

Central Institute for Cotton Research, Nagpur

Eleventh Weekly Advisory for Cotton Cultivation 4th to 10th August 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.

Weather forecast for 11th Aug to 16th Aug '2014

Zones/ Weather parameter	Temperature (Min, Max)						Rainfall					
	11/08	12/08	13/08	14/08	15/08	16/08	11/08	12/08	13/08	14/08	15/08	16/08
Punjab	27,35	27,35	27,35	26,36	26,36	26,36	Mainly or Generally cloudy sky with possibility of rain or thunderstorm			Partly cloudy sky		
Haryana	27,36	27,36	27,36	26,36	26,36	26,35	Partly cloudy sky with thundery development			Partly cloudy sky		
Rajasthan	28,36	28,36	27,35	28,36	28,37	28,38	Mainly or Generally cloudy sky with possibility of rain or thunderstorm			Partly cloudy sky		
Gujarat	26,31	26,31	26,32	27,32	27,33	28,34	Light rain					
Maharashtra	24,33	24,32	23,32	24,32	24,32	23,33	Moderate rain		Light rain		Generally cloudy sky with possibility of rain or thunderstorm	
M.P.	21,29	21,29	21,28	21,28	22,28	22,28	Light rain		Partly cloudy sky with thundery development		Partly cloudy sky	
Odisha	25,32	25,32	25,32	25,32	25,32	25,32	Mainly or Generally cloudy sky with possibility of rain or					

							thunderstorm
A.P.	25,35	25,35	25,35	25,35	24,34	24,34	Mainly or Generally cloudy sky with possibility of rain or thunderstorm
Karnataka	23,33	23,33	23,33	22,32	22,32	22,32	Light rain
Tamil Nadu	23,31	23,31	23,31	23,31	24,32		Light rain 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 *Sysiroa 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

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)

NORTH INDIA

Punjab: The crop is at square to boll development stage. The continuous cloudy weather from last ten days may increase the attack of sucking pests, so farmers are advised to monitor their crop for jassid, whitefly and CLCV regularly. The infestation of jassid is above ETL in most of the cotton growing areas of Punjab. If infestation of whitefly reaches ETL, it can be controlled by spraying recommended insecticides. The incidences of cotton leaf curl virus disease have also been noticed in areas of Abohar and Fazilka. Jassid infestation is very high, so farmers are advised to go for spraying Flonicamid 50 WG @ 80g/acre or Thiamethoxam 25 WG @ 40g/ acre if the damage crosses ETL of 2nd injury grade (curling and yellowing of leaves in upper canopy of plant). In case of population crossing ETL or appearance of CLCuD symptoms, the recommended insecticides may be sprayed. Do not allow cotton to suffer for water during flowering and fruit development stage or else heavy shedding of young buds and flowers will take place resulting in poor yield. In case of severe rainfall, maintain proper drainage of cotton fields as it cannot tolerate stagnating water. Parawilt incidence may occur during prevalent weather conditions. Affected plants may be sprayed with cobalt chloride (10 mg/litre of water).

Haryana: Crop is normal in vegetative/ reproductive stage. Interculture if required and weeds must be removed around the fields, water channel and road side to check the whitefly population on alternate host of CLCuD. Survey for cotton diseases and insect pests incidence in Hisar, Jind, Rohtak and Bhiwani Districts was conducted. Average population of leafhopper nymphs and adults was above economic threshold (ET). Mean population of whitefly adults was above ET. Solenopsis mealybug (*Phenacoccus solenopsis*) infestation was observed in few plants near road side. Mealybug infestation was also observed on Congress grass. Incidence of spotted bollworm was observed in non-Bt variety. Low incidence of leaf-curl virus disease was observed in traces. Bacterial leaf blight and fungal foliar diseases were not noticed in surveyed fields of cotton. Farmers are advised to monitor disease and insect-pest populations on weekly basis and to apply control measures only at ETL. 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. Some farmers in Jind and Hisar districts were found to spray cotton crop by mixing 2 to 3 insecticides for the control of whitefly which should be discouraged. Since *Aenasius* parasitoid is quite active, the mealybug is likely to remain in low profile and there is no need of spraying any insecticide against this pest. The present weather conditions are also favourable for build-up of red hairy caterpillar. Therefore, wherever this pest is a problem, particularly in the sandy areas, recommended insecticides may be sprayed for its control. For control of root rot disease in cotton, soil drenching with 0.2% Carbendazim solution may done in root rot affected areas. If foliar diseases appears, spray Streptomycin sulphate (6-8g) plus Copper oxychloride (600-800 g) in 200 L of water per acre 3 to 4 times at 15 days interval.

Rajasthan: The crop is 53 to 60 days old with initial boll formation stage. Continuous rains was noticed in this week. At present, crop is full of weeds and spray of Quisqualop ethyl is done to control weed with narrow leaves. Jassids remained above ETL and whiteflies incidence was recorded below ETL. Among bollworms, spotted bollworm infestation was also recorded below ETL. If any of the above mentioned insect infestation crosses ETL, recommended insecticides may be sprayed.

CENTRAL INDIA

Maharashtra: Fertilizer should be applied followed by hoeing if not done at the time of sowing. The second dose of fertilizer should be given to pre-monsoon cotton. Hoeing and Weeding should be done. No sprays are required.

Madhya Pradesh: The crop in rainfed sown crop is 30 days old at square stage and flower initiation in 60 days irrigated crop. Clear weather with light showers was noticed this week. Crop condition is good and intercultural operations are in progress. Weedy fields noticed and cleaning of field is in progress. Incidence of jassids noticed in the field.

Odisha: Out of the target of 1.35 lakh ha under cotton in the State, 98 per cent area has been sown till date. The crop is in seedling and vegetative stage. The weather is hot and humid. First top dressing, weeding and earthing up operations are going on. All three types of weeds i.e grasses, sedges and broad leaved weeds have infested the crop. Incidences of jassids were observed below ETL. Farmers are advised to drain out excess water from the field during heavy rainfall. Gap filling must be completed within 8 days of sowing. At 30 DAS, top dressing should be done with 50 % N and 25 % K₂O followed by weeding and earthing up. For reducing the jassids population, neem based pesticides @ 2.5 ml/litre of water can be sprayed.

SOUTH INDIA

Andhra Pradesh: Dry weather prevailed during the period with normal wind velocity. The fields are ready and sowings will be done after receipt of rainfall. 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 Telangana, the cotton sowings were completed and the crop is in 15 days (seedling stage) to 60 days (squaring and initiation of flowering) old.

Karnataka: The crop is in vegetative stage varying from 30 to 60 days. Cloudy and drizzling conditions continued with low temperatures. Top dressing and weeding operations were undertaken. Monocot and dicot weeds were observed in the crop. Quizolpof ethyl @ 1 ml/lit + Pyriithiobac sodium @ 0.6 ml/lit was sprayed as post emergent herbicides to control monocot and dicot weeds in cotton crop. Sucking pests and shoot weevil incidence were seen in the early sown crop. Shoot weevils were hand-picked in the morning hours as it was not possible to undertake spraying of chemicals due to drizzling conditions. No incidence of any disease. Continuous rainfall and cloudy conditions hampered the crop growth. Top dressing with 25 kg N/ha (i.e. 50 kg Urea/ha) & 12 kg K (20 kg MOP/ha) to be taken up in 40 to 50 days old crop. Post emergent spraying herbicides like Quizolpof ethyl @ 1 ml/lit of water + Pyriithiobac Sodium @ 0.6 ml/lit of water at 30 days and 60 days old standing crop is advised to control monocot and dicot weeds respectively without any harm to cotton crop. It is advised to spray the (30-45 days old) crop with Profenophos 50 EC @ 2 ml/lit + Dichlorovos 100 EC @ 2.0 ml/lit of water to reduce shoot weevil incidence and also it is better to hand pick the weevils during morning hours and destroy. Pipronil @ 1 ml/lit of water may be sprayed to control sucking pests. Spodoptera incidence is reported in some parts of northern districts in 40 to 45 days old crop. Light irrigation is advisable in black soils during the dry spell wherever the crop is under protective irrigation.

Tamil Nadu: The crop is 160 to 170 days old. Harvesting of most of the summer irrigated cotton crop has been completed. Boll bursting stage is in meager areas.. The weather prevailed during the reporting period was moderately hot and dry. Moderate wind was also observed. Picking of kapas is in progress.

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