

Central Institute for Cotton Research, Nagpur

XXVIII Weekly Advisory for Cotton Cultivation 1st to 7th Dec '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

| S.No. | States | Normal Area (DES)* | Area in lakh ha | | |
|-------|----------------------------|--------------------|-----------------|--------------|----------------|
| | | | Bt | Non Bt | Total |
| 1. | Andhra Pradesh + Telengana | 19.83 | 22.198 | 1.669 | 23.867 |
| | Andhra Pradesh (23.95%) | 4.749 | 7.121 | 0.239 | 7.360 |
| | Telangana (76.05%) | 15.081 | 15.077 | 1.430 | 16.507 |
| 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 | 40.097 | 1.822 | 41.919 |
| 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 | 0.560 | 0.140 | 0.700 |
| 11. | Uttar Pradesh | 0.010 | 0.000 | 0.260 | 0.260 |
| 12. | Others | 0.350 | | 0.050 | 0.050 |
| | All INDIA | 114.530 | 117.022 | 9.524 | 126.547 |

* Directorate of Economics & Statistics, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi
Source: Director, DOCD, Mumbai

Weather forecast for 10th to 15th Dec. '2014

| Zones/ Weather parameter | Temperature (Min, Max) | | | | | | Rainfall | | | | | |
|--------------------------------|-------------------------|-------|-------|-------|-------|-------|-------------------|-------------------------------------|-------|---|-------------------|-------|
| | States | 10/12 | 11/12 | 12/12 | 13/12 | 14/12 | 15/12 | 10/12 | 11/12 | 12/12 | 13/12 | 14/12 |
| Punjab | 7,24 | 6,24 | 7,23 | 9,22 | 11,22 | 9,22 | Mainly clear sky | | | Partly cloudy sky with thundery development | | |
| Haryana | 7,24 | 6,24 | 7,23 | 9,22 | 11,22 | 9,22 | Mainly clear sky | | | Partly cloudy sky with thundery development | | |
| Rajasthan | 9,28 | 9,28 | 8,28 | 8,28 | 8,28 | 8,28 | Mainly Clear sky | | | | | |
| Gujarat | 16,32 | 16,32 | 16,32 | 15,31 | 15,31 | 15,31 | Clear sky | | | | | |
| Maharashtra | 12,31 | 13,30 | 15,29 | 15,28 | 15,28 | 16,27 | Partly cloudy sky | | | Partly cloudy sky with possibility of rain | | |
| M.P. | 12,27 | 12,27 | 12,28 | 12,28 | 12,27 | 8,25 | Clear sky | Partly cloudy sky | | | Clear sky | |
| Odisha | 16,27 | 16,27 | 16,27 | 18,27 | 18,27 | 18,27 | Mainly clear sky | | | Partly cloudy sky with possibility of rain | | |
| A.P. | 20,32 | 20,32 | 20,32 | 19,32 | 19,31 | 18,30 | Partly cloudy sky | | | | | |
| Karnataka | 20,31 | 19,32 | 19,30 | 19,30 | 18,30 | 17,30 | Cloudy sky | Moderate rain | | | Partly cloudy sky | |
| Tamil Nadu | 22,30 | 22,30 | 23,29 | 23,29 | 23,29 | 23,29 | Light rain | Cloudy sky with possibility of rain | | 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 Harzardous 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).

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)

CENTRAL INDIA

Gujarat: The crop is at boll development and boll bursting stage Hand picking, irrigation and insecticides' spraying carried out as per requirements. Monitoring for pink bollworm by setting up pheromone traps from reliable companies must be initiated. Sampling of green bolls for pink bollworm is important in hot spots.

Maharashtra : At Marathwada, picking of cotton is in progress. Cotton should be picked as far possible in morning hours as dry leaf particles will not stick up to cotton. After picking, cotton should be dried in shade and stored at dry place. Cotton of different picking should be stored in different places. Infestation of Mealy bugs is found in some pockets. If severe, under irrigated conditions, spray of Choropyriphos 30 ml / 10 lit with 25 g washing powder may be done to manage it. At Vidharba, the crop growth and number of bolls were very less. Forced maturity in bolls noticed. Pink bollworm incidence in non Bt. Mealybug was noticed in patches but red cotton bug noticed in Bt and non Bt cotton for which suitable recommended control measures should be taken.

Odisha: The crop is 157 to 162 days old at boll development and maturity stage. Harvesting and spraying of insecticides for pest management is going on. Seed cotton should be dried under sun for 2 to 3 days and stored. Seed cotton obtained from first picking should be kept separately. Spray 2% DAP with 0.75% KNO₃ for better development of the remaining bolls in the late planted crops. To control bacterial leaf blight, spray Copper oxychloride @ 2.5 g with 1 g Plantomycin in 1 litre of water.

SOUTH INDIA

Andhra Pradesh: The crop is at boll development to picking stage. Foliar application of 2% urea/ 1-2% KNO₃/ 1-2% DAP/ 1-2% 19-19-19 along with 1.0% MgSO₄ is recommended. The recommended insecticides may be sprayed to control jassids and whiteflies. Avoid neonicotinoids as the resistance level is very high to these insecticides. Maintain good field sanitation by destroying and removing the crop residues, and weeds. Combination of cultural practices and need based insecticidal applications keep a check of whitefly populations. Repeated applications of insecticides in combination with synthetic pyrethroids lead to resurgence of whiteflies. More than 25% of leaf coverage by the whitefly pupae on the under surface of leaves of middle plant canopy and flight of white adults visible on a single stroke of the plants should be used to decide the insecticidal applications. Proper coverage of underside of the leaves during the insecticidal sprays effectively reduces the whitefly population. For the control of mealy bug, removal and burning of alternate weed hosts like *Parthenium*, *Abutilon* and other host plots etc.in the vicinity of cotton crop, monitoring the initial infestation of mealy bug, particularly on border plants and shaded areas for timing of control measures, need based spraying of insecticides, Prophenophos 50 EC @ 3.0 ml/l or Acephate 75 WP 2.0 g/l or Triazophos 40 EC @ 3.0 ml/l mixed with stickers like triton or Sandovit or Teapol etc @ 1ml/l of spray fluid is recommended. Spot application of insecticides is desirable when the infestation is confined to isolated pockets in the field. Removal and destruction by burning of heavily infested dried / dead cotton plants may be taken up to arrest further spread of the pest incidence. Removal and burning of left over cotton stubbles after harvesting. In case of *Alternaria* and other leaf spots,; spraying of Copper Oxy Chloride @ 3g/l or Mancozeb 2.5g/l twice at 10 days intervals for prevention and Propiconazole @ 1 ml/l or Captan + Hexaconazole @ 1 g/l is recommended for protection. For Rust, spraying of wettable Sulphur @ 3 g/l at 10 days interval for prevention and Tridemorph @ 1 ml/l or Propiconazole @ 1 ml/l at 15 days interval for protection.and for Grey mildew, spraying of wettable Sulphur @ 3 g/l at 10 days interval for prevention and Carbendazim @ 1g/l at 15 days interval for protection is recommended. With the addition of 1% Potassium nitrate to the above insecticide or fungicide, the nutritional status of the plant can be improved. In addition, the efficacy of the pesticide is also increased. In Coastal A.P., the cotton crop is in 115 to 140 days stage. In Telangana state the cotton crop is in picking stage. Picking should be done from fully opened bolls during dry hours. Care should be taken not to mix infested/ bad opened/ rotten bolls with good kapas. Picked bolls should be shade dried and stored in dry places with good ventilation.

Karnataka: In 120 days old cotton crop, it is suggested to spray any recommended Pyrethroid chemical for controlling pink bollworm. Night temperature is decreasing day by day with cold weather. Hence, it is advised to continue the foliar application of 19:19:19 (1%) or KNO₃ (2 %) with 1% MgSO₄ to reduce leaf reddening in Bt and Non Bt hybrids. Sucking pests seen on Bt cotton at later growth stages are to be effectively controlled by spraying the crop with insecticides like Acetamprid 20 S.P. @ 0.2 gm/lit or Thiomethaxam 25 W.D.G @ 0.2 gm/lit of water. In desi and non Bt cotton to manage *Heliothis* attack and the grey mildew disease, the crop has to be sprayed with Quinolphos @ 2.5ml/lit along with Carbendizim 50 WP @ 1g/lit of water for effective control. Light irrigation has to be given after each picking wherever irrigation facilities are available. Light irrigation in alternate furrows is advised in black soils wherever the crop is at boll development stage. In water scarcity areas alternatively, alternate furrow irrigation method is suggested to cover more area with available water. Early sown crop is at peak boll bursting stage and it is advised to avoid picking of kapas during early morning hours and kapas should be sun dried for a day and to be sent to market picking wise separately to get higher price. It is suggested to use the cotton stalks for compost making instead of burning or using as fuel.

Tamil Nadu; The crop is around 65 to 115 days at harvesting stage in Pollachi, boll maturation stage in Ariyaloor, Perambalur, Vellore districts and boll formation stage in the Southern Districts. The weather is dew filled and misty in early morning hours. Spraying against sucking pests and foliar diseases has been done. Weed infestation is moderate. Recommended measures have been taken up for jassids, thrips, bollworm. *Alternaria* leaf spot and *Aarcospara*, wilt, respectively. At Srivilliputhur, the crop is 60 to 90 days old at flowering to boll development stage. The weather prevailed during the reporting period was cool during night and moderately hot during day time. Meager rainfall in many areas was observed. Hand hoeing and top dressing of fertilizers were given. Sucking pests like leaf hoppers, whitefly and aphids noticed in some areas.

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