

Central Institute for Cotton Research, Nagpur

Fourteenth Weekly Advisory for Cotton Cultivation 1st – 7th September 2013

"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, fluzifop butyl, can be used. For sedges and grasses, Propanil is effective and Pyriproxyfen 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 or 19:19:19 (soluble complex of Nitrogen) at weekly intervals will help the plants to recover from the effect of water logging.

Weather forecast for 3rd to 6th Sep. 2013

Zones/ Weather parameter	Temperature (Min, Max)				Rainfall			
	03/09	04/09	05/09	06/09	03/09	04/09	05/09	06/09
Punjab	26,35	26,34	26,34	26,34	Partly cloudy sky		Thunderstorm with rain	
Haryana	26,36	26,36	26,36	25,35	Partly cloudy sky			
Rajasthan	27,39	27,39	27,39	27,39	Clear sky		Partly cloudy sky	
U.P.	26,34	26,34	26,34	26,34	Partly cloudy with possibility of rain or thunderstorm			
Gujarat	26,32	26,32	26,32	26,32	Partly cloudy with possibility of rain or thunderstorm			
Maharashtra	24,34	24,34	23,34	23,34	Partly cloudy sky			
Madhya Pradesh	20,30	21,30	21,30	21,30	Partly cloudy sky			
Odisha	25,31	25,31	25,31	25,31	Generally cloudy with thundery development			
Andhra Pradesh	23,35	24,35	25,35	25,35	Partly cloudy sky with thundery development			
Karnataka	23,33	23,33	23,32	23,33	Thunder with rain	Light rain		
Tamil Nadu	23,35	23,35	23,35	24,35	Light rain	Partly cloudy with possibility of rain or thunderstorm		Light rain

Source: www.imd.gov.in

State	Lakh hectares
Punjab	5.05
Haryana	5.57
Rajasthan	2.93
Uttar Pradesh	0.23
Gujarat	26.88
Madhya	6.21
Maharashtra	38.68
Andhra Pradesh	20.94
Karnataka	5.17
Odisha	1.24
Tamil Nadu	0.12
Others	0.10
TOTAL	113.12

Source: Director, DOCD, Mumbai

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. Diafenthuron (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

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

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 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).

COTTON CROP SITUATION

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

NORTH INDIA

Leaf hopper population has flared up and must be managed with insecticides. Farmers are advised to spray recommended insecticide if the damage crosses ETL of 2nd injury grade (curling and yellowing of leaves in upper canopy of plant). Monitoring for whitefly infestation may also be controlled. The population of whitefly has also crossed ETL at almost all the locations. The appearance of any fungal foliar disease may be monitored because of cloudy weather. The infestation of alternaria leaf spot has been noticed at few locations. The severe incidence of cotton leaf curl virus disease has been noticed in the entire zone. Avoid using insecticide mixtures for whitefly control. Farmers are advised not to spray pyrethroids or tank mixes containing pyrethroids to control its vector, To control physiological fruit dropping, spray of Potassium Nitrate is advised. Initiate the sprays of Potassium nitrate (13:0:45) @ 2kg/acre at the onset of flowering. Four sprays can be done at weekly interval. Farmers are advised to identify hybrids relatively tolerant to the leaf curl as host plant resistance is one of the best methods of management of the disease.

Punjab: The crop is in reproductive phase. The attack of sucking pests' i. e. Whitefly and jassids are above economic threshold level in most of the fields, so recommended plant protection measures should be followed for control of these. The incidences of CLCuD were observed in almost all Bt cotton hybrids throughout the cotton growing areas of Punjab. Potassium nitrate 2% per acre 3-4 times at weekly intervals should be sprayed as the crop is at peak flowering stage. Cotton leaf Parawilt symptoms are noticed in some fields which can be cured by spraying cobalt chloride @10mg/litre (10ppm) on affected plant within few hours of onset of symptoms.

Haryana: Cotton crop is in peak vegetative to reproductive phase. In general, the crop is healthy. The population of whitefly was observed above economic threshold in 28% farmer's fields. Leaf hopper, whitefly and bollworm incidence has to be checked. Low to moderate incidence of CLCuD was observed throughout the cotton growing areas in the State. Spray of cobalt chloride @ 1g in 100 lit of water at initial stage can check the para wilt. Farmers are advised to monitor their crop for insect pests and diseases regularly.

Uttar Pradesh: Crop is in flowering to boll formation and development stage. Farmers are advised to spray 2% urea and 1 % DAP for recovery of crop from water logged crops at 10 days interval. Control of bollworm in clean weather at 15 days interval is advised.

CENTRAL INDIA

Gujarat: At Surat, due to cloudy weather, there are chances of incidences of sucking pest in cotton. Farmers are advised to take up weeding and inter cultural operations along with application of fertilizer in the cotton fields.

Maharashtra: Sucking pest infestation is noticed. Bollworm control management to be done for non bt cotton crop. Urea 2% in 200g/10 liter of water should be sprayed at flowering stage. If wilting seen, drenching of 100g urea +25g of COC in 10 litres of water should be given.

Odish: The cotton crop is at flowering and boll initiation stage (63-73 days). The crop condition is almost good and there is no incidence of any severe pest/diseases. Drain out excess water from the field. Apply 25% Nitrogen as final top dressing. Regular monitoring should be done for other pests like Spodoptera and Semiloopers etc.

SOUTH INDIA

Andhra Pradesh: In Telangana districts of Andhra Pradesh, the crop is around 50-95 days old. In Guntur, Krishna and Prakasam districts the crop is 20-75 days old. Third split application of fertilizers at 50 kg Urea + 15 kg MOP along with inter-cultivation is recommended for the early sown crop (wherever the crop is > 80 DAS). Foliar application of 2% Urea or 2% DAP or 1-2% KNO₃ along with 1% MgSO₄ is recommended to mitigate the stress conditions. In the early sown crop (60to 90 days), spraying should be done for the control of sucking pests with recommended pesticides. Monitoring of bollworms, specifically, *Spodoptera litura* should be done through pheromone traps. Scout for Spodoptera egg masses on cotton. Excess moisture and high soil temperature may predispose the plants to fungal root rots and wilts. Sudden death of plants in patches or yellowing of leaves and wilting of plants should be managed. High relative humidity, windy rains may spread bacterial blight disease. Angular leaf spot and vein blight should be managed by spraying 0.3% (3 g/l) copper oxy chloride plus 0.01% (100 mg/l) Streptocycline at 7-10 days interval. Fungal leaf spots should be managed by protective or curative spraying with appropriate fungicides at 7-10 days interval.

Karnataka: At Dharwad, nipping of growing shoot tip is advised in 90 days old crop to check excess vegetative growth. After nipping, the crop has to be sprayed with plant hormones to manage leaf reddening and square dropping effectively. In 100-110 days old cotton crop, it is suggested to spray the crop with recommended control measures for checking boll worm incidence and leaf spot disease, respectively. Avoid heavy irrigation in black soils where the crop is at peak square and boll formation stage. Irrigating in alternate furrows is suggested to save water, time, labour and to irrigate more area in available water. Bacterial leaf blight is reported from southern districts which has to be managed. At Raichur, thrips population ranged from 2-11/ three leaves. Leafhopper population ranged from 2-6/ three leaves. Aphids population ranged from 1-7/ three leaves and Whitefly population ranged from 1-2/ three leaves. Natural enemies (Coccinellid grubs, chrysopa grubs and spiders) were noticed.

Tamil Nadu: In the summer irrigated cotton growing zones of Tamil Nadu (Parts of Tirunelveli, Virudhunagar, Ramanathapuram and Madurai District), the cotton crop is almost in final stage. Uprooting of cotton stalks is also going on. The weather prevailed during the reporting period was dry with moderate rainfall in many areas.

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