

**ICAR-Central Institute for Cotton Research**  
**Weekly Advisory for Cotton Cultivation from 8<sup>th</sup> to 14<sup>th</sup> September 2015**  
**(43<sup>st</sup> Standard Week)**

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

**WEATHER ADVISORY**

Date	Rainfall (mm) Sep 2015							ADVISORY
	8	9	10	11	12	13		
<b>PUNJAB</b>								<p><b>WHITEFLY:</b> WHITEFLY POPULATIONS HAVE DECLINED. THE POPULATIONS ARE LIKELY TO INCREASE IN THE NEXT 3-4 WEEKS. Farmers are advised to adhere to the CICR recommendations to prevent outbreaks. Whitefly outbreaks can happen because of any one or a combination of the following factors: Cloudy hot and humid weather; susceptible hybrids, hairy or bushy genotypes; late sowing; More urea and of less P&amp; K fertilizers; repeated pyrethroids, acephate, fipronil, mixtures; insecticide Resistance; weeds; continuous cultivation with crops that are hosts of whitefly; non adoption of cultural control and improper spray application methods. The following <b>MANAGEMENT</b> methods are recommended: Strictly avoid Fipronil, synthetic pyrethroids, acephate or insecticide mixtures to prevent disruption of natural control. Avoid excessive urea. Use mixed NPK as split. Yellow sticky traps at 1 trap per 100 sq metre. Spray 5% NEEM OIL, CASTOR OIL, FISH OIL ROSIN SOAP OR NIRMA and Insect growth regulators such as Diafenthiuron, Buprofezin, Pyroproxyfen, Spiromesfin and Emamectin benzoate. under unavoidable circumstances farmers may use ethion or triazophos preferably as soil application. Spray should be done in the morning or late in the evening and targeted towards mid and lower canopy of plant. KNO<sub>3</sub> @ 2 kg/acre spray is recommended. Cotton leaf cutl virus CLCuD has appeared at almost all locations. Intensity of Leaf curl disease has increased on most of the varieties /hybrids in the fields. Incidence of leaf curl virus disease was observed upto 3 grade severity in Hisar, Sirsa, Fatehabad, Jind districts and in Bawani Khara and Bhiwani blocks of Bhiwani district. Manage the vector whitefly to check its further spread and keep the field clean of collateral host. Farmers are advised not to allow crop suffer for the want of water during fruiting stages and provide irrigation as per need during the period to get higher yields, it is advised to give four sprays of N: P: K (13:0:45) @2.0 kg/acre at weekly interval starting at flower initiation. This climate is also congenial for the attack of the cotton diseases, so regularly monitor the crop for their symptoms and management thereafter. Average population of leafhopper nymphs and adults was above economic threshold (ET) in fields of Rewari, Palwal and Mohindergarh districts. Average population of leafhopper nymphs and adults was above economic threshold (ET) in fields of rice grown belt. Incidence of bollworms was observed in desi cotton. Solenopsis mealy bug incidence was observed only in traces in few fields. Fungal foliar diseases were observed in traces in some fields. Bacterial leaf blight was noticed in Bathinda district. Incidence of leafhopper incidence (3-7/3 leaves), whitefly (9-22/3leaves) and thrips (2-11/3 leaves) were observed. Parawilt has also been noticed at many locations after irrigation. Though the population of leafhopper is increasing but it is still below ETL. For parawilt spray cobalt chloride @10ppm (1g/100 litres of water). Predictions show that there will be NO RAINS henceforth.</p>
Batinda	0	0	0	0	0	0	0	
Ferozpur	0	0	0	0	0	0	0	
Muktsar	0	0	0	0	0	0	0	
Mansa	0	0	0	0	0	0	0	
<b>HARYANA</b>								
Sirsa	0	0	0	0	0	0	0	
Hissar	0	0	0	0	0	0	0	
Fatehabad	0	0	0	0	0	0	0	
<b>RAJASTHAN</b>								
Hanumangarh	0	0	0	0	0	0	0	
Sri Ganganagar	0	0	0	0	0	0	0	
Banswara	0	7	0	0	3	0	0	
<b>ORISSA</b>								Rains are expected to continue until the first week of October. The crop is 70 to 79 days old at flowering and boll formation stage.

Koraput	13	13	17	16	22	40	7	Leaf hoppers were noticed at 1-3 nymph/3leaves , Whitefly incidence crossed ETL Level (18-78/3leaves). Thrips population was observed to be ranging from 6-24/ 3 leaves. Spotted bollworm infestation also reported in traces. Incidence of Earias spp. on desi and American was recorded 6-18 larvae/20 plants. 2- 5 adult moths of pink boll worm catches were recorded per pheromone trap. All types of weeds like grasses, sedges and broad leaf weeds have infested the crop and control measure has been taken. Incidence of aphids, jassids, semilooper and grass hoppers, but all are below ETL. No report of any disease incidence. For monitoring American bollworm and Spodoptera, install 5 pheromone traps each per hectare.
Kalahandi	13	17	25	16	33	38	1	
Balagir	4	3	0	4	4	7	0	
<b>GUJARAT</b>								Intermittent rains are predicted this week in some parts of Gujarat. A final spell of rains during 17-20th September is expected after which there is an expected dry phase. The crop growth stage is at flowering and squaring stage. Leaf hoppers, whiteflies, mealy bugs and thrips were observed to be below ETL. The crop condition is good. Avoid excessive urea application. Farmers are advised strictly not to spray pyrethroids and Fipronil. These insecticides aggravate whitefly and Helicoverpa resurgence. Repeated sprays of Spinosad and thiodicarb cause problems of mealybugs and leaf reddening, respectively. The crop is free of disease. <b>PINK BOLLWORM:</b> Incidence of Pink bollworm was observed to have declined and at low levels in Bt Cotton. Farmers are advised to install pheromone traps @ 5-6 /ha to monitor pink boll worm. At economic threshold levels of 8 moths per trap per night for three consecutive nights and/or 10% damaged bolls with grown-up larvae, spray quinalphos. Farmers are advised to terminate cotton crop in December without extending it further into 2016. This is necessary to reduce pink bollworm incidence and bollworm 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 and November. Do not use mixtures especially those containing pyrethroids. This can result in whitefly infestation.
Amreli	4	7	7	6	0	7	0	
Bhavnagar	0	3	4	6	0	7	0	
Jamnagar	0	0	0	0	0	0	0	
Rajkot	0	0	0	0	0	0	0	
Baruch	14	21	15	4	4	0	1	
Sabarkantha	0	0	3	5	0	0		
Surendranagar	3	0	0	3	8	0	0	
Ahmedabad	0	3	4	6	8	7	1	
Vadodara	0	16	11	0	7	9	2	
Patan	0	0	0	3	5	0	2	
Mehsana	0	0	0	3	5	0	0	
<b>MP</b>								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. Recommended control measures may be initiated in these fields. There is no disease incidence. Rains are expected in the third week of September followed by a brief lull and a final spell of rain in the first week of October.
Khargaon	0	0	0	3	4	5	0	
Dhar	0	0	0	0	0	0	0	
Khandwa	0	0	0	0	3	3	0	
<b>MAHARASHTRA</b>								In Vidharba region, crop sown during May is in boll formation stage; crop sown in mid-June monsoon is in flowering stage and July sown crop is in vegetative stage. Final hoeing and weeding may be done in July sown crop. Mealybug and whiteflies were seen in some patches. Alternaria disease was seen in some patches. Farmers are advised to spray 2% urea or 2% DAP spray at flowering stage and 1% urea and 1% Magnesium sulphate spray at Boll development stage. It is good news for farmers of Central Mharashtra that good rains are expected this week. It is also good news that the entire cotton region in Maharashtra state is expected to recieve good rainfall during the week 17-24th September and a final spell during 30th September to 4th October. Cotton crop will benefit the most from these rains. <b>CROP-SAP PEST MONITORING REPORT:</b> Leaf hopper (Jassids) infestation was found to be above ETL in Akola (in 57.64 % villages), Jalna (42.93%), Chandrapur (39.47%), Hingoli (28.73%) of the villages surveyed. More than 10 per cent villages where jassid infestation crossed ETL were Amravati (15.49%), Osmanabad (15.78%), Nagpur (13.47%) and Gadchiroli (18.18%). About 12.39% villages of Jalna district were affected by thrips at levels above economic threshold. Leaf reddening was observed in
Nagpur	4	3	0	0	0	0	4	
Wardha	4	0	3	0	0	0	15	
Chandrapur	12	10	3	9	0	0	2	
Yavatmal	3	0	6	0	0	3	19	
Amravati	4	0	3	0	3	0	12	
Akola	0	0	4	3	3	4	0	
Buldhana	0	0	6	7	6	13	0	
Parbhani	11	5	7	21	13	12	4	
Nanded	41	15	11	23	10	11	0	

Beed	20	4	8	18	14	11	0	Ahmadnagar (33.73% affected villages) followed by Nagpur (5.80%), Aurangabad (4.34%) and Jalgaon (2.85%).
Washim	0	3	8	3	3	4	2	
Dhule	0	0	3	10	10	14	0	
Jalgaon	0	0	0	10	10	14	0	
Jalna	6	0	6	9	10	13	0	
Aurangabad	3	0	4	12	11	10	0	
<b>TELANGANA</b>								
Adilabad	73	33	18	23	11	13	8	
Warangal	15	33	18	23	20	13	5	
Khammam	21	13	12	24	35	18	11	
Karimnagar	21	33	12	17	20	13	5	
Nalgonda	20	19	14	24	35	16	6	
<b>AP</b>								
Guntur	14	13	15	31	45	16	20	
Prakasam	15	17	30	36	45	23		
<b>KARNATAKA</b>								Continuous rains are predicted all through September until mid-October in cotton growing districts of Karnataka. Proper drainage should be done in fields to avoid water logging. Application of mixed fertilizers in splits will help in preventing insect pest damage. Avoid urea alone. Root rot is observed in patches in some areas, suggested for drenching of Vitavax Power @ 2 g/lit to the affected plant and the surrounding plants. To effectively manage the leaf reddening and square dropping problems in early sown cotton crop, it is advised to spray the crop with 1.0 % of 19:19:19 (10 g/lit of water) water soluble fertilizer along with 1 % MgSO <sub>4</sub> and Planofix (0.25 ml/lit of water) at an interval of 15 days. In more than 100 days old cotton crop, it is suggested to spray the crop once with Copperoxychloride @ 3g/lit and Streptocycline @ 0.5 gm/lit to control boll rotting under irrigated conditions.
Dharwad	13	10	7	0	27	30	5	
Haveri	15	20	11	0	11	20	2	
Mysore	60	67	64	7	20	8	0	
<b>TAMILNADU</b>								Cloudy sky with possibility of rainfall is predicted for the ensuing week. Gap filling is to be taken up. 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 on seedlings. Infestation of fields with Trianthema portulacastrum, Parthenimum, Cynodon dactylon can be controlled using the remedial measures.
Perambalur	5	0	9	6	0	0	0	
Salem	21	9	70	10	8	12	1	
Trichy	10	4	14	7	0	0	0	
Virdhunagar	13	16	24	19	10	9	0	

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 15<sup>th</sup> 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 MgSO<sub>4</sub>, 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 15<sup>th</sup> 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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