

“Resistance to Bt protein because of mismanagement of refuge planting”

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By : Rahul Koul - January 13, 2018



Mumbai: In the backdrop of controversy surrounding negative effect of Pink Bollworm on cotton and its overall impact on yield, the Cotton Association of India (CAI), the apex body of cotton sector recently organized a meeting with Dr C D Mayee, President of Indian Society for Cotton Improvement (ISCI).

Dr C D Mayee who is also the President of South Asia Biotechnology Centre (SABC), New Delhi delivered a talk on the subject of “Management of Pink Bollworm” in the city on 10th January 2018. He made a presentation on the subject and suggested the way out. The SABC has come out with the ‘[Cotton Bollworm Management](#)’ booklet that was released at the event. It has also designed the infographic with tips for the cotton farmers. ([Infographics Pink Bollworm-Tips for Cotton Farmers](#)).



Dr C D Mayee is a noted scholar in agriculture particularly cotton having worked on very important positions in the country which include Vice-Chancellor of MAU, Parbhani, Director, CICR, Nagpur, Agriculture Commissioner, Government of India, Chairman of Agricultural Scientists Recruitment Board (ASRB) of the Indian Council of Agricultural Research (ICAR). Here he answered the questions of Rahul Koul on the adverse impact of bollworm on cotton production in the latest season:

Critics say that since the improved varieties of Bt cotton have proven ineffective as the bollworm has gained resistance, the answer can't be another resistant variety. How do you respond to it?

There is nothing like resistant or tolerant cultivars to PBW. Whatever we have introduced a new generation of bt gene in local material, all are basically susceptible. The only variation in damage is because of duration of different cotton germplasm. Most of the best hybrids are long duration of 180-190 days and are bound to suffer. The best way in rainfed cultivation is to recommend hybrids or varieties of short duration of 130-140 days which escapes the damage. Bt cotton is still effective in controlling American bollworm, *Helicoverpa armigera* and to a great extent the spotted bollworm *Earias* spp.

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The pink bollworm, *Pectinophora gossypiella*, has partly developed resistance to Bt protein

because of mismanagement of refuge planting. In some cases, the expression of insecticidal protein in some Bt cotton hybrids gets greatly reduced after 120 days and this amount of protein is insufficient to check the damage. Infact the low levels of expression of Bt insecticides in some hybrids in Central India in rain fed situation is favourable for attack because resistance development is favored by such low level. This is exactly what has happened with pyrethroid resistance in the past where the bollworms chew small quantities of the poison and then developed mutated strains of bollworms. It is therefore essential to manage the PBW in rainfed cottons through integrated pest management approach in Bt cotton.

What are the best measures suggested by you to tackle the pink bollworm threat?

The first strategy is to have refugia compulsory at least 5 percent susceptible cotton population in Bt cotton fields. Monitoring the supply of only short duration Bt cotton hybrids in rainfed. The crop should be strictly monitored after 90 days of sowing and then check the ETL level, one live larva in 10 green bolls or 8 moths per night for three consecutive nights has to be monitored using pheromone traps.

If this condition prevails, immediately the safest insecticide Quinalphos 25 EC or Profenophos 50 EC at 2 ml per litre water or Thiodicarb75WP at 20 gm should be sprayed. Even when there is ETL observed then undertake any Pyrethroid spray but only after 120 DAS. Cotton hybrids should be strictly sown on the onset of monsoon when there is 80-100 mm rainfall. Bt cotton should be sown on ridges using furrow for water drain when excess or conservation when limited rain. The plant-plant and row-row distance should be 90×30 cm.