

## *Pectinophora gossypiella*

### Introduction

The pink bollworm *Pectinophora gossypiella* (Saunders), is a worldwide pest of cotton and in some regions of the world it is the major cotton pest. The pest causes failure of buds to open, fruit shedding, lint damage and seed loss. The larva is very similar to that of the mallow moth (*Pectiophora malvelia*) and the cotton stalk moth (*Platyedra vilella*). When the pest attacks developing fruits, it bores directly into the developing seeds. Due to this the weight of the bolls are drastically reduced and the ginning percentage is reduced. Damaged seeds do not germinate and many of them contain the overwintering pupae.

### Identity

Authority	: Saunders (1843)
Classification	
Kingdom	: Animalia
Phylum	: Arthropoda
Class	: Insecta
Order	: Lepidoptera
Family	: Gelechiidae
Genus	: <i>Pectinophora</i>
Species	: <i>gossypiella</i>
Synonyms	: <i>Platyedra gossypiella</i> , <i>Ephastia gossypiella</i> , <i>Crelechaia gossypiella</i> , <i>Gelechiella gossypiella</i> .
Common names	: pink bollworm, pink cotton bollworm.
Role	: Pest

### Signs & Symptoms

These include holes in the fruit of host plants where larvae burrow, failure of flower buds to open, fruit shedding and in the case of cotton, lint damage and seed loss.

### Morphology

Fennah (1947)

The **adult** measures about 13 mm across its expanded wings. It has dull grey palps with three dark bands, forewings with darker patches, especially in apical half and hind wings are smoky with a deep fringe of hair-like scales.

The **larva** is pallid at first, later becoming pinkish with a series of sparse setae on each segment with a small dark spot at the base of each.

The **egg** is round, flattened, minutely ornamented, light green in colour, becoming dark before hatching.



**Fig. 1: Larva of  
*Pectinophora gossypiella*  
in cotton boll**

### **Biology & Ecology**

The moths are active at night and mate soon after emergence and start laying eggs from the third day onwards. The female lays small flat eggs singly, usually close to, or upon the open fruit, laying up to 456 eggs, the average being 125.

Egg laying may continue for 4 - 25 days depending on the climate. The emerging caterpillar burrows into the fruit (Fig. 1). The first brood develops on buds and flowers, feeding on developing anthers, style and ovary. The larvae of the subsequent broods develop within young bolls or on mature bolls. Larval stages vary from 8 - 14 days depending upon climatic conditions. The caterpillar has three instars, the third instar being pink in colour.

After a fortnight, the larva emerges and pupates on the ground among shed leaves, flowers, lint or under a clod or within the soil. Occasionally, a cocoon may be spun on the plant parts. Pupation lasts 6 - 20 days. Low temperature and humidity induce hibernation and the majority of the larvae which are full-grown in November enter into hibernation (in sub-tropical countries). The larva pupates after a brief resting period.

There are two types of generations, the short cycle generations and the long cycle generations. In the first type, the full-grown larvae pupate soon after becoming full-fed and emerge as adults. In the second type, the larvae enter the resting stage for eight to ten months before they pupate and emerge as moths. The long cycle generation is present only where there are cold winter seasons. In all, there are 4 - 6 generations per year, and each generation last about 30 days.

### **Dispersal / vectors**

The pink bollworm is dispersed via infested flowers, bolls.

## Management

### Natural Enemies

There is a large number of records of natural enemies on *P. gossypiella* (Cheema *et al.*, 1980), most of which are of no significance (Ingram, 1994). A list of Hymenopteran species released against *P. gossypiella* is given by Green and Lyon (1989): none of these has successfully kept the pest under control. Cheema *et al.*, (1980) found 22 parasitoids of *P. gossypiella* in a survey in Pakistan and of these, only *Apanteles angaleti* is a major parasite.

### List of Natural Enemies

#### Parasitoids:

*Apanteles angaleti*, *A. quadratus*, *A. taragamae*, *Bracon brevicornis*, *B. gelechia*, *B. greeni*, *B. kirkpatricki*, *Habrocytus*, *Microchelonus blackburni*, *Parasierola*, *Pyemotes herfsi*, *P. ventricosus*, *Scambus lineipes*, *S. striatus*, *Theronia lineata*, *Trichogramma achaeae*, *T. brasiliense*, *T. pretiosum*, *Trichogrammatoidea bactrae*.

#### Predators:

*Chrysopa pallens*, *Chrysoperla carnea*, *Collops vittatus*, *Hippodamia convergens*, *Mischocyttarus socialis*, *Nabis alternatus*, *Orius tristicolor*, *Pardosa milvina*, *Polybia ignobilis*, *Sinea confusa*.

#### Pathogens:

*Bacillus thuringiensis*, *B. thuringiensis aizawai*, *B. thuringiensis dendrolimus*, *B. thuringiensis entomocidus*, *B. thuringiensis finitimus*, *B. thuringiensis galleriae*, *B. thuringiensis kurstaki*, *B. thuringiensis sotto*, *B. thuringiensis subtoxicus*, *B. thuringiensis thompsoni*, *B. thuringiensis thuringiensis*, *B. thuringiensis tolworthi*.

### Pest Significance and Phytosanitary Risks

*Pectinophora gossypiella* is a worldwide pest of cotton and in some regions of the world it is the major cotton pest. *P. gossypiella* infests over 200,000 ha in the western USA alone (Green and Lyon, 1989) and economically damaging thresholds are reached if boll infestation rises above 5 - 15% (Frisbie *et al.*, 1989). Estimates for yield losses due to pink bollworm are usually about 30% for the south-western United States (Brazzel and Gaines, 1956), Egypt and China (Rao, (1978). Other estimates include loss of 10.7% of the potential yield of cotton in Sudan (Darling, 1951). Schwartz (1983), estimated that losses to cotton in the United States due to pink bollworm were 9% where the pest was controlled and 61% elsewhere.

*P. gossypiella* is considered to be a pest of high economic importance in areas which depend on cotton for export. When live infested plant material is shipped among countries, the possibility exists that the pest can be transmitted from one country to another. The pink bollworm is a quarantine pest in the USA and Russia.

### Control and Inspection Procedure

Live plants can carry eggs, larvae and pupae of the pink bollworm. These plants should be inspected for any stage of the pest and symptoms of attack. If no bolls are available, the larvae cause damage to cotton flowers resulting in “rosetted blooms.

A number of strategies has been adopted for management of the pink bollworm. These include chemical, cultural and biological measures. The use of pheromones, sterile insect techniques and Integrated Pest Management practices have also been useful in controlling this pest. Graham (1980) summarized the control methods most effective against *P. gossypiella*

#### Host Notes

**Primary hosts:** *Gossypium sp.* (cotton), *Abelmoschus esculentus* (okra), *Abutilon indicum* (country mallow), *Hibiscus* (rosemallows), Malvaceae, *Abutilon* (Indian Mallow), *Hibiscus cannabinus* (kenaf), *Hibiscus sabdariffa* (sorrel), *Medicago sativa* (Lucerne). Khidr *et al.*, (1990) found that *P. gossypiella* preferred okra over cotton towards the end of the season when the cotton boll surface was hard.

**Wild hosts:** *Althaea* (hollyhocks), *Gossypium arboreum* (cotton tree), *Gossypium herbaceum* (short staple cotton).

#### Distribution

*Pectinophora gossypiella* is distributed throughout tropical South America, Africa, Asia, Australasia, including subtropical regions of Pakistan, Egypt, USA (Arizona) and Mexico where cotton is grown. It is widespread in the Lesser Antilles and Greater Antilles (Fennah, 1947).

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