Central Institute for Cotton Research, Nagpur

Sixteenth Weekly Advisory for Cotton Cultivation 15th – 21st 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, fluazifop butyl, can be used. For sedges and grasses, Propaquizafop ethyl is effective and Pyrithiobac 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 sprays 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.

Net Cotton Area sown as on 13-09-2013

State	Lakh hectares
Punjab	5.05
Haryana	5.57
Rajasthan	2.93
Uttar Pradesh	0.23
Gujarat	26.88
Madhya Pradesh	6.21
Maharashtra	38.68
Odisha	1.24
Andhra Pradesh	21.13
Karnataka	5.29
Tamil Nadu	0.19
Others	0.10
TOTAL	113.50

Source: Director, DOCD, Mumbai

Weather forecast for 15th to 18th Sep. 2013

Zones/ Weather parameter	Temperature (Min, Max)				Rainfall			
	15/09	16/09	17/09	18/09	15/09	16/09	17/09	18/09
Punjab	21,32	22,33	24,34	24,34	Light rain	Partly cloudy sky		Clear sky
Haryana	23,35	24,36	24,36	24,36	Partly cloudy sky		Clear sky	
Rajasthan	25,38	25,37	25,37	24,36	Clear sky			
U.P.	23,35	24,35	25,34	25,34	Partly cloudy sky			
Gujarat	26,32	26,32	26,32	26,32	Partly cloudy with possibility of rain or thunderstorm			
Maharashtra	23,35	24,35	24,36	24,36	Light rain		Partly cloudy with possibility of rain or thunderstorm	
Madhya Pradesh	21,32	21,33	22,33	23,33	Partly cloudy sky			
Odisha	25,32	25,32	25,32	25,32	Generally cloudy sky with thundery development			
Andhra Pradesh	23,34	23,34	24,34	24,34	Partly cloudy sky with thundery development			
Karnataka	21,32	21,32	21,32	21,32	Moderate rain	Light rain		
Tamil Nadu	24,30	24,30	24,30	24,30	Partly cloudy sky		Partly cloudy with possibility of rain or thunderstorm	

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., *Aphilinus* 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 *Sl*NPV (*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% Metaldehide (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 Pyrithiobac 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

Haryana: Cotton crop is in peak vegetative to reproductive phase. In general, the crop is healthy. Excessive nitrogen application may be avoided. The population of whitefly was observed above economic threshold in farmers' field. For checking leaf hopper and whitefly, appropriate control measures have to be taken up. Bollworms in non Bt cotton has to be controlled. Avoid repeated use of the same insecticide or insecticides of the same group. Do not spray synthetic pyrethroids at this stage. Avoid indiscriminate and mixing of two or more insecticides. Clean the sprayer thoroughly before use. Moderate to high incidence of CLCuD was observed throughout the cotton growing areas in the state. Bt hybrids free of CLCuD may be recorded. Foliar disease has to checked and sprayed with recommended measures per acre 3-4 times at 15 days interval. Spray of cobalt chloride @ 1g in 100 liters of water at initial stage can check the para wilt. Farmers are advised to monitor their crop for insect pests and diseases regularly.

Rajasthan: No signal for rain in next few days. The farmers are advised to conserve the moisture as mostly it is dry days ahead. Farmers are advised to control jassids and spotted bollworm attack through recommended measures.

Uttar Pradesh: Crop is in boll formation to boll development and maturity stage. Farmers are advised to apply light irrigation to avoid water stress in the crop. The bursting bolls are to be picked and dried in the sun light and kept in jute bags.

CENTRAL INDIA

Gujarat: At Surat, due to cloudy weather, there are chances of incidences of sucking pest in cotton. Climate condition is suitable for growth of crop and farmers are advised to do weeding, inter culturing and fertilizer application to the field crops as early as possible. At Junagadh, the incidence of jassids was above ETL and thrips below ETL. where as white fly and mealybug was in very low population throughout the week.

Maharashtra: Recommended insecticides are to be sprayed to control sucking pests in Bt cotton and bollworms in non Bt cotton. Urea @ 2% in 200g/10 liter of water should be sprayed,at flowering stage. Irrigation should be given wherever it possible in alternate rows.

Odisha: The cotton crop is at boll formation and boll development stage stage (77-87 days). The crop condition is almost good and there is no incidence of any severe pest/diseases. Conserve the rain water by making cross bunds between two rows. Remove the tips of the plants at 90 DAS or when the plants are at 1 metre height. To check the incidence of sucking pests like aphids, jassids, thrips and whitefly, spray neem based pesticides @ 3ml/litre of water. In case of severe infestation spray recommended insecticides. Regular monitoring for eggmasses should be done for Spodoptera

SOUTH INDIA

Andhra Pradesh: In Telangana districts of Andhra Pradesh the crop is around 60-100 days old. In Guntur, Krishna and Prakasam districts, the crop is 25-80 days old. Second and third split application of fertilizers at 50 kg Urea + 15 kg MOP along with inter-cultivation is recommended for the late sown crop (wherever the crop is $\geq$ 45-60 DAS) and early sown crop (wherever the crop is $\geq$ 80 DAS). Foliar application of 2% Urea or 2% DAP or 1-2% KNO_3 along with 1% $MgSO_4$ is recommended to mitigate the stress conditions. For the control of sucking pests need based spraying is recommended. Monitoring of bollworms in particular to *Spodoptera litura* through pheromone traps. Spraying of recommended insecticides is advised. Excess moisture and high temperature may predispose the plants to fungal root rots and wilts. Sudden death of the plants in patches or yellowing of leaves and wilting of plants should be managed by drenching the affected plants and soil with appropriate measures. High relative humidity, windy rains may spread bacterial blight disease. Angular leaf spot, vein blight and fungal leaf spots should be managed by protective or curative spraying with appropriate spraying of fungicides at 7 to 10 days interval.

Karnataka: At Raichur, there has been sucking pest incidence in some areas but under control. The rainfall recieved during first week of September was more than the normal rainfall. Thrips population ranged from 8-26/ three leaves. Leafhopper population from 1-3/ three leaves, Aphids population from 2-5/ three leaves and whitefly population from 1-2/ three leaves. Natural enemies (Coccinellid grubs, chrysopa grubs and spiders) were noticed. The larval population of *Helicoverpa armigera* was 1.08 larvae/plant. At Dharwad, under continuous rainfall situations where it is not possible for mechanical and manual weeding in cotton crop, it is suggested for spraying of selective post emergent herbicides on weeds for effective control of both monocot and dicot weeds. To reduce or effectively manage the leaf reddening menace in early sown cotton it is advised to spray the crop with 0.5 % of 19:19:19 (5 g/lit of water) water soluble fertilizer or 2 % DAP along with 1 % $MgSO_4$ at an interval of 15 days. These nutrient sprays may be combined with the insecticide sprays if required at that stage. It is suggested to spray the crop with recommended insecticide for effective management of mirid bug. In desi cotton, incidence of grey mildew disease is to be checked.

Tamil Nadu: The winter irrigated cotton cultivation has started in isolated meager areas of southern parts of Tamil Nadu (Parts of Tirunelveli, Virudhunagar, Ramanathapuram and Madurai District). Rainfed cotton sowing is also in progress by utilizing the pre monsoon rainfall in some areas. The weather prevailed during the reporting period was moderately cool with drizzle in many areas. As the sowing of cotton is under way, acid delinting and seed treatment with insecticides / fungicides followed by biofertilizer may be recommended as a prophylactic measure.

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