

Central Institute for Cotton Research, Nagpur

Ninth Weekly Advisory for Cotton Cultivation 28th July – 3rd August 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, fluazifop 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.

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.

DONT's

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

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

Incidence of white fly, leafhopper and thrips were noticed in the fields of cotton crop. At most of the locations, whitefly has crossed ETL. Farmers are advised to monitor their fields for the population buildup of whitefly, thrips and check for appearance of CLCuD symptoms. Second dose of nitrogen fertilizer can be applied if vegetative growth has reached its peak. In case of rains, farmers must ensure proper drainage of water from the fields.

Punjab: The cotton crop is at square to boll development stage. The continuous cloudy weather and rains over the week may increase the attack of pests, so farmers are advised to monitor their crop for insect pests and diseases regularly. The infestation of whitefly is above ETL in most of the cotton growing areas of Punjab. The incidences of cotton leaf curl virus disease have also been noticed in areas of Abohar and Fazilka.

Haryana: In Haryana during preceding week (17th to 23rd July) variable weather and 35.5 mm rain was observed. Maximum temperature varied from 32.6 to 39.0 °C and minimum temperature varied from 24.5 to 28.5 °C with 67 to 93 per cent relative humidity. In general, the crop is healthy and in vegetative phase. Weeding, interculture and fertilizer application must be done during rain free period. Incidence of leaf hopper and white fly were observed above economic threshold at few farmers field in Hisar, Fatehabad and Sirsa districts. In the next fortnight, the leaf hopper population in cotton may increase if rains occur frequently and mean relative humidity remain above 70 per cent. However, the whitefly population is likely to remain at low to moderate level. The present weather conditions are also favourable for buildup of red hairy caterpillar. Therefore, wherever this pest is a problem, particularly in sandy areas, recommended insecticides may be sprayed for its control. Incidence of cotton leaf curl virus disease was observed in some farmers field in Hisar, Fatehabad and Sirsa districts. Weeds of *Sida* and *Abutilon* spp. must be removed around the fields, water channel and roadside to check the whitefly population on alternate host of the virus/vector. Farmers are advised to monitor their crop for insect pests and diseases.

Rajasthan: At Banswara, the weather during next few days would be stable with clouds. Drizzling to normal rains up to 5-13 mm is expected during all the four days. Incidence of white fly, jassid, thrips and leaf eating caterpillar were noticed in the cotton fields for which appropriate measures has to be taken up.

Uttar Pradesh: Crop stage is at square to flowering and boll formation stage. Farmers are advised to remove the weeds in the cotton fields.

CENTRAL INDIA

Gujarat: At Surat, 84.0 mm rainfall has been recorded during last week at this centre. Continuous rainfall interrupted the interculturing and other field operations. Farmers are advised to apply light nitrogen dose after weeding and drain out excess water from the field as stagnancy of water in the root zone is harmful to cotton crop. Due to cloudy weather, there are chances of incidences of sucking pest in cotton, so spraying of systemic insecticide are advisable.

Madhya Pradesh: Total rainfall in the week was 56 mm. Seasonal rainfall of about 834 mm has been received since June 1st 2013. Max. Temp between 24.0 and 27.5°C and Minimum Temp between 22 and 23 °C with relative humidity around 85 to 95 per cent were recorded in the week. Crop condition is good and attack of sucking pests was observed in rainfed cotton. Farmers are advised to apply fertilizers in irrigated cotton. Intercultural operations in rainfed cotton are in progress.

Maharashtra: In the HDPS (high density planting systems) if the non Bt plants are about 40 days old, semilooper can be seen damaging the leaves in this region. This is also likely to occur in those non Bt fields adjoining soyabean. Please do not exercise any control measure against this pest on cotton as they aid the multiplication of natural enemies in the field.

Farmers can readily identify non Bt plants in fields growing Bt by the semilooper damage that may appear on the leaves on non Bt plants during 40 to 70 days after sowing. Bt plants will not demonstrate the symptoms. Leaf hoppers and aphids are the dominant pests. Myrothecium leaf spot is seen occurring on Bt and non Bt as a result of very heavy continuous rains. Farmers are advised to ignore it as fresh leaves are free of disease symptoms.

Odisha: The cotton crop is at 4 to 5 weeks stage. Sowing of cotton has almost been completed. Weeding should be done either manually or with application of post emergence herbicide. 50% N and 50% K₂O of the

recommended dose should be applied as first top dressing. Regular monitoring should be done for other pests like Spodoptera and Semiloopers etc. Drain out excess water from the field.

SOUTH INDIA

Andhra Pradesh: In Telangana districts of Andhra Pradesh the crop is around 30-60 days old. The heavy rains received during this week resulted in water logging conditions in low lying areas in some of the districts like Adilabad, Karimnagar and Khammam. Farmers are advised to drain the water from the fields immediately. The first and second split application of fertilizers @ 40-50 kg Urea + 10-15 kg MOP per acre at 25-30 DAS and 50-60 DAS is recommended, respectively. Foliar application of 1-2% KNO₃ for early sown crop is also recommended to mitigate the stress conditions. The sowings are in progress in some of the cotton growing areas of Guntur and Prakasam districts.

Karnataka: Advised no sowing of Hybrid cotton either Bt or Non Bt beyond July. Instead, Hybrid Maize and sunflower crops are suggested as an alternate or contingent crops and sowing of these crops can be continued throughout August depending upon the rainfall conditions. Sowing of desi cotton varieties (Jayadhar, DDHC-11 and RAHS-14) may be continued till this week end in northern districts. In heavy and continuous rainfall conditions, it is advised to drain out the excess water from the cotton fields as the crop is sensitive to water logging. One month old and 50 days old Hybrid Cotton has to be top dressed with 25 kg N/ha (i.e. 50 kg Urea/ha) and 12 kg K (20 kg MOP/ha). Early sown crop where the crop is at flowering and boll formation stage, leaf spot and rotting of early formed lower bolls is expected due to drizzling and cloudy conditions. Advised to have close monitoring for mirid bug incidence in the crop which is at peak square formation stage. In northern districts where the crop is under protective irrigation and the rainfall is scanty, suggested to irrigate the crop at critical stages *i.e.*, square formation and flowering by adopting alternate furrow irrigation to irrigate more area with the available water.

Tamil Nadu: In the summer irrigated cotton growing zones of Tamil Nadu (Parts of Tirunelveli, Virudhunagar, Ramanathapuram and Madurai District), the cotton crop is in boll maturity stage. Harvesting of kapas is in progress. The weather prevailed during the reporting period was dry with mild wind. Boll worm incidence was noticed in some areas for which need based plant protection measures may be followed depending on the economic threshed level. If ETL crosses 10% damage level.

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