

ICAR-Central Institute for Cotton Research

Weekly Advisory for Cotton Cultivation from 6th to 12th October 2015

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

WEATHER ADVISORY

Date	Rainfall (mm) Oct 2015							ADVISORY
	6	7	8	9	10	11	12	
PUNJAB								The crop is in maturity stage. Picking has started in <i>G. arboreum</i> at all locations and in <i>G. hirsutum</i> at few places. Do not mix seed cotton of <i>G. arboreum</i> with <i>G. hirsutum</i> after or during picking. Farmers who have sown <i>G. arboreum</i> this year may like to reuse the seed next year. Population of leafhopper and thrips is negligible. Whitefly incidence is increasing and the second peak of whitefly is expected in this week and farmers are advised to spray Diafenthiuron/Ethion wherever required. Spotted bollworm incidence has been noticed in <i>G. arboreum</i> cotton at few places. Abandoned fields of cotton support mealy bugs. Care must be taken while uprooting and destroying the cotton stalks especially from abandoned fields. Since picking in cotton has started, farmers are advised to adopt clean picking practices. Cotton should be picked clean and dried to get a good price in market. Picking should be done after every 8 to 10 days to avoid loss. Intensity of Leaf curl disease has increased in most of the varieties /hybrids in the fields. Leaf reddening has been observed in cotton after rainfall which could be managed with spray of Magnesium Sulphate @1% per acre. Fields that were sown late and stressed cotton crop showed more damage (blackening of lower leaves) due to whitefly attack as compared to well managed crop that was sown on time. The population of leafhopper was below ETL (2 nymphs and adults/leaf) in all the fields observed. Incidence of <i>Spodoptera</i> and <i>Solenopsis</i> mealy bug incidence were observed in traces only. Incidence of <i>Helicoverpa</i> and <i>Earias</i> species was observed in traces only on desi cotton in few fields. Cotton leaf curl virus disease was observed upto 3 grade severity in Hisar, Sirsa, Fatehabad, Jind and Bhiwani district. Bacterial leaf blight disease did not appear in cotton. Low incidence of fungal foliar diseases were observed in some fields. Do not irrigate the field after one-third opening of the bolls in the field. Avoid picking of rotten bolls. Dry the kapas before storage to avoid micro organism damage. In Rajasthan, the crop is in flowering and boll bursting stage. Sanwa grass (<i>Echinochloa</i> sp.), Motha (<i>Cyperus</i> sp.), Dub grass (<i>Cyanodon</i> sp.) and Santhi (<i>Trianthema</i> sp.) were the important weeds found in the fields.
Batinda	0	0	0	0	0	0	0	
Ferozepur	0	0	0	0	0	0	0	
Muktsar	0	0	0	0	0	0	0	
Mansa	0	0	0	0	0	0	0	
HARYANA								
Sirsa	0	0	0	0	0	0	0	
Hissar	0	0	0	0	0	0	0	
Fatehabad	0	0	0	0	0	0	0	
RAJASTHAN								
Hanumangarh	0	0	0	0	0	0	0	
Sri Ganganagar	0	0	0	0	0	0	0	
Banswara	0	0	0	0	0	0	0	
ORISSA								
Koraput	10	3	0	0	0	0	0	
Kalahandi	6	0	0	0	0	0	0	
Balagjir	0	0	0	0	0	0	0	
GUJARAT								
Amreli	0	0	0	0	0	0	0	
Bhavnagar	0	0	0	0	0	0	0	
Jamnagar	0	0	0	0	0	0	0	

Rajkot	0	0	0	0	0	0	0	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.
Baruch	0	0	0	0	0	0	0	
Sabarkantha	0	0	0	0	0	0	0	
Surendranagar	0	0	0	0	0	0	0	
Ahmedabad	0	0	0	0	0	0	0	
Vadodara	0	0	0	0	0	0	0	
Patan	0	0	0	0	0	0	0	
Mehsana	0	0	0	0	0	0	0	
MP								
Khargaon	0	0	0	0	0	0	0	The crop condition is good. Summer sown crop is in fruiting stage while normal sown crop is in vegetative stage. There are no reports of insect pest or disease incidence, If sucking pests are observed to reach economic thresholds in any fields, 2.0% neem oil emulsion in soap may be sprayed. Strictly avoid excessive nitrogen and chemical insecticides.
Dhar	0	0	0	0	0	0	0	
Khandwa	0	0	0	0	0	0	0	
MAHARASHTRA								
Nagpur	0	0	0	0	0	0	0	Pre monsoon cotton is in boll bursting stage, cotton sown in monsoon is in boll development stage and July sown cotton is in boll initiation stage. Square dropping was seen in all species of cotton. Square drying also noticed in Bt varieties. To avoid further dropping of squares, Planofix 5ml +100 g urea in 10 litre of water may be sprayed. Repeat spray after seven days. Jassids and White fly incidence was noticed in some pockets. Flubendiamide for bollworm in non Bt cotton may be sprayed. American bollworm was above ETL level in <i>G. arboreum</i> and <i>G. hirsutum</i> sown in June and July cotton. Yellow sticky traps may be installed wherever whiteflies are noticed in Bt cotton fields. Wherever soil moisture is adequate, application of DAP at this stage will help the plants in boll setting and retention for high yields. Otherwise, 2% urea or 2% DAP spray at flowering stage. 1% urea and 1% Magnesium sulphate spray at boll development stage should be given. Do not spray pyrethroids for bollworm management. Adopt recommended practises as in Annexure. Percentage of districts where jassid damage remained above ETL- Akola (70.30 %) and Jalna (61.95%). Jassid infestation was above ETL in the range of 10-30% villages : Nanded (17.06%). Regions where <10% villages affected were Aurangabad (7.45%), Parbhani (7.23%), Beed (6.12%), Yeotmal (4.10%), Hingoli (4.02%) and Nagpur (2.67%). Thrips infestation was in trace (<2%) in Amravati and Jalna. In Amravati district, whitefly population crossed ETL in 34.15 % villages. More than 50 % villages were affected by leaf reddening in Dhule (56.25%) and this was followed by Parbhani (47.23% villages), Ahmednagar (42.58%), Nagpur (32.14%), Chandrapur (23.68%) and Gadchiroli (18.18%).
Wardha	0	0	0	0	0	0	0	
Chandrapur	0	0	0	0	0	0	0	
Yavatmal	0	0	0	0	0	0	0	
Amravati	0	0	0	0	0	0	0	
Akola	0	0	0	0	0	0	0	
Buldhana	0	0	0	0	0	0	0	
Parbhani	0	0	0	0	0	0	0	
Nanded	0	0	0	0	0	0	0	
Beed	0	0	0	0	0	0	0	
Washim	0	0	0	0	0	0	0	
Dhule	0	0	0	0	0	0	0	
Jalgaon	0	0	0	0	0	0	0	
Jalna	0	0	0	0	0	0	0	
Aurangabad	0	0	0	0	0	0	0	
TELANGANA								
Adilabad	0	0	0	0	0	0	4	The crop is at reproductive stage. Second or Third split application of N & K fertilizers to be given wherever necessary. Foliar application of nutrients with 1-2% Urea or 1-2% KNO ₃ along with 1% MgSO ₄ to mitigate abiotic stress conditions as well as leaf reddening. Suggested Acephate 1.5 g/l or Fipronil 2.0 ml/l for the control of sucking pests like jassids / thrips. Ensure that fields are well drained. Management of <i>rhizoctonia</i> rot may be achieved soil drenching with Copper-oxy-chloride @ 3.0 g/l of water. For the control of fungal leaf spot diseases, spraying with Propiconazole @ 1.0 ml/l or Mancozeb + Carbendazim 2.0 g/l of water is recommended. Due to high temperatures and high relative humidity, sucking pests and Spodoptera was observed. For the control of leafhoppers and whitefly , spraying of recommended measures as appended in the advisory may be followed on a rainfree day. Do
Warangal	10	4	0	0	0	3	4	
Khammam	36	4	4	3	0	3	0	
Karimnagar	10	4	0	0	0	3	0	
Nalgonda	36	5	4	3	0	6	5	
AP								

Guntur	46	0	6	4	0	8	4	not spray pyrethroids.
Prakasam	46	9	8	11	13	31	22	
KARNATAKA								
Dharwad	11	7	11	5	8	28	5	Heavy rainfall of more than 70 mm in a day has been reported in several parts of Northern Karnataka during last week. It is suggested to drain out the stagnant water in cotton crop to avoid boll dropping and top dress the crop with 25 kg Urea/acre in such conditions. Field sanitation is to be maintained by collecting the dropped diseased leaves and squares from the field and to be buried in the soil or to be burnt. Pink bollworm is to be managed with suitable plant protection measures. Desi cotton to be top dressed with 30 kg urea/acre. Foliar spraying of 1% of 19:19:19 soluble fertiliser along with 1% MgSO4 and Planofix (5 ml in 15 lit of water) to be undertaken at 15 days interval to manage leaf reddening and to reduce square dropping. Crop to be monitored for mirid and midge incidence, if found above ETL level, specific plant protection measures are to be taken immediately.
Haveri	13	16	16	12	8	7	7	
Mysore	50	33	10	12	33	11	0	
TAMILNADU								
Perambalur	4	5	6	10	13	6	9	The crop is in vegetative stage. Weed infestation noticed for which appropriate weedicides have been sprayed. Aphid infestation noticed but below ETL. 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. Sucking pests like leaf hoppers, aphid, whitefly and thrips were noticed. Rains will wash out the sucking pests. Hence do not spray this week. For the control of sucking pests, management practices as described in the annexure of this advisory may be followed on a rainfree day in the next week, if necessary .
Salem	11	14	9	39	45	17	21	
Trichy	15	9	3	5	7	3	5	
Virdhunagar	22	12	13	40	37	11	11	

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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