

ICAR-Central Institute for Cotton Research
Weekly Advisory for Cotton Cultivation from 17th to 23rd August 2015
(40th Standard Week)

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

WEATHER ADVISORY

Dates	Rainfall (mm) August 2015							ADVISORY
	17	18	19	20	21	22	23	
PUNJAB								The crop is in its early reproductive stage. Hot and humid conditions are likely to prevail in Punjab, Haryana and Rajasthan. Inter-culture and weeding may be carried out to remove alternate host plants of whiteflies. Jassid populations were found to have increased over the past two weeks due to favourable weather conditions. Whitefly population varied from 8 to 21 per three leaves in all the districts surveyed. CLCuV incidence was observed on all the cotton hybrids in Bathinda, Mansa, Hisar and Faridkot districts. The current conditions of hot, humid and cloudy weather are likely to assist whiteflies in proliferating. It is important to exercise care so as to ensure that any pest control intervention should not disrupt the ecosystems at this stage. Majority of insecticides kill predators and parasitoids of the whitefly, which leads to outbreak of the pest. Never use Fipronil, synthetic pyrethroids or any insecticide mixtures. Excessive urea application at this stage strongly enhances whitefly and jassid infestation. Top dressing application of N: P: K (13:0:45) is recommended. Use of yellow sticky traps, suction traps, water sprays, soap sprays and neem-oil based sprays may be encouraged. These methods would result in moderate pest control efficacy and prevent resurgence of whiteflies. Wherever economic thresholds have crossed 8 adults per leaf, buprofezin, pyriproxyfen or spiromesifen or diafenthiuron may be alternated at fortnightly intervals. Strictly avoid any other insecticides and urea application. Whitefly attacks are most likely to become severe in September if the above guidelines and precautions are ignored. Site specific remedial measure for root rot (wilt) and parawilt may be initiated based on symptoms. Recommended insect pest/disease control measures can be initiated only at economic threshold levels on rain free days
Batinda	0	0	0	0	0	0	0	
Ferozpur	0	0	0	0	0	0	0	
Muksar	0	0	0	0	0	0	0	
Mansa	0	0	0	0	0	0	0	
HARYANA								
Sirsa	3	0	0	0	0	0	0	
Hissar	3	0	0	0	0	0	0	
Fatehabad	0	0	0	0	0	0	0	
RAJASTHAN								
Hanumangarh	5	0	0	0	0	0	0	
Sri Ganganagar	0	10	0	0	0	0	0	
Banswara	31	12	6	0	0	0	0	
ORISSA								
Koraput	44	40	15	25	24	22	19	
Kalahandi	24	16	8	8	6	5	15	
Balagiri	13	9	4	4	6	0	3	
GUJARAT								
Amreli	0	6	0	0	0	0	0	
Bhavnagar	0	4	0	0	0	0	0	
Jamnagar	0	0	0	0	0	0	0	
Rajkot	0	6	0	0	0	0	0	
Baruch	0	11	0	0	0	0	0	
Sabarkantha	7	7	0	0	0	0	0	
Surendranagar	0	4	0	0	0	0	0	
Ahmedabad	0	6	0	0	0	0	0	
Vadodara	0	5	5	0	4	9	8	
Patan	5	0	0	0	0	0	0	

Mehsana	0	0	0	0	0	0	0	reduce pink bollworm incidence and development of resistance to Bt-cotton. Last year cotton stalks have been observed lying on the bunds. They must be destroyed immediately. Old cotton seed stored in godowns or homes serve as a carryover for pink bollworm moths, destroy immediately if infested. The crop is in flower initiation stage. Farmers are advised to irrigate wherever possible and apply first dose of NPK fertilizers. Thrips and leaf hopper infestations are expected this week. Farmers are advised not to spray pyrethroids, spinosad, thiodicarb as it will cause problems of Helicoverpa, mealybugs, leaf reddening, respectively.
MP								
Khargaon	0	0	3	0	0	0	0	Weather is expected to be cloudy with very light rainfall. The crop is about 55 to 65 days in different areas as per sowing dates. Top dressing with N+P is recommended during rain free period. Wilt and root rot problems are expected after rains. These should be attended on priority with remedial measures recommended in the appendix of this advisory. Do not spray insecticide against sucking pests. If sucking pests persist on susceptible Bt-cotton hybrid, neem oil based sprays are recommended. Monitor for the presence of rosette flowers, a diagnostic of pink bollworm. Isolated case of Mealybug incidence is being reported. The pest may be ignored as it is well check by native natural parasitoid Anasius among others.
Dhar	12	0	5	3	0	0	0	
Khandwa	0	3	3	0	3	0	0	
MAHARASHTRA								
Nagpur	0	0	6	0	0	4	0	The crop is in boll formation stage in the irrigated field and flowering to boll formation in the rainfed areas. Repeated hoeing is advisable to conserve the soil moisture under scanty rainfall areas. Final top dressing of nitrogenous fertilizers to be done @ 60 kg N / ha for irrigated and 36 kg / ha for rainfed crop. Intercultural operations should be carried out to control emerging weeds. Foliar application of 2 % DAP / Urea should be done on 60-70 days old crop. KNO ₃ 2 % should be applied at 75 days after sowing. Application of 0.2 % MgSO ₄ at square formation and boll formation to reduce leaf reddening. Emerging weed should be controlled by interculture and weeding may be done, if necessary. There is a dry spell in central Maharashtra. Infestation of thrips and jassids is observed in this region. The best IPM friendly insecticides are neem oil based sprays, soap water, or spinosad in emergency situations. Parawilt is observed in some areas. The CICR recommendations made in the appendix of this advisory may be followed. Additionally, drenching of 200 g Urea + 200 g Potash per 10 lit. water should be done immediately after observation of symptoms. 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, a diagnostic of pink bollworm as stray reports of rosette flowers have been received from Nagpur and Jalgaon.
Wardha	4	0	0	0	0	3	0	
Chandrapur	0	3	5	4	5	5	0	
Yavatmal	37	0	0	0	3	3	0	
Amravati	0	0	11	0	4	0	0	
Akola	0	0	0	0	0	0	0	
Buldhana	0	4	4	0	4	0	0	
Parbhani	0	0	0	0	0	3	0	
Nanded	0	0	0	3	0	4	0	
Beed	0	3	0	0	0	3	0	
Washim	10	0	0	0	0	0	0	
Dhule	4	4	5	0	3	3	3	
Jalgaon	0	4	5	0	4	3	3	
Jalna	18	0	0	0	0	0	0	
Aurangabad	12	3	3	0	0	7	5	
TELANGANA								
Adilabad	4	0	4	7	4	7	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 done in recently sown crop. Inter-cultivation as a weed free and moisture conservation practice should be taken up. Foliar application of nutrients with 1-2% Urea or 1% KNO ₃ can be given to mitigate abiotic stress conditions. Pre-emergence application of Pendimethalin @ 1.5 l. / acre should be done within 24 to 36 hours of sowing (wherever sowings are under progress). In view of the incessant rains, there is no need for any insecticide applications during this week.
Warangal	13	6	9	9	14	11	0	
Khammam	18	15	11	18	22	6	0	
Karimnagar	13	6	9	9	14	11	0	
Nalgonda	18	15	11	18	22	11	8	
AP								
Guntur	20	18	14	22	25	4	0	
Prakasam	26	18	14	22	25	16	10	
KARNATAKA								

Dharwad	4	6	0	4	14	11	9	<p>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. Top dressing with 25 kg N/ha (i.e. 50 kg Urea/ha) & 12 kg K (20 kg MOP/ha) to be taken up in 50 days old crop. 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% MgSO₄ and Planofix (0.25 ml/lit of water) to manage leaf reddening and square dropping effectively. It is advised to spray the (30-45 days old) crop with Profenophos 50 EC @ 2 ml/lit water to reduce shoot weevil incidence and also it is better to hand pick the weevils during morning hours and destroy. If incidence of mirid bug in the developing squares is seen, it is suggested to spray the crop with Acephate 75 SP @ 1 g/lit. Alternatively alternate furrow irrigation is suggested for 60-70 days old crop in black cotton soils for better soil aeration and saving of irrigation water.</p>
Haveri	7	0	6	6	10	11	26	
Mysore	8	8	12	6	5	23	20	
TAMILNADU								
Perambalur	15	15	5	0	4	0	10	<p>Cloudy sky with possibility of rainfall is predicted for this week. Sowng is in progress wherever rains were received. Pre – emergence application of herbicide – Pendimethalin @ 3.3 liters / ha. and seed treatment with <i>Pseudomonas fluorescens</i> @ 10 / kg of seed or <i>Trichoderma viride</i> @ 4 g /kg of seed is to be done. For aphid control – Imidacloprid 17.8 SL @ 0.6ml per lit. may be sprayed.</p>
Salem	19	19	11	10	14	14	14	
Trichy	30	30	3	4	6	0	6	
Virdhunagar	30	30	7	4	8	8	6	

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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