Central Institute for Cotton Research, Nagpur

Thirteenth Weekly Advisory for Cotton Cultivation 25th – 31st 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, 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.

Net Cotton Area sown as on 22-08-2013

State	Lakh ha
Punjab	5.05
Haryana	5.51
Rajasthan	2.93
Uttar Pradesh	0.23
Gujarat	26.63
Madhya	6.21
Maharashtra	38.62
Andhra Pradesh	17.61
Karnataka	5.08
Odisha	1.24
Tamil Nadu	0.07
Others	0.10
TOTAL	111.34

Source: Director, DOCD, Mumbai

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.

Weather forecast for 25th to 28th Aug. 2013

Zones/ Weather parameter	Temperature (Min, Max)				Rainfall			
	25/08	26/08	27/08	28/08	25/08	26/08	27/08	28/08
Punjab	26,35	26,36	26,34	26,33	Light rain		Thunderstorm with rain	
Haryana	26,35	26,36	26,34	26,33	Light rain		Thunderstorm with rain	
Rajasthan	28,38	28,38	28,38	28,38	Partly cloudy sky			
U.P.	25,34	25,33	25,32	24,31	Partly cloudy with possibility of rain or thunderstorm		Thunderstorm with rain	
Gujarat	25,30	26,31	26,31	26,31	Moderate rain	Light rain		Partly cloudy with possibility of rain or thunderstorm
Maharashtra	21,26	21,28	23,30	23,29	Light rain			
Madhya Pradesh	20,23	21,24	22,26	23,27	Heavy rain		Partly cloudy sky	
Odisha	26,34	26,33	25,32	25,31	Generally cloudy			
Andhra Pradesh	23,34	23,34	23,34	24,35	Partly cloudy with possibility of rain or thunderstorm		Partly cloudy sky	
Karnataka	21,33	21,33	21,32	21,32	Partly cloudy with possibility of rain or thunderstorm			
Tamil Nadu	22,32	22,32	21,32	21,32	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., *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 *S*lNPV (*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

After the week long rainy duration, leaf hopper population has flared up and must be managed with insecticides. Monitoring for whitefly infestation may be taken up. The population of whitefly has also crossed ETL at almost all the locations. Farmers are strictly advised not to use mixture of insecticides as some of the combinations lead to phytotoxicity on leaves and dropping of fruiting bodies subsequently. The appearance of any fungal foliar disease may be monitored because of cloudy weather. The infestation of alternaria leaf spot has been noticed at few locations. The incidence of cotton leaf curl virus disease has been noticed in the entire zone. Farmers are advised to control its vector, white fly to check further spread of the disease. Initiate the sprays of potassium nitrate (13:0:45) @ 2kg/acre at the onset of flowering. Four sprays can be done at weekly intervals. Leaf curl tolerant BT hybrids may be noted. Do not spray pyrethroids or tank mixtures containing pyrethroids for whitefly management.

Punjab: The crop is in reproductive phase. The attack of sucking pests i. e. Whitefly and jassids are above economic threshold level in some pockets and recommended plant protection measures should be followed for control of these. The attack of whitefly has resulted in the incidences of cotton leaf curl virus disease in many cotton areas of Punjab.

Haryana: Cotton crop is in peak vegetative to reproductive phase. In general, the crop is healthy. Farmers are advised to drain out the stagnated rain water from cotton fields. The population of whitefly was observed above economic threshold at farmer's field in Hansi sub division of Hisar district. Leaf hopper, whitefly and bollworm attack may be given proper treatment. Low to moderate incidence of CLCuD was observed throughout the cotton growing areas in the State. Foliar disease spray to be taken up 3 to 4 times at 15 days interval. Spray of cobalt chloride @ 1g in 100 L of water at initial stage can check the para wilt. Farmers are advised to monitor their crop for insect pests and diseases regularly. Monitor for flared up squares for bollworm damage in non Bt and Bt.

Uttar Pradesh: Crop is in flowering to boll formation and development stage. Farmers are advised to spray urea and DAP for recovery of crop from water logged field at 10 days interval.

CENTRAL INDIA

Gujarat: At Surat, farmers are advised to carry out intercultural operations and remove weeds during dry spell to maintain weed free condition. If there is stagnant water, need to be drained out from the field. Sucking pest attack is to be controlled. At Junagadh, germination in all the experiments was quite good but due to continuous rains, growth of cotton crop is not satisfactory. Initial crop condition was very good but now adversely affected growth due to submergence and continued rainfall.

Maharashtra: At Akola, farmers are advised to apply Nitrogen immediately after weeding and hoeing. Spray to be done for sucking pests attack. Bollworm attack to be monitored in non Bt cotton. Urea should be sprayed at flowering stage. The regions where there is intermittent rainfall viz: Jalgaon, Dhule, Pune districts of MPKV, Rahuri jurisdiction, there may be possibility of the incidence of fungal foliar disease and bacterial blight. Farmers are advised to carryout intercultural operations and so as to keep crop weed free and to give top dressing of urea (1 bag urea/acre), wherever necessary. Monitor for flared up squares for bollworm damage in non Bt and Bt.

Odisha: The cotton crop is at square formation and early flowering stage(56-66 days). The crop condition is almost good and there is no incidence of any severe pest/diseases. Drain out excess water from the field. Weeds should be controlled. Apply 25% Nitrogen as final top dressing. Apply plant hormone to check drop of fruiting bodies. Sucking pests attack to be controlled. Regular monitoring should be done for other pests like Spodoptera.

SOUTH INDIA

Andhra Pradesh: In Telangana districts of Andhra Pradesh, the crop is around 45 to 90 days old. In Guntur, Krishna and Prakasam districts, the crop is 15 to 70 days old. Third split application of fertilizers (Urea + MOP) along with inter-cultivation is recommended for the early sown crop (wherever the crop is > 80 DAS). Foliar application is recommended to mitigate the stress conditions. Due to the continuous rains wherever inter-cultivation operations could not be taken up for the control of monocot and dicot weeds, proper remedial measures is recommended. Avoid spraying neonicotinoids up to 60 DAS. In the early sown crop (60to 90 days), spray for sucking pests should be taken up. Monitoring of bollworms in particular, *Spodoptera litura* through pheromone traps for incidence. Excess moisture and high soil temperature may predispose the plants to fungal root rots and wilts. High relative humidity and windy rains may spread bacterial blight disease. Angular leaf spot and vein blight should be managed at 7 to10 days interval. Fungal leaf spots should be managed by protective or curative spraying at 7-10 days interval.

Karnataka: Earthing up with intercultivation is advised in 50 to 60 days old crop. The crop at boll formation stage has to be sprayed with 0.5 % of 19:19:19 (5 g/lit of water) water soluble fertilizer along with foliar nutrients to manage leaf reddening and square dropping effectively. Post emergent herbicide application is suggested for effective control of both monocot and dicot weeds wherever it was not possible to take up inter-cultivation and hand weeding due to continuous rains. Shoot weevil incidence is reported in most of the Bt hybrids. If incidence of mirid bug in the developing squares is seen, it is suggested to spray the recommended insecticides. In 100 to110 days old cotton crop, it is suggested to spray the crop for controlling pink boll worm and leaf spot disease, respectively.

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 and almost in ending stage. About 5 to 6 kapas pickings were completed. In rainfed areas, the field has been ploughed and kept ready for cotton cultivation anticipating rainfall.

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