

Central Institute for Cotton Research, Nagpur

Eighth Weekly Advisory for Cotton Cultivation 21st -27th July 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.

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

There were no rains in the zone. 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 formation stage. The incidences of jassid and white fly have been observed in the fields. The jassid infestation has been noticed above ETH level

Haryana: In general, the crop is healthy and in vegetative phase. Average population of leaf hopper nymphs and adult was observed below economy threshold. Mean population of whitefly adult per leaf was observed above economic threshold in villages Barwala, Mohamadpur Rohi, Bhodia khera, Panjwana and CCS HAU Research farm. In the next fortnight, the leaf hopper population on cotton may increase if rains occur frequently and mean relative humidity remains above 70 per cent. However, the whitefly population is likely to remain at low to moderate level. On the other hand, if there is a long dry spell of 15 days or more, the population of whitefly may increase fast. Since *Aenasius* parasitoid is quite active, the mealy bug is likely to remain in low profile and there is no need of spraying any insecticide against this pest. Incidence of cotton leaf curl diseases was observed in traces in Panjwana and Sikandarpur villages of Sirsa district. Weeding and intercultural operations should be carried out. Farmers are advised to monitor their crop for insect pests and diseases.

Rajasthan: At Banswara, the weather during next 4 days would be stable with clouds. Drizzling to normal rains up to 3 to 7 mm rains is expected during all the four days. Farmers are advised to complete sowing. Farmers are also advised to go for weeding and interculture operation in kharif crops.

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

CENTRAL INDIA

Gujarat: In Junagadh, total rainfall of 39.7 mm and four rainy days were observed during this week. Germination in all the experiments was quite good and satisfactory. However, necessary gap filling was done to maintain proper plant stand. Initial crop condition was very good and satisfactory due to timely rainfall. At Surat, a total rainfall of 276.7 mm has been recorded during last week at this centre. Constant and continuous rainfall may hamper the inter-culturing operation. Farmers are advised to drain out excess water from the field as stagnation of water in the root zone is harmful to cotton crop. Due to cloudy weather, there is chance of incidence of sucking pest in cotton for which spraying of systemic insecticide is advisable.

Madhya Pradesh: At Khandwa, more than 700 mm rains have been recorded so far. The crop is satisfactory in all the regions. The cultivators are advised for inter culture operations and fertilizer applications as per requirement and field conditions. The incidence of jassids was noticed in many fields. At Indore, cloudy weather with showers of rain prevailed. Crop condition is very good and no damage reported till date. Farmers are advised to apply fertilizers in irrigated cotton. Intercultural operations in rainfed cotton are in progress. Farmers are advised to protect the crop from sucking pests.

Maharashtra: The rainfall received at Akola was 382.3mm. Wherever there is continuous rains, water should be removed immediately to avoid water logging. In the HDPS (high density planting systems) if the non Bt plants are about 40 days old, semiloopers 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 40-70 days after sowing. Bt plants will not demonstrate the symptoms.

Odisha: Sowing of cotton has almost been completed. The cotton crop is at 3-4 week stage. Weeding should be done either manually or with application of post emergence herbicides. Regular monitoring should be done for other pests like Spodoptera and Semiloopers etc. Excess water should be drained from the field.

SOUTH INDIA

Andhra Pradesh: In Telangana districts of Andhra Pradesh, the crop is 10 to 50 days old. The heavy rains received during this week resulted in water logging conditions in low lying areas in some of the districts. Farmers are advised to drain the water from the fields immediately. First split application of fertilizers i.e. 40 to 50 kg Urea + 10-15 kg MOP per acre at 25-30 DAS is recommended. Foliar application of 1 to 2% KNO₃ for early sown crop is recommended. With the advantage of the receipt of the rainfall during this week, the sowings in the rest of the 60-70% non sown areas of Guntur and Prakasam districts were taken up.

Karnataka: One month old Bt Cotton crop has to be top dressed with 25 kg N/ha (i.e. 54 kg Urea/ha) and 12kg K (20 kg MOP/ha). Sowing of desi cotton varieties like Jayadhar/DDHC-11/RAHS-14/DLSa-17 may be taken up till July end. Incidence of shoot weevil has been reported in cotton growing areas of Dharwad and Haveri districts. It is advised to hand pick the weevil from the top of the cotton plant during morning hours and destroy the weevils. Under cloudy and drizzling conditions, snails are damaging the cotton seedlings in Haveri and Ranebennur districts. Repeated intercultivation is advised to reduce weed intensity and to conserve soil moisture under rainfed conditions wherever the rainfall is scanty.

Tamil Nadu: Land preparation is in progress for winter irrigated and winter rainfed cotton. Cloudy weather is continuing in Coimbatore and Erode districts. Winter irrigated cotton sowing will be taken up during 1st week of August and winter rainfed sowing during 2nd week of August. In the summer irrigated 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. Mild breeze was observed in western part of Virudhunagar and Tirunelveli Districts. Boll worm insects incidence was noticed in some areas for which need based plant protection measures may be followed based on the economic threshold level. If ETL crosses 10% damage,

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