

SPLAT :

A new technique for pink bollworm management in cotton

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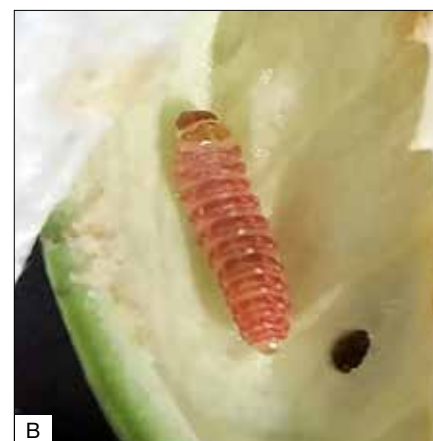
Cotton is one of the most important fibre and cash crop worldwide as well as in India, and called as 'white gold'. It plays a major role in the industrial and agricultural economy of the country by providing the basic raw material to the textile industry. Cotton in India is cultivated in different soils, climates and agricultural practices, and grown extensively in different states of India i.e., Maharashtra, Gujarat, Karnataka, Madhya Pradesh, Punjab, Rajasthan, Haryana and Tamil Nadu. With the introduction of Bt cotton, while on one hand, important cotton pests such as American bollworm, spotted bollworm and tobacco bollworm have reduced, on the other, many small sucking pests once considered minors have emerged as major pests. The pink bollworm is re-emerging as an important pest on cotton in central and south India as well as in north India, since last 6-7 years. Severity of this pest has increased and become a formidable problem due to its resistance to cryo-toxins and insecticides. Conventional pesticide against pink bollworm is ineffective because of its internal feeding habit coupled with its resistance to major pesticides and Bt toxins. In these paradoxical circumstances, farmers left with no option but to explore the possibility of novel, eco-friendly, long-lasting alternative to manage this pest. A novel mating disruption-based technology called SPLAT (Specialized Pheromone and Lure Application Technology) can be a ray of hope to curb the menace of pink bollworm.

Keywords: Cotton, Pink bollworm, SPLAT

PINK bollworm (*Pectinophora gossypiella*) usually emerges in the morning and evening but remain hidden in the crevices or debris of plants during the day. The flowers turns into rosette structure, where larva resides. It enters boll from there eventually the entry point is closed. The pink caterpillar present inside the developing green bolls moves between the integuments causing damage which is distinctly visible in the blossomed boll. The economic threshold level of this pest is 8 adults/trap or 10% of affected flowers, buds and bolls with live caterpillars for three consecutive days. Infestation of this pest occurs in the middle and late stages of the crop and causes huge economic loss by eating cotton seeds. Conventional pesticide against pink bollworm is ineffective because of its internal feeding habit

coupled with its resistance to major pesticides and Bt toxins. In these paradoxical circumstances, farmers left with no option but to explore the possibility of novel, eco-friendly, long-lasting alternative to manage this pest. Although mass trapping of pink bollworm has been tried

in cotton ecosystem, it became partially successful as traps and pheromone dispensers deployed at a lower density than recommended. Considering all these shortcomings, there is a need to shift from traditional management practices to a novel technique called SPLAT



Pink bollworm (PBW) infestation in cotton. A. Rosette flower, B. Boll damage.

(Specialized Pheromone and Lure Application Technology), which is best suited alternative to manage pink bollworm population.

SPLAT technique

The sex pheromone in the pink bollworm called gossypure, is emitted by the female and is responsible for attracting the male for the purposes of mating. Male moths are active before female moths on a daily and seasonal basis and here comes the role of synthetic pheromones which intercepts and trap male moths before mating. Specialized Pheromone and Lure Application Technology (SPLAT) is one such wax-based formulation with slow and sustained release of pheromones (gossypure) that disrupts mating of insects. The SPLAT formulation for PBW consists of gossypure ((ZZ/ZE)7, 11- hexadecadienyl acetate) as active ingredient blended with wax and water. The dosage per acre is 125 g per application and it should be applied at 30, 60-65, 90-95 and 120-125 days after sowing. A minimum area of 25 acre at one location is best suited for its effectiveness. The ready to use formulation is in the form of a paste and can be applied in the form of small dollops (peanut size) at primary branch axil (below 3 to 4 inches from crop canopy) at 400 to 500 spots per acre at 3 meters apart in zigzag pattern. Unlike females, SPLAT dollops emit high doses of pheromone continuously and the amount of sex pheromone emitted by each SPLAT dollop is many times more than the amount of natural pheromone, which creates a very powerful attraction and the male moths of pink bollworms are attracted towards these dollops of SPLAT paste confusing them for females. In absence of female, they are unable to copulate, because of which the process of fertilization and reproduction is affected and thereby, the field gets rid of pink bollworm attack. Although there are many tools available for pink bollworm management, the disadvantages associated with each one far outweigh their benefits. However, this is a unique, farmer

friendly and ecofriendly solution. The ready to use (RTU) formulation is user friendly and can be applied in large area with minimalistic labour. In addition, these formulations also demonstrate rain fastness on vegetation and is long lasting.



SPLAT tube



SPLAT application in field

Field testing of SPLAT has been validated in 50 acres of land in village Bhainichandarpal, Rohtak, Haryana, under IPM program by the cotton team of ICAR-National Research Center for Integrated Pest Management, New Delhi, in collaboration with ICAR-Central Institute of Cotton Research, Nagpur. Apart from this, similar field trials were carried out in an area of 25 acres, from *kharif* 2022 in collaboration with Agriculture College, Rajmata Vijayraje Scindia Agricultural University, Khandwa, Madhya Pradesh and ICAR-Central Cotton Research Institute, Nagpur. The results of the trials are quite encouraging and this technology has created a buzz among the cotton farmers. SPLAT technology against pink bollworm is a boon to farming community and this can be a game changer in near future. It must be an integral part of Integrated Pest Management (IPM) strategies to optimize cotton yield along with healthy environment.

Integrated management of pink bollworm

The following IPM strategy using SPLAT technology may be adopted for effective pink bollworm

management.

- Grow non *Bt* cotton along with *Bt* cotton.
- Remove the cotton residue from the fields.
- Do not store insect infested cotton in godowns.
- Setting up of pheromone traps after 45 days of sowing to monitor the activity of pink bollworms.
- With the start of moth activity and when the moths get captured in pheromone trap, SPLAT formulation should be applied @ 125g/acre at 400-500 spots.
- Regular monitoring of level of pest infestation.
- Collection and destruction of fallen buds/flowers/bolls infested with pink bollworm.
- Need based spray of Spinetor 11.7 SC @ 0.8 ml/litre or Profenophos 50 EC @ 3 ml/litre or Emamectin Benzoate 5 SG @ 0.50 g/litre.
- Completion of harvest by the end of December and destruction the crop residues.

SUMMARY

Considering the threat of pink bollworm, an immediate action plan is the need of the hour. Specialized Pheromone and Lure Application Technology (SPLAT) is one such wax-based formulation with slow and sustained release of pheromones (gossypure) that disrupts mating of pink bollworm and thereby restricts the population buildup. Although there are many tools available for pink bollworm management, the disadvantages associated with each one far outweigh their benefits. In addition, it is an ecofriendly formulation and can be an integral part of existing IPM strategies. This technology should be demonstrated and popularized among farmers for optimum yield.

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