Central Institute for Cotton Research, Nagpur

XXVII Weekly Advisory for Cotton Cultivation 24th to 30th Nov '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 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 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

Area in lakh ha

S.No.	States	Normal Area (DES)*	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 1st to 6th Dec. '2014

Zones/ Weather parameter	Temperature (Min, Max)						Rainfall					
States	01/12	02/12	03/12	04/12	05/12	06/12	01/12	02/12	03/12	04/12	05/12	06/12
Punjab	11,27	11,26	10,26	10,26	10,26	9,25	Partly cloudy sky			Mainly clear sky		
Haryana	11,27	10,26	10,26	10,26	9,25	9,25	Partly cloudy sky		Mainly clear sky			
Rajasthan	12,28	12,28	11,27	11,27	11,27	11,27	Mainly Clear sky					
Gujarat	19,34	18,34	18,34	17,34	17,33	17,33	Clear sky					
Maharashtra	12,31	12,31	12,31	11,31	11,31	11,31	Mainly Clear sky					
M.P.	13,32	13,31	13,31	12,30	12,30	11,29	Partly cloudy sky	Clear sky		Haze		Mist
Odisha	15,31	15,31	14,31	14,31	14,31	14,31	Mainly clear sky					
A.P.	17,32	17,32	17,31	18,31	18,31	18,31	Partly cloudy sky					
Karnataka	14,31	14,30	14,30	14,30	14,30	14,30	Mainly clear sky		Haze		Partly cloudy sky	
Tamil Nadu	22,29	21,29	21,29	22,29	22,29	22,29	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

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 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).

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 nearly 175 days at reproductive stage (Crop bearing squares, flowers, bolls), boll development and boll bursting stage. Weather remains cloudy and bright during the reporting period. Hand picking, irrigation and insecticides' spraying carried out as per requirements. The population of jassids and whitefly were recorded above ETL and aphids, thrips & mealy bug were found low throughout the reporting period. 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
Cotton is facing acute moisture stress. Forced boll opening is commonly being seen in cotton, including Bt cotton and has entered senescence in areas without irrigation on marginal and shallow soils. Reddening is being observed in some Bt hybrids in some locations.

Odisha: The crop is 150 days old at boll development and maturity stage. Harvesting and spraying of insecticides for pest management is going on. All three types of weeds i,e grasses, sedges and broad leaved weeds have infested the crop but their population has reduced. Incidence of aphids, jassids and mealy bug was observed. Sporadic incidence of leaf folder, stem borer, Spodoptera and American boll worm recorded. Picking of the fully open bolls should be done on clear days after drying of the morning dew. 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% KNO_3 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. To control American boll worms, spray Flubendiamide @ 3.75 ml per 15 litre of water.

SOUTH INDIA

Andhra Pradesh: The crop is in flowering to boll development stage. In early sown crop, picking is under progress). Inter-cultivation with harrow and blade taken up in late sown crop. Sucking pests like Jassids, whiteflies and mealy bug have been noticed. For the control of Jassids, ETL based spraying (2 jassids/leaf) should be given. Avoid neonicotinoids as the resistance level is very high to these insecticides. Spraying of 5%NSKE and spraying of Monocrotophos 36 SL @ 1.6 ml/l or Acephate 75 SP @1.5g/l or Fipronil 5 SC @ 2.0 ml/l or Diafenthiuron (1.25 g/l) or Flonicamid 0.3 g/l can be done. For the control of whiteflies, erection of yellow sticky traps @ 20/acre one foot above the crop canopy, maintenance of 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. Neem oil (1%) or neem seed kernel extract (NSKE) 5% or other commercial neem products maintainin rotation of insecticides. 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 checks the mealy bug population. 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. Remove and burn left over cotton stubbles after harvest. To control *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 the control of 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 is recommended. 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 can be given. 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 105 to 125 days stage. In Telangana, the crop is 110 days (vegetative) to 150 days (boll formation, boll development and 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: As cold conditions are prevailing in majority of cotton growing areas, it is advised to continue the foliar application of 19:19:19 (1%) or DAP (2 %) with 1% $MgSO_4$ to reduce leaf reddening in Bt and Non Bt hybrids. Cotton is to be picked on rain free days wherever the first formed bolls are opened and stored properly. Kapas should be sun dried for a day and to be stored picking wise separately if it has to be stored for future sale. Cyclonic rains in some places damaged kapas quality hence, it is suggested to pick such kapas after bright sunshine for a day or two and sell the kapas separately. In early sown crop, wherever kapas picking is completed it is advised not to irrigate the crop to get new flush of growth and few flowers and bolls. It will lead to build up of pest and diseases which will affect the forthcoming regular cotton crop in that region during next season. It is suggested to use the cotton stalks for compost making instead of burning or using as fuel. Alternatively the cotton stalks can be rotoslashed in the field itself by tractor operated rotovator.

Tamil Nadu; The crop is 55 to 80 days old at flowering to boll development stage. Flowering is seen in southern districts which is 60 to 105 days old crop. The weather prevailed during the reporting period was cool. Moderate rainfall was received in many areas and low rainfall in some places. Hand weeding and top dressing was taken up. Sucking pests incidence were observed in rainfed cotton area of Virudhunagar district for which the recommended dosage of insecticide may be sprayed. Root rot was observed in few fields.

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