Cotton + Arhar		

Terminal drought (Early withdrawal of monsoon)

Condition			Suggested Contingency Measures	
Terminal drought (Early withdrawal of monsoon)	Major Farming Situation	Normal Crop / Cropping System	Crop management	Rabi Crop planning
	Red soil, High rainfall, Medium elevation	Cotton	Provide protective irrigation	Mulch with stovers Dibble rabi crop
		Cotton	Provide protective irrigation	
		Cotton + Arhar	Provide protective irrigation Harvest at physiological maturity stage	

In case of severe drought situation following measures may be taken apart from the above contingent plans.

- Bacterial blight, fungal foliar spots and parawilt are the major diseases in this region. Long dry spells with intermittent rains may aggravate the incidence of the diseases. These should be managed with fungicidal sprays as and when required.
- Foliar spray of KCl or KNO₃ to partially alleviate moisture stress during drought.
- Application of anti-transpirants or hormones.

Gujarat**1st -15th September (Terminal drought)**

- Weeding
- Top dressing of Urea if sufficient occurrence of rain
- Insecticide spray for control of sucking and bollworms
- Alternate furrow irrigation, if irrigation water is available
- Adopt topping to reduce evapotranspiration losses

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)

NORTH INDIA

Punjab: At Faridkot, the crop is nearly 125 days at reproductive stage (Crop bearing squares, flowers, bolls), Weather remained mildly hot and humid during the reporting period, Since medium to heavy rainfall is occurring across the cotton belt, farmers are advised to drain out the stagnant water. Give sprays of Potassium nitrate @2kg/acre at weekly intervals. The farmers who have witnessed leaf reddening in their cotton fields are advised to spray $MgSO_4$ @1%(1 kg/100 lts of water) twice during flowering and boll development stage as a prophylactic remedial measure. Due to high rainfall during last week, there may be resurgence of itsit (*Trianthema* spp.) which is a host of Tobacco caterpillar. Hence farmers need to be vigilant if hot and humid conditions persist. If necessary, spray Triazophos 40 EC @ 600ml/acre or Ethion 50 EC @ 800 ml/acre if whitefly population is higher than ETL level of 6/leaf after rainfall. If numbers are too high, spray Polo (Diafenthiuron 50 WP @200g/acre). Cotton leaf curl disease intensity has increased to highest levels in the past week; Fungal foliar spots are noticed and it might increase if cloudy weather persists. If plants show Parawilt symptoms after rainfall, spray Cobalt Chloride @ 10 mg/litre on affected plants within few hours to check it. At Bhatinda, Cotton crop is in boll development stage. Boll opening has started in early maturing varieties/hybrids. The infestation of whitefly is quite high in cotton growing areas due to high humidity. Parawilt symptoms are noticed in some fields due to heavy rainfall which can be cured by spraying Cobalt chloride @ 10mg/litre (10ppm) on affected plant within few hours of onset of symptoms. Crop reddening can be cured by spraying two sprays of $MgSO_4$ @ 1kg in 100 litres of water at fifteen days interval. Farmers are advised to monitor their crop for insect pests and diseases regularly.

Haryana: The crop is normal at vegetative/reproductive stage, Light to moderate rain/thunder showers may occur at isolated places during this period. Weeds must be removed around the fields, water channel and road side to check the whitefly population on alternate host of CLCuD. Irrigate the field as and when required. Mean population of whitefly adults was above ETL. High incidence of white fly was observed in some fields of Hisar, Jind and Bhiwani districts. Population of leafhopper was below ETL. Pink boll worm infestation was noticed in *Desi* cotton/non Bt. varieties. Solenopsis mealybug (*Phenacoccus solenopsis*) incidence was observed in traces in few fields. Incidence of *Spodeptera* was observed in few farmers field. Low to moderate incidence of leaf-curl virus disease was also recorded. Myrothecium leaf spot disease and boll rot were observed in traces. Farmers are advised to monitor disease and insect-pest populations on weekly basis and to apply control measures only at ETL. For the control of bollworms in *Desi* and non Bt cotton varieties, spray 600g Carbaryl/600 ml Quinalphos/500-600 ml triazophos/700 ml Profenophos in 200L of water per acre. Population of whitefly may increase fast in case the dry spell prolongs. For checking whitefly, Nimbecidine 300 ppm @ 1 litre/acre may be sprayed twice at five days interval followed by one spray of 300 ml Dimethoate 30 EC in 200 litres of water per acre. For boll rot complex, spray Copper oxychloride 800 g. or Bavistin 400 g. in 200 litres of water per acre

Rajasthan: The crop is 91 to 96 days old at full boll formation stage, The weather was partially cloudy with high humidity, Weeding and spray for sucking pests has been taken up, At present, the crop is weed free. Jassids continued to remain above ETL whereas whiteflies incidence was recorded below ETL. Among bollworms, spotted bollworm infestation was also recorded below ETL. If any above said insect infestation is found above ETL, any of the recommended insecticide should be sprayed.

CENTRAL INDIA

Gujarat: The crop is nearly 150 days old at reproductive stage (Crop bearing squares, flowers, bolls). Weather remained cloudy and rainy during the reporting period. Since heavy rainfall is there across the cotton belt, farmers are advised to drain out the stagnant water. Due to heavy rainfall, incidence of weeds is intense. The population of jassids was recorded above ETL and thrips, aphids, white fly and mealy bug were low throughout the reporting period. No incidence of bacterial blight and other cotton diseases.

Maharashtra: At Akola, the excess rains caused parawilt in cotton from 5 to 30 per cent in some patches where the rain water stagnated. Farmers are advised to drain out excess water. Affected plant should be drenched with 25g COC and 100g urea and SOP in 10 litre of water. Hoeing and weeding should be done immediately after rains cease. At Rahuri, the crop is 80 to 120 days old at Square formation to boll development stage, Fertilizer application, weeding, Insecticide sprays were taken up. Weed infestation was up to 30 to 40 per cent, sucking pest attack around 25 to 30 per cent. Among diseases, Alternaria leaf blight incidence to the tune of 20 per cent and Tobacco Streak Virus up to 10 per cent were noticed. Heavy rains during late August led to square drop and sudden wilting of plants. The control measures recommended may be followed to control the pest and disease attack.

Odisha: The crop is 59 to 79 days old at square initiation, flowering and boll formation stage. The weather was hot and humid. Second top dressing, weeding and earthing up and spraying for pest management is going on. All three types of weeds i.e grasses, sedges and broad leaved weeds have infested the crop. Incidence of aphids and jassids observed (below ETL), sporadic incidence of leaf folder, stem borer and Spodoptera recorded. When sucking pest population exceeds ETL (> 20% infested plants), spray buprofezin @ 1 ml/litre of water. To control the pests like Spodoptera, stem borer and leaf folder, spray Beauveria bassiana bio-pesticide @ 2 ml per litre of water.

SOUTH INDIA

Andhra Pradesh: Gap filling and thinning is being carried out in the late sown crop. Weed management by working Gorru and Guntaka as an inter cultivation operation was carried out. Post emergence application of weedicides is recommended at 4 to 6 leaf stage of weeds. For the control of grassy weeds, Quizalofopethyl @ 400 ml/acre and for the control of broad leaf weeds, Pyrethiobac sodium @ 250 ml/acre is recommended. Spraying of Mancozeb @ 3 g/l or Propiconazole @ 1 ml/l is recommended to manage the leaf spots. Spray Copper oxy chloride @ 3 g/l + Streptocycline @ 0.1 g/l against bacterial blight. Soil drenching with Copper oxy chloride @ 3 g/l or Carbendazim @ 1 g/l near the root zone is advocated against wilt diseases. Summer cotton sown in approximately in an acreage of 25 thousand hectares which is in squaring to flowering stage to boll development stages. Suitable Plant Protection against sucking pests (Jassids & Thrips) were recommended. In Coastal A.P the cotton crop is in seedling to 80 days stage and with the availability of soil moisture depending on the crop stage, top dressing of 25 to 30 kg Urea and 15kg of MOP is recommended. In Telangana, the cotton sowings were completed and the crop is in 30 days (seedling stage) to 80 days (squaring and initiation of flowering). Topdressing of nitrogen and potassium fertilizers is under progress. Inter-cultivation by working in the Gorru and Guntaka is under progress for the conservation of moisture and control of weeds.

Karnataka: At Dharwad, In some areas due to continuous drizzling, it is not possible for mechanical and manual weeding in cotton crop, hence, it is suggested for spraying selective recommended post emergent herbicides on weeds for effective control of both monocot and dicot weeds. Suggested to drain out the excess water stagnated in the crop due to high intensity rainfall. Top dress the crop with Urea (25 kg/ac) for immediate recovery from water stagnation effect. Root rot is observed in patches in some areas, suggested for drenching of Vitavax Power @ 2 g/lit to the affected plant and the surrounding plants. To reduce or effectively manage the leaf reddening menace in early sown cotton, it is advised to spray the crop with 1.0 % of 19:19:19 (10 g/lit of water) water soluble fertilizer along with 1 % MgSO₄ at an interval of 15 days. These nutrient sprays may be combined with the insecticide sprays if required at that stage. It is suggested to spray the crop with Acephate @ 1.0 g /lit of water for effective management of the mirid bug. In desi cotton, Carbendizim @ 1.0 g/lit of water to be sprayed to control grey mildew disease.

Tamil Nadu: The crop is 35 to 45 days old at square formation stage. The crop is normal. No significant incidence of pests and diseases or weeds noticed in the fields.