

## ICAR-Central Institute for Cotton Research

### Weekly Advisory for Cotton Cultivation from 23<sup>rd</sup> to 29<sup>th</sup> June 2015

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

#### WEATHER ADVISORY

| State/Districts       | Rainfall (mm) JUNE |     |     |    |    |    |    | Advisory |
|-----------------------|--------------------|-----|-----|----|----|----|----|----------|
|                       | Date               | 23  | 24  | 25 | 26 | 27 | 28 |          |
| <b>PUNJAB</b>         |                    |     |     |    |    |    |    |          |
| Bathinda              |                    | 7   | 44  | 0  | 0  | 0  |    |          |
| Ferozepur             |                    | 12  | 48  | 7  | 0  | 0  |    |          |
| Muktsar               |                    | 12  | 50  | 4  | 0  | 0  |    |          |
| Mansa                 |                    | 7   | 44  | 0  | 0  | 0  |    |          |
| <b>HARYANA</b>        |                    |     |     |    |    |    |    |          |
| Sirsa                 |                    | 7   | 50  | 8  | 0  | 0  |    |          |
| Hissar                |                    | 7   | 21  | 8  | 0  | 0  |    |          |
| Fatehabad             |                    | 7   | 27  | 8  | 0  | 0  |    |          |
| <b>RAJASTHAN</b>      |                    |     |     |    |    |    |    |          |
| Hanumangarh           | 1                  | 5   | 15  | 3  | 2  |    |    |          |
| Sri Ganganagar        | 1                  | 5   | 15  | 3  | 2  |    |    |          |
| Banswara              | 3                  | 8   | 12  | 15 | 2  |    |    |          |
| <b>ORISSA</b>         |                    |     |     |    |    |    |    |          |
| Koraput               |                    | 0   | 5   | 8  | 5  | 9  |    |          |
| Kalahandi             |                    | 19  | 6   | 0  | 0  | 3  |    |          |
| Balagir               |                    | 28  | 9   | 0  | 0  | 0  |    |          |
| <b>GUJARAT</b>        |                    |     |     |    |    |    |    |          |
| Amreli                | 12                 | 100 | 90  | 22 | 0  | 0  |    |          |
| Bhavnagar             | 31                 | 56  | 29  | 3  | 0  | 0  |    |          |
| Jamnagar              | 1                  | 200 | 174 | 56 | 0  | 0  |    |          |
| Rajkot                | 12                 | 144 | 159 | 56 | 0  | 0  |    |          |
| Broach                | 1                  | 62  | 59  | 11 | 5  | 0  |    |          |
| Sabarkantha           |                    | 0   | 57  | 50 | 47 | 11 |    |          |
| Surendranagar         |                    | 68  | 159 | 56 | 0  | 0  |    |          |
| Ahmedabad             | 2                  | 26  | 66  | 39 | 0  | 0  |    |          |
| Vadodara              | 2                  | 83  | 83  | 26 | 35 | 5  |    |          |
| Patan                 | 4                  | 11  | 100 | 41 | 30 | 0  |    |          |
| Mehsana               | 1                  | 5   | 57  | 52 | 20 | 0  |    |          |
| <b>MADHYA PRADESH</b> |                    |     |     |    |    |    |    |          |
| Khargaon              | 5                  | 66  | 20  | 3  | 10 | 9  | 18 |          |
| Dhar                  | 10                 | 193 | 36  | 9  | 3  | 17 | 19 |          |
| Khandwa               | 10                 | 61  | 3   | 4  | 5  | 17 | 16 |          |
| <b>MAHARASHTRA</b>    |                    |     |     |    |    |    |    |          |
| Nagpur                | 15                 | 11  | 3   | 0  | 0  | 0  | 0  |          |
| Wardha                | 12                 | 6   | 2   | 0  | 0  | 0  | 0  |          |
| Chandrapur            | 21                 | 1   | 3   | 0  | 0  | 0  | 2  |          |
| Yavatmal              | 1                  | 1   | 2   | 0  | 0  | 0  | 0  |          |
| Amravati              | 25                 | 12  | 4   | 2  | 5  | 4  | 2  |          |
| Akola                 | 22                 | 10  | 3   | 0  | 0  | 0  | 0  |          |

|                  |    |    |    |    |    |    |    |   |
|------------------|----|----|----|----|----|----|----|---|
| Buldhana         |    |    | 2  | 3  | 1  | 3  | 0  |   |
| Parbhani         | 5  | 4  | 8  | 0  | 7  | 0  | 0  |   |
| Nanded           | 12 | 2  | 7  | 0  | 9  | 0  | 0  |   |
| Beed             | 18 | 4  | 3  | 0  | 6  | 0  | 0  |   |
| Washim           | 3  | 3  | 2  | 0  | 0  | 0  | 0  |   |
| Dhule            | 0  | 4  | 5  | 10 | 20 | 17 | 15 | Immediate sowing is a MUST in rainfed areas. Late sown crop will face moisture stress in rainfed farms in the districts.  |
| Jalgaon          | 2  | 2  | 8  | 0  | 3  | 6  | 3  |   |
| Jalna            | 8  | 3  | 7  | 0  | 0  | 0  | 3  |   |
| Aurangabad       | 4  | 5  | 6  | 10 | 13 | 11 | 15 |   |
| <b>TELANGANA</b> |    |    |    |    |    |    |    |   |
| Adilabad         | 1  | 3  | 5  |    | 4  | 0  | 0  | This week is the best time for sowing in the state. Rains are predicted in the first two weeks of July in Adilabad. In rest of the districts, cloudy conditions with sporadic drizzle is predicted. Moderate rains are predicted from 8th to 30th July in districts other than Adilabad. Sowing MUST be completed this week in all rainfed farms. |
| Warangal         | 2  | 0  | 6  |    | 8  | 5  | 0  |   |
| Khammam          | 3  | 4  | 5  |    | 8  | 6  | 3  |   |
| Karimnagar       | 3  | 0  | 5  |    | 0  | 0  | 0  |   |
| Nalgonda         | 1  | 0  | 5  |    | 0  | 0  | 0  |   |
| <b>AP</b>        |    |    |    |    |    |    |    |   |
| Guntur           | 8  | 6  | 5  |    | 8  | 4  | 0  | Sowing should be taken up in irrigated regions.   |
| Prakasam         | 3  | 5  | 3  |    | 6  | 0  | 3  |   |
| <b>KARNATAKA</b> |    |    |    |    |    |    |    |   |
| Dharwad          | 4  | 12 | 15 | 9  | 7  | 6  |    | Sowing MUST be taken up immediately in rainfed tracts. In irrigated farms Bt-cotton hybrids may be sown as early as possible.   |
| Haveri           | 3  | 12 | 6  | 5  | 6  | 5  |    |   |
| Mysore           | 5  | 9  | 6  | 5  | 4  | 3  |    |   |
| <b>TAMILNADU</b> |    |    |    |    |    |    |    |   |
| Perambalur       | 0  | 0  | 0  | 0  | 0  | 0  |    | Irrigate the crop wherever possible to ensure that the crop does not face any moisture stress during the boll formation stage   |
| Salem            | 1  | 0  | 0  | 0  | 0  | 0  |    |   |
| Tiruchi          |    | 0  | 0  | 0  | 0  | 0  |    |   |
| Virdunagar       | 0  | 0  | 0  | 0  | 0  | 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., *Aphilinus* 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 spray 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.

#### **Weekly weather Advisory Report Coordinating Team**

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