

ICAR-Central Institute for Cotton Research
Weekly Advisory for Cotton Cultivation from 25th to 30th August 2015
(41st Standard Week)

"The advisory is based on inputs received from the State Agricultural Universities of the respective states"

WEATHER ADVISORY

Date	Rainfall (mm) August 2015						ADVISORY
	25	26	27	28	29	30	
PUNJAB							<p>WHITEFLY OUTBREAKS: Cloudy, hot and humid conditions with infrequent drizzle are likely to prevail in Punjab, Haryana and Rajasthan until the end of August followed by a predicted dry period until 10th September. These conditions are highly congenial for whitefly. Insecticides give temporary relief but aggravate the whitefly infestation within two weeks after spray, because insecticides destroy naturally occurring parasites of whiteflies.</p> <p>MANAGEMENT STRATEGIES: The following ecologically compatible strategies are reasonably effective and can help in keeping the whitefly populations under control. 1. Avoid urea. Application of NPK 13:0:45 should be preferred. Muriate of Potash (KCl) can be applied separately to confer plant resistance to whiteflies. 2. Remove all weeds from fields, bunds and in vicinity. 3. CICR sticky traps (available with CICR, Sirsa) can be placed alternately in fields at one trap per 100 sqm. 4. CICR suction traps can be used in the field. 5. Sprays with 1.0% Nirma laundry detergent and 5.0% castor oil emulsion or neem oil emulsion can be used to reduce whitefly populations. 6. Wherever available Beauveria bassiana fungus may be used along with neem oil emulsion. 7. Wherever economic thresholds have crossed 8 adults per leaf, Buprofezin or Pyriproxyfen or Spiromesifen or Diafenthiuron at recommended dose may be alternated at fortnightly intervals. 8. Under emergency conditions, soil application of 5.0% solution of chlorpyrifos or acephate or profenophos may be done near the root zone of plants. This will minimize toxic effects on beneficial predatory insects.</p> <p>Whitefly attacks are most likely to become severe in September if the above guidelines and precautions are ignored. Incidence of leaf curl virus disease was observed upto 3 grade severity in Hisar, Sirsa, Fatehabad, Jind districts and in Bawani Khera, and Bhiwani blocks of Bhiwani district. Site specific remedial measure for root rot (wilt) and parawilt may be initiated based on symptoms. Recommended insect pest control measures must be taken up be initiated only at economic threshold levels on rain free days. Precautionary measures may be initiated for disease control wherever initial symptoms are seen.</p>
Batinda	0	0	0	3	0	0	
Ferozepur	0	0	0	3	0	0	
Muksar	0	0	0	3	0	0	
Mansa	0	0	0	0	0	0	
HARYANA							
Sirsa	0	0	0	0	0	0	
Hissar	0	0	0	0	0	0	
Fatehabad	0	0	0	0	0	0	
RAJASTHAN							
Hanumangarh	0	0	0	0	0	0	
Sri Ganganagar	0	0	0	0	0	0	
Banswara	0	0	0	0	0	0	
ORISSA							
Koraput	29	32	33	51	31	17	
Kalahandi	22	25	24	33	22	12	
Balagiri	6	4	11	25	18	21	
GUJARAT							
Amreli	0	0	0	0	0	0	
Bhavnagar	0	0	0	0	0	0	
Jamnagar	0	0	0	0	0	0	
Rajkot	0	0	0	0	0	0	
Baruch	4	0	0	0	0	0	
Sabarkantha	0	0	0	0	0	0	
Surendranagar	0	0	0	0	0	0	
Ahmedabad	0	0	0	0	0	0	

Vadodara	11	6	0	4	5	7	10% damaged bolls, quinalphos may be sprayed to control the pest. Farmers are advised to terminate cotton crop in December without extending crop to April- May of 2016. This is necessary to reduce pink bollworm incidence and development of resistance to Bt-cotton. Cotton stalks of last year have been observed lying on the bunds. They must be destroyed immediately. Old cotton seed stored in go-downs or homes serve as a carryover for pink bollworm moths. If the seeds are infested, these may be destroyed immediately. If unattended, pink bollworm can cause heavy damage in October.
Patan	0	0	0	0	0	0	
Mehsana	0	0	0	0	0	0	
MP							
Khargaon	0	0	0	0	4	0	The crop condition is good. Summer sown crop is in fruiting stage while other crop is in vegetative stage. The weather is dry with high temperature. Jassid incidence crossed economic thresholds in some hybrids in some parts of the state. There is no disease incidence.
Dhar	0	0	0	0	0	0	
Khandwa	0	0	0	0	6	3	
MAHARASHTRA							
Nagpur	0	0	4	58	37	52	The crop is in boll formation stage in the irrigated field and flowering to boll formation in the rainfed areas. The weather is dry during the initial period of the week in Marathwada region. Inter-cultural operations should be carried out for weed management. Moisture conservation practices should be carried out in rainfed crop. Opening of furrows should be done to irrigated crop for moisture conservation and land configuration for surface irrigation. Foliar application of MgSO ₄ and KNO ₃ should be done at 75 to 85 DAS. Infestation of jassids and thrips is observed on cotton. Appropriate control measures may be initiated. Incidence of Alternaria leaf spot is noted in some pockets. In Vidharba region, farmers are advised to complete weeding and hoeing operations. Furrows should be opened in every or alternate row for conservation of moisture. In early sown non-Bt cotton, scouting for bollworms may be initiated and recommended measures may be taken up based on economic threshold levels of damage. Rigorously monitor for the presence of rosette flowers as a diagnostic tool to detect pink bollworm. Stray reports of rosette flowers have been received from Nagpur and Jalgaon. Avoid ratooning of cotton including Bt cotton. Leaf hopper infestation was high in Akola. Infestation was above economic thresholds in 95% of villages in Chandrapur, 93% of the villages surveyed in Dhule, 75% of villages surveyed in Akola, in 48% villages surveyed in Amravati and 19% of villages in Yeotmal. Infestation was above ETL in 29-42% of the villages in Aurangabad division. Appropriate control measures may be initiated in these districts wherever the leaf hopper populations may have crossed economic threshold levels.
Wardha	0	0	0	48	12	41	
Chandrapur	0	0	5	30	34	35	
Yavatmal	0	0	0	20	9	24	
Amravati	0	0	0	21	8	17	
Akola	0	0	0	6	5	6	
Buldhana	0	0	0	0	7	7	
Parbhani	0	6	0	0	4	6	
Nanded	0	0	0	0	4	10	
Beed	0	8	0	0	3	0	
Washim	0	0	0	6	5	14	
Dhule	9	4	0	3	3	3	
Jalgaon	0	0	0	0	7	3	
Jalna	0	4	0	0	3	7	
Aurangabad	4	4	0	0	3	4	
TELANGANA							
Adilabad	0	0	4	4	6	0	The crop is in seedling to vegetative stage. Sowings are also under progress in few areas. Moderate to heavy rainfall is predicted for the second and third weeks of August. First split application of N & K fertilizers may be given in early sown crop. Gap filling may be done in recently sown crop. Inter-cultivation helps in weed control and moisture conservation. Foliar application of nutrients with 1-2% Urea or 1% KNO ₃ can be given to mitigate abiotic stress conditions. In view of the incessant rains, there is no need for any insecticide applications during this week.
Warangal	0	0	7	9	6	5	
Khammam	0	0	7	11	4	5	
Karimnagar	0	0	7	9	6	5	
Nalgonda	0	0	8	11	4	5	
AP							
Guntur	3	0	8	17	0	0	
Prakasam	3	0	8	23	6	0	
KARNATAKA							
Dharwad	3	3	12	10	10	11	Earthing up with intercultivation is advised in 50 -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. For effective management of mirid bug in the developing squares, it is suggested to spray the crop with Acephate 75 SP @ 1 g/lit of water. 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
Haveri	3	6	13	11	6	12	
Mysore	4	3	7	6	9	30	

							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 mixed with Blitox @ 3g/lit. Cloudy sky with possibility of rainfall is predicted for this week. Sowing can be taken up in this week. Pre-emergence application of herbicide – Pendimethalin @ 3.3 liters / ha. and seed treatment with Pseudomonas fluorescens @ 10 / kg of seed or Trichoderma viride @ 4 g /kg of seed is to be done. Ignore aphid and leafminer incidence.
TAMILNADU							
Perambalur	0	0	0	0	0	0	
Salem	3	0	7	10	0	0	
Trichy	0	9	6	4	0	0	
Virdhunagar	6	9	10	9	0	4	

Legend					
Rainfall in mm	< 5	5-20	20-50	50-80	> 80

MANAGEMENT STRATEGIES RECOMMENDED BY CICR

(Authored by K. R. Kranthi; No part of this advisory may be used in any form in any publication electronic or print or any other means without the permission of the author)

The strategies recommended in this brief note are based on results of experiments conducted by CICR and developed in consonance with various ecologically compatible guidelines issued by various National and Global agencies.

GENERAL CROP HEALTH MANAGEMENT PRACTICES

1. **Early maturing varieties or Bt-cotton hybrids** may be preferred in rain-fed regions.
2. **Early sowing** is preferred in rain-fed regions immediately after receiving the first showers of 80 mm rainfall.
3. **Sowing on ridges in rain-fed regions** especially in high density planting systems is most preferred.
4. **Bt-cotton hybrids** may be sown at 90 x 30 cm in rain-fed regions and at wider spacing under irrigation
5. **Non-Bt varieties** Suraj such as (CICR) NH 615 (VN-MAU, Parbhani), AKH 081 (Dr PDKV Akola), Phule Dhanwantari (MPKV Rahuri) and Anjali (LRK 516) are early maturing. If these varieties are sown before 15th June in high density planting at 60x10 cm (40x10cm for Phule Dhanwantari), the crop will escape drought stress and bollworms.
6. **Intercropping in high density non-Bt cotton varieties** can be taken up with soybean (seed treated with *Bradyrhizobium japonicum*), cowpea or blackgram in alternate rows at 45 cm row to row and 10 cm plant to plant.
7. **Intercropping in Bt hybrids** can be taken up with soybean (seed treated with *Bradyrhizobium japonicum*), cowpea or blackgram as one row between two Bt-hybrid rows
8. **Border rows (2-3 rows) of pigeonpea** around cotton fields will prevent infestation of mealy bugs and serve as refugia.
9. **Farm Yard Manure** @ 5 to 10 t/ha or compost should be applied just after the first rain.
10. **Azotobacter and PSB** @ 25 g each / kg seed should be used for nutrients fixation.
11. **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.
12. **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.
13. **Retention of squares and flowers:** Spray Planofix 4.5 SL (NAA) hormone @ 21 ppm (7 ml per 15 litres of water).

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. **Imidacloprid (8 g), Vitavax or Thiram (3 g)** per kg seed will protect varieties against sucking pests and diseases.

4. **Use nitrogenous fertilizers to the minimum** especially for sucking pest susceptible varieties.
5. **Maintain field sanitation** (weed free)
6. **Remove and destroy mealy bug infested plants.**
7. **Use Neem preparations and biological control options** for least disruptive pest management.
8. **Pheromone traps** are efficient for pest monitoring of Pink bollworm.
9. **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

10. **Avoid late sowing beyond 15th May in North India** to prevent aggravation of cotton leaf curl virus.
11. **As far as 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.
12. **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.
13. **Do not spray Bt-formulations on Bt cotton** to avoid further selection pressure.
14. **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.
15. **Do not use WHO Class-I (Extremely Harzardous category) insecticides** such as Phosphamidon, Methyl parathion, Phorate, Monocrotophos, Dichlorvos, Carbofuran, Methomyl, Triazophos and Metasystox.
16. **Avoid Fipronil and Pyrethroids** to prevent whitefly outbreaks.
17. **Avoid insecticide mixtures.** Mixtures severely disrupt eco-systems thereby leading to pest outbreaks.

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 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 Dimethoate.

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 (*Helicoverpa armigera* Nuclear Polyhedrosis Virus)** on Bt-cotton followed by the application of **5% Neem Seed Kernel Extract (NSKE)** a week later. **OR, use Phosalone** at ETL for the management of bollworms, *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,
 - b. Flubendiamide,
 - 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.

OTHER PESTS

1. ***Spodoptera litura*:** Collection of egg masses or application of *SINPV* (*Spodoptera litura* Nuclear Polyhedrosis Virus) @ 500 LE/ha or Spray 200 ml Novaluron 10 EC or 250g Thiodicarb 75WP in 250 litres of water per acre
2. To minimize **shoot weevil** damage, spray Profenofos @ 2 ml/lit
3. **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

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

Application of Pre-emergence weedicide Stomp 30EC or Basalin @45EC 2.5 lt/ha and harrow immediately to prevent degradation.

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 Pyriithiobac sodium

Post-emergence weedicides would provide effective and timely control especially when interculture operations or manual weeding becomes difficult in wet soils. 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. Pyriithiobac sodium is effective on broad leaf weeds. Farmers may consult the technical experts of the Agricultural Universities for further details.

WATER LOGGING MANAGEMENT

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.

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