Central Institute for Cotton Research, Nagpur

Fourteenth Weekly Advisory for Cotton Cultivation 25th to 31st August 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 (As on 22-08-2014)

Area in lakh ha

S.No.	States	Normal Area (DES)*	Bt	Non Bt	Total
1.	Andhra Pradesh + Telengana	19.830	18.559	1.669	20.228
.	Andhra Pradesh (23.95%)	4.749	5.611	0.239	5.850
	Telangana (76.05%)	15.081	12.948	1.430	14.378
2.	Gujarat	26.490	26.880	2.930	29.810
3.	Haryana	5.640	6.310	0.080	6.390
4.	Karnataka	5.270	6.520	0.630	7.150
5.	Madhya Pradesh	6.390	5.445	0.285	5.730
6.	Maharashtra	39.160	37.398	1.822	39.220
7.	Odisha	0.970	0.000	1.240	1.240
8.	Punjab	5.170	4.300	0.200	4.500
9.	Rajasthan	4.000	3.950	0.208	4.158
10.	Tamil Nadu	1.250	0.056	0.014	0.070
11.	Uttar Pradesh	0.010	0.000	0.260	0.260
12.	Others	0.350		0.050	0.050
	All INDIA	114.530	109.418	9.388	118.806

* Directorate of Economics & Statistics, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi

Weather forecast for Aug to '2014

Zones/ Weather parameter	Temperature (Min, Max)						Rainfall					
States	01/09	02/09	03/09	04/09	05/09	06/09	01/09	02/09	03/09	04/09	05/09	06/09
Punjab	26,34	25,33	24,32	24,32	24,32	24,32	Partly cloudy sky with thundery development		Thunderstorm with rain		Partly cloudy sky with thundery development	
Haryana	26,34	26,34	26,33	25,33	25,33	24,32	Cloudy sky	Partly cloudy sky with thundery development				
Rajasthan	28,38	28,38	28,35	28,36	29,35	29,34	Partly cloudy sky with thundery development		Thunderstorm with rain		Partly cloudy sky with thundery development	
Gujarat	26,30	25,30	25,30	25,30	25,30	25,31	Heavy rain	Moderate rain	Light rain			Mainly or Generally cloudy sky with possibility of rain or thunderstorm
Maharashtra	24,31	24,31	24,32	24,32	24,33	24,33	Light rain		Partly cloudy sky with thundery development			
M.P.	21,30	21,29	21,29	21,29	21,29	21,29	Thunderstorm with rain					
Odisha	19,27	19,27	19,28	19,28	19,28	19,28	Generally cloudy sky with possibility of rain or thunderstorm					
A.P.	23,28	23,28	23,28	24,28	24,28	24,28	Moderate rain	Light rain	Mainly or Generally cloudy sky with possibility of rain or thunderstorm			
Karnataka	22,28	23,28	24,29	24,29	25,29	25,30	Moderate rain	Light rain				
Tamil Nadu	22,31	23,32	23,33	23,33	23,33	23,33	Partly cloudy sky	Light rain	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 *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

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).

DROUGHT MANAGEMENT

Odisha

Early season drought (Normal onset)

Condition	Major Farming Situation	Normal Crop / Cropping System	Suggested Contingency Measures	
Early season drought (Normal onset)			Crop management	Soil nutrient & moisture conservation measures
At vegetative Stage	Red soil High rainfall Medium elevation	Cotton	Spray Quizalofop ethyl for weed control	Spray planofix Top dress after rain
	Red and Yellow soil High rainfall Medium elevation	Cotton	Spray Quizalofop ethyl for weed control	Spray planofix *Top dress after rain
	Black soil High rainfall Medium elevation	Cotton+ Arhar	Spray Quizalofop ethyl for weed control Provide irrigation at critical	Spray planofix Top dress after rain Spray 2% urea

Mid season drought (long dry spell)

Condition			Suggested Contingency Measures	
Mid season drought (long dry spell	Major Farming Situation	Normal Crop / Cropping System	Crop management	Soil nutrient & moisture conservation measures
At flowering/ fruiting stage	Red soil High rainfall Medium elevation	Cotton	Applying of Planofix hormone * spraying the crop with Imidacloprid for controlling of sucking pests	Apply 1250ml micronutrient/ha
	Red and Yellow soil High rainfall Medium elevation	Cotton		
	Black soil High rainfall Medium elevation	Cotton + Arhar		

Terminal drought (Early withdrawal of monsoon)

Condition			Suggested Contingency Measures	
Terminal drought (Early withdrawal of monsoon)	Major Farming Situation	Normal Crop / Cropping System	Crop management	Rabi Crop planning
	Red soil, High rainfall, Medium elevation	Cotton	Provide protective irrigation	Mulch with stovers Dibble rabi crop
		Cotton	Provide protective irrigation	
		Cotton + Arhar	Provide protective irrigation Harvest at physiological maturity stage	

In case of severe drought situation following measures may be taken apart from the above contingent plans.

- Opting for castor, sesamum and safflower (mid *Rabi* crop) (as per recommendations specific to the agro eco region) instead of cotton to manage severe drought situation in *Kharif season*.
- In the event of late planting of cotton due to delayed onset of monsoon, maintenance of higher plant population and optimum input management to the extent possible is suggested.
- Bacterial blight, fungal foliar spots and parawilt are the major diseases in this region. Long dry spells with intermittent rains may aggravate the incidence of the diseases. These should be managed with fungicidal sprays as and when required.
- Foliar spray of KCl or KNO_3 to partially alleviate moisture stress during drought.
- Application of anti-transpirants or hormones.

Gujarat

1st to 15th September Terminal drought

- Weeding
- Top dressing of Urea if sufficient occurrence of rain
- Insecticide spray for control of sucking and bollworms
- Alternate furrow irrigation, if irrigation water is available
- Adopt topping to reduce evapotranspiration losses

Andhra Pradesh

Sowing time for unified State of Andhra Pradesh

1. Coastal A.P - July to 15th August
2. Rayalaseema - June to July
3. Telangana - June 15th to20th July

- Repeated inter-cultivation operation to form soil mulch to reduce evaporation losses.
- Foliar nutrition with 2% urea or 2% KNO_3 2 to 3 times at 10-15 days interval.

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)

NORTH INDIA

Punjab: At Faridkot, the crop is 115 days old at reproductive stage (Crop bearing squares, flowers, bolls). Weather remained hot and dry during the reporting period. Owing to hot weather, severe thunderstorms may cause lodging in timely sown crop. Therefore, farmers are advised to apply light irrigation on calm days only. Give sprays of Potassium nitrate @2kg/acre at weekly intervals. The farmers who have witnessed leaf reddening in their cotton fields are advised to spray $MgSO_4$ @1%(1 kg/100 lts of water) twice during flowering and boll

development stage as a prophylactic remedial measure. Due to low rainfall, incidence of weeds is lesser than that of last years' condition. Whitefly and jassid (leafhopper) are presently infesting the crop. Jassid incidence has reduced over the last few weeks. If whitefly population is higher than ETL level of 6/leaf, the recommended insecticide may be sprayed. If plants show Parawilt symptoms after irrigation, spray Cobalt Chloride @ 10 mg/litre on affected plants within few hours to check it. At Bhatinda, the crop is at full bloom and boll development stage. The attack of whitefly and jassid are above economic threshold level in most of the fields for which the recommended insecticides should be sprayed. The incidences of CLCuD were observed in the districts of Bathinda, Mansa and Muktsar in addition to traditional infected areas of Abohar and Fazilka on almost all *Bt* cotton hybrids. Two sprays of $MgSO_4$ @ 1kg in 100 litres of water at 15 days interval are recommended for management of the cotton reddening at full bloom and boll development rate. The infestation of *Spodoptera* spp., American boll worm and Spotted boll worm was recorded in *desi* cotton and non-*Bt* varieties of American cotton which can be controlled by using Acephate @ 800g or Thiodicarb @ 250g per 100 litres of water.

Haryana: The crop is normal at vegetative/reproductive stage. Go for Interculture if required and weeds must be removed around the fields, water channel and road side to check the whitefly population, an alternate host of CLCuD. Irrigate the field as and when required. Mean population of whitefly adults was above ET in fields. Pink boll worm infestation was observed in *Desi* cotton/non Bt. varieties. Solenopsis mealybug (*Phenacoccus solenopsis*) infestation was observed in few plants near road side. Mealybug infestation was also observed in congress grass. Low to moderate incidence of leaf-curl virus disease was observed. No incidence of Bacterial leaf blight and fungal foliar diseases in cotton. Management of the biotic stress factors may be ignored.

CENTRAL INDIA

Maharashtra: At Akola, weeding is necessary upto 60 days after sowing. Sucking pests like jassids and aphids were noticed for which it should be controlled with recommended insecticides.

Odisha: The crop is 45 to 65 days at square initiation and flowering stage. The weather was hot and humid. Second top dressing, weeding, earthing up and spraying for pest management is going on. Farmers are advised to drain out excess water from the field during heavy rainfall. For control of weeds, glyphosate should be applied as post emergence directed spray @ 1.0 kg/ha 50 days after sowing. At 60 DAS, 2nd top dressing should be done with 25 % N. To reduce the flower and fruit drop spray Planofix @ 7.0 ml/15 litres of water. For reducing the aphids and jassids population, spray neem based pesticides @ 2.5 ml/litre of water. When sucking pest population exceeds ETL (> 20% infested plants) spray recommended insecticide @1 ml/litre of water

SOUTH INDIA

Andhra Pradesh: Gap filling and thinning is being carried out in the late sown crop. Pre-emergence application of Pendimethalin was done. Advised prophylactic spray for the control of leaf spots. Summer cotton sown in approximately in an acreage of 25 thousand hectares which is in squaring to flowering stage to boll development stages. Suitable Plant Protection against sucking pests (Jassids & Thrips) were recommended. In Coastal A.P the cotton crop is in seedling to 75 days stage and with the availability of soil moisture depending on the crop stage top dressing of 25-30 kg Urea and 15kg of MOP is recommended. In Telangana, the cotton sowings were completed and the crop is in 25 days (seedling stage) to 75 days (squaring and initiation of flowering) old. Top dressing of nitrogen and potassium fertilizers is under progress. Inter-cultivation by working in the Gorru and Guntaka is under progress for the conservation of moisture and control of weeds.

Karnataka: The crop duration varies from 50 days to 75 days at square initiation stage. The weather was cloudy with the receipt of torrential and high intensity rains during the reporting week. Top dressing, weeding and spraying operations were undertaken. Glyphosate @ 5 ml/lit of water was sprayed wherever severe infestation of weeds was seen. Intercultivation and hand weeding was taken up. Mite infestation was noticed for which Dicofol

@ 2 ml/lit of water was sprayed. Leaf spot disease was observed in some genotypes. Sprayed with Mancozeb @ 2 g/lit of water. Suggested to drain out the excess water stagnated in the crop due to high intensity rainfall. Top dress the crop with Urea (25 kg/ac) for immediate recovery from water stagnation effect. In 80-90 days old cotton crop, it is suggested to spray the crop with Mancozeb @ 2g/lit of water for controlling leaf spot disease. Avoid heavy irrigation in black soils where the crop is at peak square and boll formation stage. Irrigating in alternate furrows is suggested to save water, time, labour and to irrigate more area in available water. Bacterial leaf blight is reported from southern districts which can be managed by spraying Streptocycline @ 0.5 g/lit tank mix with Blitox @ 3g/lit. Earthing up with intercultivation is advised in 50 to 60 days old crop. Repeated hoeing is advisable to conserve the soil moisture under scanty rainfall areas. The crop at boll formation stage has to be sprayed with 1 % of 19:19:19 (10 g/lit of water) water soluble fertilizer along with 1% $MgSO_4$ and Planofix (0.25 ml/lit of water) to manage leaf reddening and square dropping effectively.

Tamil Nadu: The weather prevailed during the reporting period was moderately cool and dry. Moderate rainfall was observed in many areas. As the crop is almost in ending stage, no specific pest was observed. Picking of kapas is going on. In the recently sown areas, the crop is 24 days old at seedling stage. Weed infestation is moderate. Thinning operation was taken up.

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