

**ICAR-Central Institute for Cotton Research**  
**Weekly Advisory for Cotton Cultivation from 15<sup>th</sup> to 20<sup>th</sup> September 2015**  
**(44<sup>th</sup> Standard Week)**

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

**WEATHER ADVISORY**

State/Districts	Rainfall (mm) Sep 2015						ADVISORY
Date	15	16	17	18	19	20	
<b>PUNJAB</b>							<p>It is likely to rain from 24 to 26<sup>th</sup> September 2015 in some parts of north India. This could be the last spell. Effective fruiting and boll formation period is still on so keep the crop healthy for more fruiting bodies, do not allow cotton crop to suffer for want of water during flowering and fruiting stages to check shedding of flowers and bolls. To hasten boll opening, last irrigation may be given at the end of September. 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. A few plants may suffer from parawilt immediately after irrigation or after the spell of rain. Severe parawilt has been noticed at many locations when irrigated after a dry spell. Spray cobalt chloride @ 10 mg/ litre of water only on the affected plants within few hours of appearance of symptoms. Whitefly populations have declined. The populations are likely to increase in the next 2-4 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. Install yellow sticky traps at 1 trap per 100 sq metre to trap the increasing adult population, spray 5% emulsion of NEEM OIL, CASTOR OIL, FISH OIL RESIN SOAP OR 1% NIRMA. At ETL levels any one of the Insect growth regulators such as Diafenthiuron, Buprofezin, Pyroproxyfen, Spiromesfin and Emamectin benzoate may be sprayed. Under unavoidable circumstances farmers may use ethion or triazophos preferably as soil application. Intensity of Leaf curl disease has increased in most of the varieties /hybrids in the fields. Manage the vector whitefly to check its further spread and keep the field clean of collateral hosts. Incidence of Earias spp. on Desi and American was recorded 7-17 larvae/20 plants, 6-10 adult moths of pink boll worm catches per pheromone trap/ week. Farmers are advised to monitor Desi <i>Gossypium arboreum</i> and non-Bt <i>Gossypium hirsutum</i> cotton crop for bollworm incidence and take appropriate steps for their management. This climate is also congenial for the attack of the cotton diseases specially leaf blight, so regularly monitor the crop for their symptoms and management thereafter.</p> <p>Continuous rains are expected until the first week of October, followed by another spell during 7-11<sup>th</sup> October. The crop is three month old at flowering and boll formation stage. No report of any disease incidence. 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 was noticed, but all are below ETL. For Spodoptera, install 5 pheromone traps per hectare. Bollworm infestation is unlikely to occur in any part of Orissa now. Conserve rain water by making cross bunds in between two rows of cotton.</p>
Batinda	0	0	0	0	0	0	
Ferozepur	0	0	0	0	0	0	
Muktsar	0	0	0	0	0	0	
Mansa	0	0	0	0	0	0	
<b>HARYANA</b>							
Sirsa	0	0	0	0	0	0	
Hissar	0	0	0	0	0	0	
Fatehabad	0	0	0	0	0	0	
<b>RAJASTHAN</b>							
Hanumangarh	0	0	0	0	0	0	
Sri Ganganagar	0	0	0	0	0	0	
Banswara	0	0	0	0	14	7	
<b>ORISSA</b>							
Koraput	54	51	34	29	29	23	
Kalahandi	43	39	29	27	8	36	
Balagir	22	30	27	19	7	13	

GUJARAT							Rains are expected in the next week in several parts of Gujarat. The crop is in peak flowering and boll formation stage. The crop is healthy and there are hardly any reports of any pest attacks. Apply 25% dose of recommended dose of fertilizer to ensure that nitrogen is kept to the optimum recommended levels. In the current cloudy and humid conditions with intermittent rain, nitrogen can cause whitefly infestation. Whitefly attacks can become severe if chemical insecticides are sprayed now for some reason. Strictly avoid pyrethroids, imidacloprid, acephate, fipronil thiomethoxam and any organophosphate sprays. The best way to manage all sucking pests at this stage is to use neem oil 1 to 5% in soap emulsion. Neem seed kernel extract 1-2 Kg per acre can be added to the emulsion wherever available. Neem based sprays help in protecting the natural enemies and provide effective long term control. Thrips were reported to cause mild damage in some parts. Farmers were advised to spray spinosad. PINK BOLLWORM: Incidence of Pink bollworm was observed to have declined and at low levels in Bt Cotton. Infestation is expected to start from the last week of September, reach initial damaging levels in October and intensify in November-December. 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 or thiodicarb once in October and pyrethroid preferably 'lambda-cyhalothrin' once in November. Thiodicarb is sprayed more than once can cause leaf reddening in rainfed farms. If unattended, pink bollworm can cause heavy damage in October and November. Strictly avoid pyrethroids until the end of October. Never use any insecticide mixtures. This can result in whitefly infestation. Farmers are advised to terminate cotton crop in December without extending it any 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.
Amreli	0	3	0	0	12	47	
Bhavnagar	0	0	0	0	12	47	
Jamnagar	0	0	0	0	0	13	
Rajkot	0	0	0	0	0	20	
Baruch	0	12	0	0	9	20	
Sabarkantha	0	0	0	0	8	5	
Surendranagar	0	0	0	0	0	30	
Ahmedabad	3	0	0	0	33	58	
Vadodara	11	9	7	10	45	34	
Patan	0	0	0	0	0	16	
Mehsana	0	0	0	0	0	12	
MADHYA PRADESH							
Khargaon	8	3	3	21	24	25	
Dhar	0	0	0	10	8	22	
Khandwa	13	3	7	33	49	25	
MAHARASHTRA							
Nagpur	8	19	23	33	24	20	
Wardha	5	12	29	35	28	18	
Chandrapur	7	19	20	21	28	19	
Yavatmal	16	10	18	26	29	12	
Amravati	12	10	32	41	52	24	
Akola	18	5	13	37	41	25	
Buldhana	20	4	6	31	37	26	
Parbhani	25	10	7	46	29	9	
Nanded	24	18	6	59	30	7	
Beed	21	9	7	43	22	4	
Washim	32	7	12	27	38	16	

Dhule	14	0	0	9	49	44	of the Insect growth regulators such as Diafenthiuron, Buprofezin, Pyroproxifen, Spiromesfin and Emamectin benzoate may be sprayed. Under unavoidable circumstances farmers may use ethion or triazophos preferably as soil application. Infestation of Alternaria leaf spot may occur due to cloudy weather. Foliar spray of <i>Pseudomonas fluorescens</i> 0.2 per cent or Copper oxy chloride @ 25 g / 10 lit may be done for its management.
Jalgaon	16	4	5	27	49	44	
Jalna	11	4	4	18	24	15	
Aurangabad	12	0	5	15	42	33	
<b>TELANGANA</b>							Continuous rains are predicted all through September until the first week of October in cotton growing districts of Telangana and AP. The crop is 35 to 80 days old at early square formation to flowering stage. Saturated conditions may prevail in the field. Due to wide spread rain forecast, water logging may occur in low lying areas, hence farmers are advised to take-up necessary remedial measures to drain out excessive water from the fields and form ridges & furrows. First /Second split application of N & K fertilizers along with MgSO4 can be given. Application of 25-35kg of Urea + 15kg MOP per acre may be taken up immediately in fields with young plants. Foliar application of nutrients 70-80 days old crop with 1-2% DAP or 1-2% KNO3 along with 1% MgSO4 to mitigate abiotic stress conditions as well as leaf reddening condition. Avoid excessive nitrogen and any application of organophosphate insecticides to prevent prolongation of vegetative phase and infestation of sap sucking insects. Weeds may be managed based on the CICR recommendations given in the annexure of this advisory. Inter-cultivation is important. Post-emergence of selective weedicides may become necessary in the event of continuous rains interspersed with small dry spells. Strictly avoid acephate and fipronil for the control of early sucking pests like jassids / thrips. This will lead to whitefly infestation. For the control of rhizoctonia blight and other fungal leaf spot diseases, spraying with propiconazole @ 1.0 ml/l or mancozeb + carbendazim 2.0 g/l of water is recommended. If acephate and fipronil are sprayed to control sucking pests, whitefly is likely to emerge as a problem. There will be no need on any insecticides in view of the continuous rains during the peak vegetative and early-mid reproductive phase.
Adilabad	22	20	15	71	34	11	
Warangal	21	27	30	71	34	11	
Khammam	21	28	38	11	14	4	
Karimnagar	21	27	30	36	28	9	
Nalgonda	13	28	38	22	8	8	
<b>ANDHRA PRADESH</b>							
Guntur	14	28	20	5	4	0	
Prakasam	18	28	22	7	14	17	
<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. Sowing of Desi cotton either sole or as an intercrop in Onion + chilli in some parts of Northern Karnataka may be continued till this week end. Nipping of growing shoot tip is advised in 100-110 days old crop especially in H x B hybrids and spray the crop with 1.0 % of 19:19:19 (10g/lit of water) water soluble fertilizer along with 1 % MgSO4 and Planofix (0.25 ml/lit of water) to manage leaf reddening and square dropping effectively. 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. It is suggested to spray the crop with Acephate @ 1.0 g /lit of water for effective management of the mirid bug. In desi cotton, carbendazim @ 1.0 g/lit of water to be sprayed to control grey mildew disease. The crop at peak square and boll formation stage should not be irrigated heavily in deep black soils.
Dharwad	17	46	16	7	26	44	
Haveri	27	46	16	5	25	51	
Mysore	16	17	13	14	34	72	
<b>TAMILNADU</b>							In Winter irrigated cotton, sowing was completed and gap filling is in progress. Herbicide, pendimethalin may be applied @ 3.25 l/ha on 3 DAS. Drenching of Chlorpyrifos @750 ml/ha along with Bavistin @ 750 g/ha may be done as a prophylactic measure against stem weevil and root rot. Grasses: Echinochloa spp, Dactyloctenium aegyptium, Sedges: Cyperus spp, BLW: Trianthema portulacastrum noticed in most of the fields and control measures taken for the same.
Perambalur	0	0	0	0	0	0	
Salem	0	0	0	6	0	7	
Trichy	0	0	0	0	0	7	
Virdhunagar	0	13	9	8	22	56	

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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