

## Role of forewarning insect pests in IPM

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The indiscriminate use of pesticides led to problems of pest resistance to chemicals, resurgence of pests and hazards to humans, animals and environment. The strategy of management rather than control by integrating ecologically compatible options known widely as Integrated Pest Management (IPM) is in vogue currently to shift the paradigm of insecticide treadmill to “ecological –physiological treadmill”. Eco because it takes into account what is happening within the natural environment consisting biotic and abiotic factors, physiological because attempts are being made to understand pest population development and their influence on yield through increasingly fine-tuned analysis. Since IPM is essentially an ecological approach to pest management, it requires the knowledge of the interaction between pests and their environment. Understanding the factors affecting population abundance of the pest during the crop as well as off seasons would guide in formulating strategies of their management. While the factors of influence on pests may be abiotic or biotic, the former is the driving force for the latter and hence describing the pest population build up in relation to environment weather variables should aid in pest forecasting. If forecasting pest abundance over the crop season can be a success, time and type of control tactics can be better targeted and the pest management becomes an easy and economical activity of cotton production.

### Monitoring of insect pests in cotton

- Insect pest monitoring is a priority for pest management and it requires the presence and population size of insects besides their effects *viz.* Damage to be estimated. The tools used for pest monitoring include light and pheromone traps besides field scouting.
- The ecocidal effect of light traps that the natural enemy fauna gets eliminated limits their use in any crop ecosystem and cotton is not an exception.
- Pheromones in traps are used for monitoring adults of Spodoptera. Helicoverpa, Earias and Pectinophora. The insect specific pheromone lures are commercially available in form of rubber septa. They are used in conjunction with funnel traps @ 5/ha for monitoring, with replacement of septa done once in 15 days. Trap height for pink and spotted bollworms should be 60 cm above ground level in the early season and 15 cm above crop canopy in the late season. For Helicoverpa the trap height should be 1 m above ground level in early season and 1 m above crop canopy during late season.
- Scouting is the primary method of monitoring pest population by regular and systematic sampling of fields to estimate pest infestation levels and subsequently determining whether ETL has reached.
- Random samplings of a minimum of 20 plants per acre with observations on the number of individuals from three leaves at each positions of top, middle and bottom of a plant constitute scouting procedure for jassids, thrips and whiteflies. For aphids it is the proportion of infested plants with greater number of aphids (> 50) from 10 plants in a row at 10 randomly selected places per acre. While egg, larval and damage counts are in use for Helicoverpa management percent incidence and damage has been the scale of measure for spotted and pink bollworms.
- Egg and larval counts for Helicoverpa are based on search method among twenty randomly selected plants per acre. Bollworm damage is assessed through visual observations of the damaged out of the total fruiting structures (squares, flowers and bolls) from among the 10 randomly selected plants per acre. However, assessment of pink bollworm damage should be based on destructive sampling (boll cracking method) for large areas. For small plots (< an acre) pheromone trap catches should be considered for scheduling insecticidal sprays.