Pests of Cotton

Dr. Kalpana Singh
Asst. Professor
Department of Zoology
University of Lucknow
Lucknow-226007

Several pests of cotton are reported but important ones are few:

1. Cotton leaf roller: *Sylepta derogata*
2. Spotted boll worm: *Earias fabia*, *Earias insulana*
3. Pink boll worm: *Pectinophora gossypiella*
4. Red cotton bug: *Dysdercus cingulatus*
5. Hairy caterpillar

1. Sylepta derogata (Cotton leaf roller)

- Ban ki surahi
  - Order: Lepidoptera
  - Family: Pyrilidae
- Food Plants:
  - Cotton,
  - Lady's finger,
  - Hollyhock & several plants of malvacae family
- Nature of Damage:
  - Caterpillars damage the plant leaves.
  - Young caterpillars feed upon lower surface of the leaf.
  - As they grow older they roll the leaf in the shape of the funnel.
  - They remain hidden in the leaf roll and eat the leaf from the margin.
  - They make big holes in the leaf or they consume the entire leaf.
  - The insets prefer American cotton in which plants are tall and bushy.

- General Appearance:
  - The moth is whitish with faint yellow fringe.
  - There are many fine dark lines present on the wings so that the pattern on the wings becomes irregular.
- Size:
  - length is 2 cm,
  - wing span 3 ½ cm.

- Life cycle:
  - Pest is active from march to October or November.
  - Adults emerge from the pupae in march. Moths fly during dusk and they remain hidden during the day.
  - Eggs are laid on the underside of the leaf along the thicker veins on the leaves.
  - After copulation males die but the females start laying eggs.
  - Females lay single egg at a time.
  - Eggs are brown in colour. They hatch in 4-6 days.
  - Young caterpillars feed upon lower side of the leaf.
  - Caterpillars spin threadlike structure over and around themselves for protection and in this protected cocoon like structure they moult.

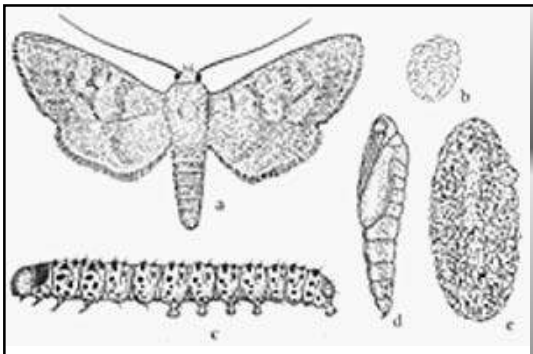
- Larvae continue to feed and grow during this period they turn the leaf edge in a fold like manner bind the two edges of the leaf with silken thread, gradually they form a nest of rolled leaf for their protection.
- They also damage the leaf by feeding.
- Caterpillars are fully grown in about 2 weeks.
- Fully grown caterpillars are 1.25 inches long, greenish and their head is dark brown.
- Before pupation they become pink.
- The larvae may pupate in the rolled leaf or they may fall on ground and pupate among the fallen leaves.
- Pupa is reddish brown in colour, pupal period is 1 week.
- Several generations are produced from March-Nov.
- the caterpillar of the last generation over winter.

Larvae

Sylepta derogata:
Cotton leaf roller

Pupa

Adult



Life stages of *Sylepta derogata*

- Control Measures:
  - Alternate host plants must be removed from the vicinity of cotton fields from april onwards.
  - Hibernating caterpillars should be destroyed by irrigation or by ploughing the infested field during November-February.
  - Regular hand picking of the rolled cotton leaves containing larvae during mid-july to mid-september is also beneficial.
  - Leaves should be burned.
  - The field should be sprayed with Endrin in 20% EC (effective concentration) endosulphate 35% EC.
  - Fields may also be sprayed with 10% carbaryl dust and 5% Fenitrothion.
  - Natural enemies are birds which destroy larvae.

2. Earias insulana, *E. Fabia*

- Citkabari surhi
  - Order: Lepidoptera
  - Family: Cymbidae
- They are major pests of cotton.
- *E. fabia* is found in the region with high rainfall while *E. insulana* is found in comparatively dry cotton growing areas.
- Food plants:
  - Cotton,
  - lady's finger,
  - Hollyhock and other plants belonging to malvaceae family.

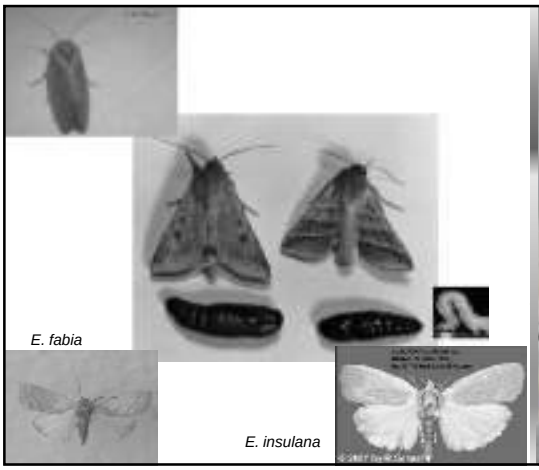
- Damaging stage is caterpillar, caterpillar damage the crops by two methods:
- They attack the top tender portion of the shoot in the beginning of the crop season when the plants are 6-9 inches high. Such plants do not survive.
- The caterpillars attack flower buds and balls. The attacked parts are shed by the plant due to injury. The remaining balls and less injured parts of the cotton ball are of inferior quality. A single caterpillar can destroy several cotton bolls. The hole made in the boll is pluged with excreta.

Appearance:

wing span of *E. fabia* is 2-5 cm.
Anterior wings have a broad green band extending from base to the apex of the wing.
Posterior wings are white.
In *E. insulana* are green and hindwings are white.

- Life History:
  - Host is active throughout the year.
  - The population is lowest during Dec.-March and highest during July to September.
  - Females lay about 200-400 eggs.
  - Eggs are laid in instalments.
  - Laying is done during night.
  - Eggs are laid singly on shoots, buds, flower and top tender leaf.
  - Eggs are spherical and bluish green in colour.
  - Parallel longitudinal ridges are present.
  - Eggs hatch in 3-4 days in warm weather and in about a week in cooler months.
  - Newly hatched caterpillar is brownish white, head is dark.
  - Prothoracic shield is present it is 1.3 cm in length.
  - Fully grown larva is .75 inches long.
  - It is brownish with a median longitudinal streak in *E. fabia*.

- The larva of *E. insulana* is dull greenish with several black marks.
- There are oval orange dots on prothorax. Larval period 7-15 days.
- The larvae pupate on plants or ground among the fallen leaves.
- Pupae are brown.
- Coccon is silken dirty white or light brown.
- Pupal period is 15 days during warmer months, 3 weeeks in autumn and 6-12 week during winter and early spring.
- Several generations are produced per year.
- Pest also survives in leftover bhindi plants.
- It is invariably present in the rotten cotton plants which are carried over to next year.
- Life cycle is complete in 4-6 weeks.



E. fabia

E. insulana

- Control:
  - In the beginning of the cotton season (June & July) all the withered top shoots of the plants should be collected and destroyed from August onwards when the pest is destroying buds and bolls.
  - All the infected buds and bolls should be picked and destroyed.
  - After harvesting the cotton crop the old leftover plants must be completely destroyed.
  - All the alternate host plants must be removed or destroyed from the vicinity of cotton fields.
  - Chemical spray as above: Endrin, Parathion and Fenitrothion.

3. Pectinophora gossypiella
(Pink boll worm)

- Order: Lepidoptera
- Family: Gelechiidae
- It is very widely distributed all over the world.
- It is supposed to one of the worst pest of cotton.
- In India it is most destructive pest in U.P., Punjab, Andhra Pradesh, Chennai and parts of Mumbai.
- Food plants:
  - cotton is main food plant,
  - occasionally found on deccan hemp and also on some other uncultivated plants.

- Damaging stage:
  - Caterpillars, bores shoot, buds bolls and seeds of cotton.
  - Young caterpillar bore inside the boll.
  - The entrance hole heals without leaving any trace of infection.
  - Each boll may contain up to 10 caterpillars.
  - These destroy seed as well as cotton fiber or the lint. 75-100% bolls are damaged during December to January.
  - Pest prefers American cotton.

General Appearance:
Moth is less than 1.25 cm in length.
Antennae are filiform.
Palpi are long and curled.
General colour is grey brown with dark spots of different sizes.
Hind wings have long brown fringes.
There are blackish spots on the forewings.

- Life Cycle:
  - Pest produces several generations per year.
  - It overwinters in larval stage inside a white cocoon.
  - Cocoons may be present in the soil and bolls in the fields or inside the seed in the store.
  - Some of these larvae pupate in March and adults come out in early April.
  - Most of the larvae pupate just after beginning of the monsoon season so that large number of adults come out in July to midaugust.
  - Females lay eggs singly or in batches of 2-10.
  - Eggs are laid on leaves, buds, flowers and bolls but mostly on the bolls.

- Freshly laid eggs are flattened, elongated and almost white.
- They turn brown on third day and become deep brown before hatching.
- Eggs are .35 mm in length and .26 mm in breadth.
- Each female may lay upto 300 eggs.
- Eggs hatch in 4-23 days depending upon season.
- Newly hatched caterpillar is pale yellow with dark head and grayish prothoracic shield.

- The larvae bore shoots, flowers, buds or bolls.
- The wound heals perfectly so that the healthy and infected bolls can not be differentiated.
- Mature caterpillar is pinkish in colour and 12 mm long.
- Caterpillar is fully grown in 10-29 days.
- Now it comes out of its infected place, falls on the ground forms a silken cocoon and pupate amongst the fallen leaves.
- Pupal stage lasts for one week and adult moth emerges.
- Entire life cycle is completed in 3-8 weeks.

- Four to five generations are produced between July to end of November.
- The caterpillars of last generation hibernate in hollowed cotton seed. It is present in curved state inside the seed.
- The damaged seed is covered over by partly damaged seed.
- So that a double seed is formed.
- The moth has two types of lifecycle:
  - short and
  - long.
- Life cycle covering 5-10 months in case of overwintering larvae.

Larva

Larva inside a cotton bud

Adult

Pink boll worm:

Pectinophora gossypiella

- Control:
  - Infested bolls should be destroyed.
  - All old bolls, fallen leaves and stems should be destroyed.
  - Cotton seeds should be spread in thin layers and exposed to sun for 2-4 hours or they should be heated to 140 °F.
  - This kills the hibernating larvae.
  - Seeds should be fumigated with carbon bisulphide or methyl bromide to kill hibernating larvae.