



Pink Bollworm in Cotton: A Surging Up Concern for Farmers

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Pink Bollworm (*Pectinophora gossypiella*) is a monophagous pest belonging to Family Gelechiidae, Order Lepidoptera. It is very widely distributed and economically highly notorious cotton pest in the world. It is found in parts of India, Pakistan, America, Africa and Australia. Its larvae enters into cotton bolls and feed on the seeds, resulting reduction in the yield. Chemical pesticides are frequently applied to manage *P. gossypiella* but this method is leading for various concerns including insecticide resistance (major issue), pollution and food safety concern. To effectively control *P. gossypiella*, a multidisciplinary approach has to be adopted as an alternative to chemical pesticides. This article mainly focuses on control of Pink Bollworm by using IPM practices below ETL.

Introduction

Cotton (*Gossypium sp.*) is a major cash crop in India, offering fabric material to the world. It is also an oilseed crop. According to the Committee on Cotton Production and Consumption, cotton is grown on 120.7 lakh hectares with a production of 316 lakh bales in 2023-24 season. In complete season of cotton crop, it is attacked by 16 different kinds of insect pest in India where Pink Bollworm is most serious pest now-a-days. It also attacks on other Malvaceae family crops consisting Bhindi, Hollyhock, Hibiscus. The incidence of Spotted Bollworm () and American Bollworm () dropped with the introduction of Bt-cotton but Pink Bollworm get resistance to Cry1Ac Bt-toxin (derived from soil bacteria *Bacillus thuringiensis*) with time, resulting Pink Bollworm a serious destructive insect in North India. Pink Bollworm occurs in cotton from square formation stage and continue till picking and goes even to ginning mills.

Life Cycle

Life cycle of Pink Bollworm consists of four stages of development- Egg, Larvae, Pupae and Adult. The time of life cycle is about one month in summer months.

Egg: Eggs are pearly white, flattened and oval in shape, measuring 0.5 mm long and 0.25 mm wide. These are laid either in a cluster of 4-5 or singly. Female lays flattish white eggs which turns orange and later larval head capsule is visible prior to hatching. Egg period ranges from 4-20 days.

Larvae: Tiny white 1-2 mm caterpillars with brown head which starts turning pink from third instar and mature in 12-15mm size with complete pink color in forth instar. Larval period ranges for 12-15 days. It is the most damaging stage where after hatching it get enters in mature balls and remain devouring seed and fiber forming tissues.

Pupae: It is brown in color and 8-10 mm in length. Pupation occurs in cotton bolls inside a loose fitting cocoon. Pupal period varies from 7-10 days.

Adult: Emerge as brownish or grayish moth with dark spots on wings. Moths are about 5 mm in length. Adults may live for one to two months. Female moths produce sex pheromones that

helps male in locating it. Mating occurs within 2-3 days after emergence and adult moth lays eggs within 10 days after emerging.

Damage Symptoms

- Young larva enters into ovaries of flowers and feeds on it. It results with flowers that do not open giving a 'Rosette' appearance flowers.
- Damage squares and bolls which cause premature opening of bolls causing invasion to saprophytic fungus.
- As larvae burrows within bolls, lint is cut and stained causing decrease in lint quality.
- Entry hole in cotton bolls is closed by excreta, making difficult to differentiate between a healthy and infested boll.

Factors responsible for Pink Bollworm Upsurge

The indiscriminate use of insecticide is a factor that is responsible for upsurge of pest population. Larvae of Pink Bollworm spend most of time feeding inside the cotton bolls making chemical control ineffective. Insect is getting resistance over chemicals use. Also, using same variety each successive year on a large area makes it resistant to Bt-cotton. Moreover, absence of crop rotation is also an important factor responsible.

Integrated Pest Management (IPM)

It is an ecosystem based strategy that focuses on long term prevention of crop from pest damage by using various techniques such as cultural control, pheromonal control, resistant varieties, biological control and chemical control in an integrated (combination) manner.

- **Cultural Control:** Cultural practices helps in reducing overwintering population of Pink Bollworm. There is 80% reduction in the moth emergence where field is ploughed and shrewd. Cultural techniques such as Deep ploughing at a depth of 6 inch, winter irrigation and disking, shredding of stalks are highly effective. Use of early maturing varieties, crop rotation, avoiding ratoon crop are also effective.
- **Pheromonal Control:** Pheromones are scents released by female moths to attract male moths for mating. Artificially synthesized scents at proper dosages can be used in mass trapping and to confuse mating. Pheromone gossyplure is effective in reducing 60-80% pest population.
- **Biological Control:** Egg stage is more susceptible to be attacked by some mites as it is more exposed then larval and pupal stage. *Apanteles angaleti* is a major larval parasite, *Labidura riparia* attacks all immature stages of Pink Bollworm including pupa. Moreover, *T. chilonis* parasitize eggs and *Paradosa milvina* and *Polybia ignobalis* are adult predators.
- **Chemical Control**
 - a) Seed fumigation with methyl bromide @0.4kg/1000 cu ft. or aluminium phosphide @50 tablets/1000 cu ft.
 - b) Use insecticides in accordance with ETL – 10% Pink Bollworm infested rosette flowers.
 - c) Insecticides like Quinalphos 2.5ml/l or Chlorpyriphos 2ml/l at 15 days interval can be effective.
 - d) In severe incidence Cypermethrin 2ml/l or thiodicarb 1.5g/l can be used towards the end of crop season.

Conclusion

P. gossypiella is a monophagous pest and cause damage to crops belonging to Malvaceae family (cotton, bhindi, hibiscus). This article is a discussion about pink bollworm effect in cotton, its life cycle, damage symptoms and its integrated management. To manage the pest

population any one practice is not sufficient. A combination of more than one practice is required for it. So, there is a need to use IPM tactics in an effective, environmentally safe and socially acceptable manner.

References

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