

## 4. TECHNOLOGIES ASSESSED AND TRANSFERRED

### Nagpur

#### Dissemination of Pest Management Technologies

Strategy for management of Pink bollworm was refined,

#### ADVISORY FOR PINK BOLLWORM (PBW) MANAGEMENT ON COTTON

Pink bollworm has become resistant to Bollgard II and has emerged as a major pest of BGII cotton in some parts of India. It has impacted boll opening, coinciding with the second picking of cotton in most areas. The pest is usually monophagous and has few alternate hosts. Availability of cotton round the year promotes rapid buildup of the pest. In light of this development, for the benefit of cotton farmers, ICAR-Central Institute for Cotton Research, Nagpur has formulated following advisories for dissemination and implementation in **Central India**

1. Do not extend the cotton crop beyond January
2. Clean up fields of residual stalks and partially opened bolls. Do not stock stalks on the field bunds.
3. Do not store infested or stained cotton in the godowns.
4. Install pheromone traps with authentic lures near ginneries to trap suicidal emergence of moths, if any.
5. Do not sow cotton crop in the month of April as it would be susceptible to PBW.
6. Timely sowing of early maturing short duration BGII hybrids are recommended for the region.
7. Procure and sow authentic BGII seeds. Do not use authorized or F<sub>2</sub> seeds. Retain the bills with authentic name of purchaser from authorised seed dealer for further claims, if arises.
8. Fields that has suffered heavy damage due to PBW during the previous year may be closely monitored during the subsequent crop season.
9. Monitoring of pink bollworms using pheromone traps may be initiated 45 days after sowing.
10. Install pheromone traps @ 5/ha for monitoring moth activity of PBW. ETL (Economic Threshold Level) of PBW is 8 moths catch per pheromone trap for consecutive 3 days.
11. Use lures of authentic quality and change them at

validated and disseminated through awareness workshops, distribution of leaflets, bulletins, press notes, newspaper advisories, press releases and TV shows.

recommended intervals. Beware of spurious lures.

12. Inspect the crop at squaring and flowering stage for presence of PBW larvae within flowers, and the ETL at this stage is 10% damaged flowers (Rosette flowers). If necessary spraying of recommended insecticide (see table below) may be advocated.
13. At boll formation stage, farmers are advised to inspect the presence and damage of PBW by plucking 20 green bolls from different plants randomly. ETL at this stage is 10% damaged green bolls (at least two bolls having white or pink larvae/exit holes).
14. Farmers are advised to collect and destroy the fallen squares, flowers and bolls from the field.
15. Promote the multiplication and release of the parasitoid *Trichogramma bactrae* where ever is available.
16. Sprays of recommended insecticides (see table below) may be undertaken if the pest crosses ETL.
17. Picking of clean and infested cotton may be carried out separately. Clean cotton may be stored or marketed. Infested cotton should be destroyed to contain the pest.
18. Information on PBW Management is available and circulated through ICAR-CICR website, further press notes, leaflets, folders, pamphlets and e-kapas voice messages to manage PBW.

#### Schedule for insecticides spray wherever necessary

Month	Insecticides	Dose per 10 lit water
September	Quinolphos 20% AF or Thiodicarb 75% WP	20 ml 20 gm
October to November	Chlorpyriphos 20% EC or Thiodicarb 75% WP	25 ml 20 gm
December	Fenvalerate 20% EC or Cypermetherin	10 ml 10 ml

Farmers are advised to strictly comply with the recommendations provided in the advisory to minimize the losses due to PBW infestation in cotton.

#### High Density Planting System (HDPS) - demonstrations

During *kharif* season 2017-18, 10 tribal farmer's field of Umred Taluka villages (MGMG) were chosen for field demonstration experiments of HDPS under TPS (Tribal Sub Plan). The tribal farmers were also given training under NSP-TSP-III in Nagpur district, 27 Feb to 14

March 2018 at Wathoda, Bothli and Parseoni.

#### Crop Pest Surveillance and Advisory Project (CROPSAP)

Cotton pest management strategies were disseminated through ICT tools as one of the stakeholders in Crop Pest Surveillance and Advisory Project (CROPSAP) 2017-18

in 28 districts of Maharashtra. At the beginning of the crop season, window based pest management strategies were finalized in consultation with all the three Entomology Department Heads of the State Agricultural Universities (SAUs) located at Vidarbha, Marathwada and Western Maharashtra region. Advisory was transmitted as text messages to registered farmer's mobile by the concerned SAU's twice a week. Real time data was constantly monitored and uploaded on CROPSAP portal. Regular visits were made to farmers field to collect first hand information on pest status.

## Coimbatore

### Front Line Demonstrations

During the summer season, demonstrations were made on Integrated Crop Management in twenty hectares conducted on fifty farmers' fields at Tirupathur, Vellore District. The technologies *viz.*, improved variety Surabhi, popular Bt cotton hybrids, Integrated Weed Management, Integrated Nutrient Management, Integrated Pest Management and application of growth regulators was demonstrated. Similarly, twenty hectares of FLDs on ELS cotton was demonstrated under summer irrigated condition at Uthangarai block of Krishnagiri district. These demonstrations were coordinated by Dr (Mrs) S. Usha Rani, Principal Scientist (Agricultural Extension).

## Sirsa

### HDPS - demonstrations

FLDs on HDPS with CSH-3129 on 40 hectares involving 100 farmers of 51 villages, CSH-3075 on 80 hectares area

### Whitefly management strategies disseminated

#### Management strategies implemented to manage whitefly in North zone

- 1. Mass campaign :** Awareness and training through mass campaign for early detection of the pest.
- 2. Monitoring and management :** Area wide monitoring and management of whitefly should be initiated from February onwards on all the alternate hosts – vegetable, ornamentals and weeds.
- 3. Cultivate recommended hybrids/varieties :** Grow recommended high yielding cotton genotype approved by the SAUs/ICAR having tolerance to whitefly and CLCuD.
- 4. Timely sowing :** Ensure timely sowing (up to 15 May for the American cotton hybrids/ varieties and upto 30 April for Desi cotton varieties) of the crop as timely sown crop tolerates whitefly and CLCuD. Maintain 8,000 –10,000 plants per acre of the American cotton hybrids in the field.
- 5. Promote Desi cotton varieties :** Desi cotton varieties/hybrids are tolerant to the whitefly and immune to the CLCuD.
- 6. Fertilizer doses :** Apply recommended dose of fertilizers as per the package of practices recommended by respective SAU and after soil health inspection. Avoid excessive urea (nitrogen) application during early vegetative phase.

involving 200 farmers of 87 villages in Haryana, Punjab & Rajasthan States were conducted.

Highest seed cotton yield (30 q/ha) was recorded of the variety CSH-3129, whereas, seed cotton yield of Bt hybrid grown by corresponding farmers was 25.00 q/ha. The variety recorded 20% SCY increase over the Bt hybrid RCH773. By adopting CSH-3129 farmer was benefitted by Rs 9448/ha as compared to Bt hybrid.

Highest seed cotton yield of the variety CSH-3075 (HDPS in spacing of 67.5×10 cm) was 30 q/ha., as compared to SCY of Bt hybrid (67.5×60 cm) (25 q/ha. The variety gave 20.00 % increase over the Bt hybrid RCH-773. Average seed cotton yield of 200 FLD's on CSH-3075 (HDPS) conducted was 17.31 q/ha. Whereas, average seed cotton yield of Bt hybrids at farmers field was 15.78 q/ha. An average increase of 10.96 % was obtained by the farmers for the variety CSH-3075(HDPS) over the Bt hybrids. The cost benefit ratio of CSH-3075 was 1.20 against the Farmer's (1.02)and the farmer was benefitted by Rs. 12753 /ha by growing CSH-3075 (HDPS) in comparison to Bt hybrid.



View of CSH-3075 at Farmer's field

7. **Fertilizer application:** Apply half dose of nitrogen up to squaring and remaining half dose may be applied between flowering and boll formation. P&K can be applied as basal dose. Apply 2 - 4 sprays of 2% potassium nitrate (13:0:45) at 7-10 days intervals starting from flower initiation onwards.
8. **Irrigation :** Apply first irrigation at 4-6 weeks after sowing followed by need based irrigation depending on rainfall and stop irrigation at 1/3 of boll opening.
9. **Weed sanitation:** Keep fields, bunds and the vicinity free of weeds before and after the sowing of cotton. Destroy volunteer/ratoon cotton plants as well as the weed hosts growing near the irrigation channel/ canal and fallow lands during the off season.
10. **Barrier crop :** Grow two dense rows of sorghum or pearl-millet or maize as border around cotton fields. Create ecological diversity by growing Desi cotton and other non host crops between the cotton fields.
11. **Yellow sticky traps and suction traps :** Install yellow sticky traps @ 40-50/acre during July to August. Use vacuum adult whitefly suction traps during August when the adult whitefly population is high.
12. **Use botanicals :** Initially apply two sprays with 1.0% neem oil + 0.05-0.10 % laundry detergent emulsion or nimbecidine (0.03% or 300 ppm) @ 1.0litre/acre to reduce whitefly populations and conserve the natural enemies.
13. **Use insect growth regulators :** Insect growth regulators such as diafenthiuron (200 gm/acre), buprofezin (320 ml/acre), spiromesifen (200 ml/acre) and pyriproxifen (400-500 ml/acre) can be used after mid august. These insecticides are effective on whiteflies and are relatively safe to its natural enemies. To manage the second flush of whitefly (during September) restricted use of Ethion (800 ml/acre) is advised. If higher population of eggs and nymphs is observed under the leaves, then application of spiromesifen (250ml/ acre) or pyriproxifen (400-500 ml/acre) is advisable. Diafenthiuron is useful in mixed infection of whitefly adults and thrips.
14. If the mixed infestation of whitefly and leafhopper is observed apply flonicamid 50WG (80 g/acre).
15. Never use synthetic pyrethroids, acephate or any insecticide mixtures. These insecticides are known to aggravate resurgence of whitefly when used indiscriminately.

### On Farm Demonstrations

#### Nagpur

On large plots performance of popular Bt hybrids from private sector along with public sector BGII hybrids (H8 and H10) and desi varieties (Roja and Phule Dhanwantary) were demonstrated under rainfed conditions on deep vertisols at recommended spacings with the approved package of practices. The productivity of different private Bt hybrids ranged from

1839-2644 kg/ha. The yield of public sector BGII hybrids -H8 and H10 was 2426 and 2440 kg/ha respectively. Desi cotton varieties P. Dhanwantary and Roja yielded 1765 and 1492 kg/ha respectively.

#### Coimbatore

One acre field trial demonstrating all the CICR technologies was conducted for the benefit of visitors to ICAR - CICR, Regional Station, Coimbatore.

