

Integrated pest management of pink boll worm *Pectinophora gossypiella* in cotton

Sitaram Seervi¹ and Pradeep Kumar²

Department of Entomology, Bundelkhand University, Jhansi, Teaching Associate²,
Department of Entomology, Bundelkhand University, Jhansi

ARTICLE ID: 057

Introduction

Cotton is the most important commercial crop grown for fibre, fuel and edible oil under diverse agro-climatic conditions. The pink boll worm originally reported in India in 1842. The crop is cultivated in more than 100 countries in 32 million hectares. Earlier, a loss to the extent of 2.8 to 61.9 % in seed cotton yield, 2.1 to 47.10% loss in oil content and 10.70 to 59.20 % loss in normal opening of bolls were caused by pink boll worm infestation in cotton.

The pink boll worm *Pectinophora gossypiella* is one of the most important destructive pests of cotton growing areas causing maximum seed cotton loss in quantity and quality. Pink boll worm is emerging as a serious pest and its activity period from January to till the end of the pest has been frequently noticed from early flowering. Soon after emergence the pink boll worm larva, enter the fruiting body. As a result, the farmers caused by pink boll worm until the boll opening and hence could not exercise any target specific control measure against the pest.

Life cycle of pink boll worm

Pink boll worm passes its life through four stage viz. egg, larva, pupa and adult. Complete life cycle approximately 4 week. This pest completes its produced 4 to 6 generation in a year.

Mark of identification

A female moth laid about 125 to 300 flattened eggs singly on the under surface of leaves, flower buds and green bolls. Female pink bollworm moths lay eggs singly or, more

commonly, in small groups. Eggs are white when first laid but then turn orange, and later the larval head capsule is visible prior to hatching. Feeding continues inside the boll. The larvae become full grown in about two weeks with three moultings and pupation place in silk cocoon. In double seed or come out from the exit hole and pupate the creackish in the soil. The full-grown larvae of the last generation do not pupate and hibernate during winter in the larval stage inside the boll. The pupal period is about one week. The pupa is brown and approximately one-half inch long. It does not feed or move about during the pupal period of four to six days. Adult pink bollworms are mottled brown to grey moths and are about one half inch long. They emerge from pupae in an approximately 1:1 male to female ratio. There is a period of two to three days after emergence during which the female mates and prepares to lay eggs. About four to six generations are completed by this pest in a year. The life cycle is completed in four weeks.

Nature of damage

The damage is caused by the larvae, which bore into flower buds, flowers and young bolls. The young attacked bolls are invariably fall down. The pink boll worm larvae do most spectacular damage to practically mature cotton bolls in which they enter at such a tiny stage that their entry hole is healed and in which devour both seed and fibre-forming tissues. Oil content, germinating capacity and lint formation are badly affected. Rosette flower is characteristic symptoms. The total shedding is caused by all the boll worms collectively one half (50%) may be due to attack of pink boll worm. Larvae of pink boll worm over winter in seed.

Integrated strategy for pink boll worm

Pre-sowing stage

- Deep summer ploughing to expose the pupa in the soil to birds and sunlight.
- Removal and destruction of alternate host of pink bollworm.
- Maintain field sanitation at the vicinity of the main field and keep nearby areas free from weeds.
- Crop rotation should be followed to break the life cycle of pink bollworm.

Sowing stage

- Do not sow cotton crop in the month of April- May as it will attract pink boll worm infestation at early crop stage
- Take up sowing in the month of June with early maturing short duration *Bt*-cotton hybrid/ varieties recommended for particular region
- Select tolerant/resistant cultivars.
- Use certified seeds.
- Refuge (20 % non *Bt* seeds) should be planted along with *Bt* cotton, if provided in separate packet.

Vegetative growth stage

- Undertake roving survey at every 10 km distance initially at weekly intervals and thereafter at 10 days intervals (depending upon pest population). Record incidence of pink bollworm on all host crops of the locality. Observe at each spot diagonally criss cross 20 plants/acre at random. Record the population potential of different bio-control fauna.
- Undertake Field scouting for pink bollworm and bio-control fauna once in 3 – 5 days to workout ETL. For pink bollworm eggs, terminal leaves should be observed. Observe larvae on fruiting bodies and leaves per plant. For percent, bollworm incidence count total and affected fruiting bodies on the plant and in the shed material and work out the percent infestation.
- Install glossy lure pheromone baited traps @ 5/ha, after 45 days of sowing for monitoring the moth activity of pink bollworm.

Flowering, boll formation and picking stage

- Inspect the crop at squaring and flowering stage for the presence of pink boll worm larvae within flowers.
- Collect and destroy fallen squares, flowers and bolls in the field.
- If rosette flowers found in the field, pluck it mechanically and destroy to stop the further multiplication.
- At boll formation stage, farmers are advised to inspect the presence and damage of pink bollworm by plucking and splitting 20 green bolls from different plants randomly.

- Installation of large numbers of pheromone traps for mass trapping and destruction of pink bollworm.
 - One spray of neem seed kernel extract (NSKE) 5% may be taken up at 60 days after sowing which provides anti feed ant and ovicidal effect.
 - Conserve and augment natural enemies of pink bollworm includes
Parasitoids- *Trichogramma brasiliensis* (egg), *Chelonus sp.* (egg-larval), *Campoletis chlorideae* (larval), *Bracon lefroyi* (larval)
Predators- *Chrysoperla carnea*, *Coccinellids*, wasp, Reduviid bug, Pentatomidbug
 - Release parasitoid *Trichogramma bactrae* eggs @ 3 cc (60,000)/acre.
 - Chemical control measures should be initiated when pest crossed ETL.
 - Spray Quinolphos 20% AF @20 ml per 10 lit. of water or Thiodicarb 75%WP@ 20 gram per 10 liter of water or Chlorpyriphos 20%EC @ 20 ml per 10 litre of water Fenvalerate 20% EC @ 10 ml per 10 litre of water or Cypermethrin10% EC @ 10 ml per 10 lit. of water
 - Avoid repeating chemical pesticide spray and use in cyclic rotation as per need.
- After last picking stage**
- Terminate cotton crop by December to mid-January.
 - Destroy residual stalks and partially opened bolls.

*** **