

## Biology and Control of the Brinjal Stem Borer - *Euzophera perticella* Rag. (Lepidoptera, Pyralididae)

by

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*Euzophera perticella* Rag. has been reported occurring commonly throughout the plains of India wherever brinjal is cultivated, sometimes as a major pest. In spite of this, however, it was found that little information was available on the life history, habits and the control of this pest. Hence, the observations taken on these aspects of *Euzophera perticella* Rag. have been given in the following account.

**Food plants:** The caterpillar of *Euzophera perticella* Rag. has been reported boring into the stems of brinjal, chillies, potato and tomato from various parts of India. However, its most favoured food plant is brinjal. Fletcher (1919) pointed out that the caterpillar also sometimes bores into the stems of tomato in Bombay. Jhaveri (1917) reported it boring into tomato stems at Surat. Shah (1942) found it boring into chilly stems and reported it to be a minor pest of chillies. From Coimbatore and Ranchi it was reported to be boring into the potato stems. But in Uttar Pradesh and Rajasthan, it has been found to be feeding on wild and cultivated brinjals only and has not been found on other Solanaceous plants.

**Nature of Damage:** The caterpillar confines its activities to the main stem mostly and it has never been found boring into the fruits of brinjal. The fullgrown caterpillars are found usually near the root portion of the stem about one to two inches above the ground. It attacks both the young and old plants alike. The borer eats up the tissues inside and fills the cavity with its excreta which in most cases oozes out from its hole of entry. The top shoots of young plants droop down and wither, older plants get stunted and sometimes even wither. In cases of severe infestation all the plants may be killed.

**Characters for Identification:** The caterpillar is creamy white with only a few bristly hairs on the body, tapering towards posterior end; full-grown caterpillar varies from 20 to 22 m. m. in length and 2.0 to 2.25 m. m. in width, crotchets on prolegs uniordinal, uniserial in complete ovals, spiracles vertically oval with brown rims guarded by chitinous teeth.

The adult moth has a wing expanse of 26 m. m. in the male and 32 m. m. in the female. Its head and thorax are pale rufous and grey, abdomen is pale. Fore wings are pale rufous and the costal area beyond the middle and the apical area is suffused with grey. The hind wings are whitish and their marginal area is tinged with fuscous in the female.

The immature stages of *B. perticella* Rag. are often confused with those of *Leucinodes orbonalis*. The following table gives few of the distinguishing features between the immature stages of both.

TABLE 1

*Distinguishing Features of Leucinodes orbonalis and  
Euzophera perticella in Immature Stages.*

No.	Stage	<i>Leucinodes orbonalis</i>	<i>Euzophera perticella</i>
1.	Egg	Creamy white, elongate, 0.75 to 0.8 x 0.5 to 0.6 m.m. in size.	Creamy or yellowish scale like, 1.0 x 0.8 m. m. in size
2.	Larva	Found on the upper stems or fruits, pinkish violet in colour, full grown larva measures 16-20 m. m. x 2.5-3.8 m. m.	Found in the lower stems, creamy white in colour. When full grown measures about 20 - 22 m. m. x 2.5 m. m.
3.	Pupa	Hard, reddish brown to dark brown in colour, 8-12 m. m. x 2.5 to 3.5 m. m. in size, cremaster with 8 spines.	Delicate, thin, light brown 14-20 m. m. x 8 to 4 m. m. in size.
4.	Cocoon	Tough, white or dark brown and measures 10-14 m.m. x 3-4 m. m.	Delicate, dirty white or brown and measures 30 m. m. x 4 m. m. in size.

**Life History:** The moths usually appear towards the end of March and copulation usually takes place at night. Two to four hours after mating the females start laying eggs singly or in batches usually in the angles formed by the veins with the mid-rib on the young leaves. Sometimes the eggs are also laid on the petioles and tender branches of the plants (about two months old). The egg laying is completed generally by the end of July. During the period from April to middle of October all the stages of the insect are present in the field.

*Egg*: The eggs are small,  $1.0 \times 0.8$  m. m. in size, scale like and creamy or yellowish in colour. The freshly laid eggs are translucent. They become more and more dull in colour as the days advance and finally become opaque. The egg stage lasts from about 3 to 10 days but most of the eggs hatch from 4th to 6th day. Duration of the egg stage depends on the prevailing climatic conditions and temperature.

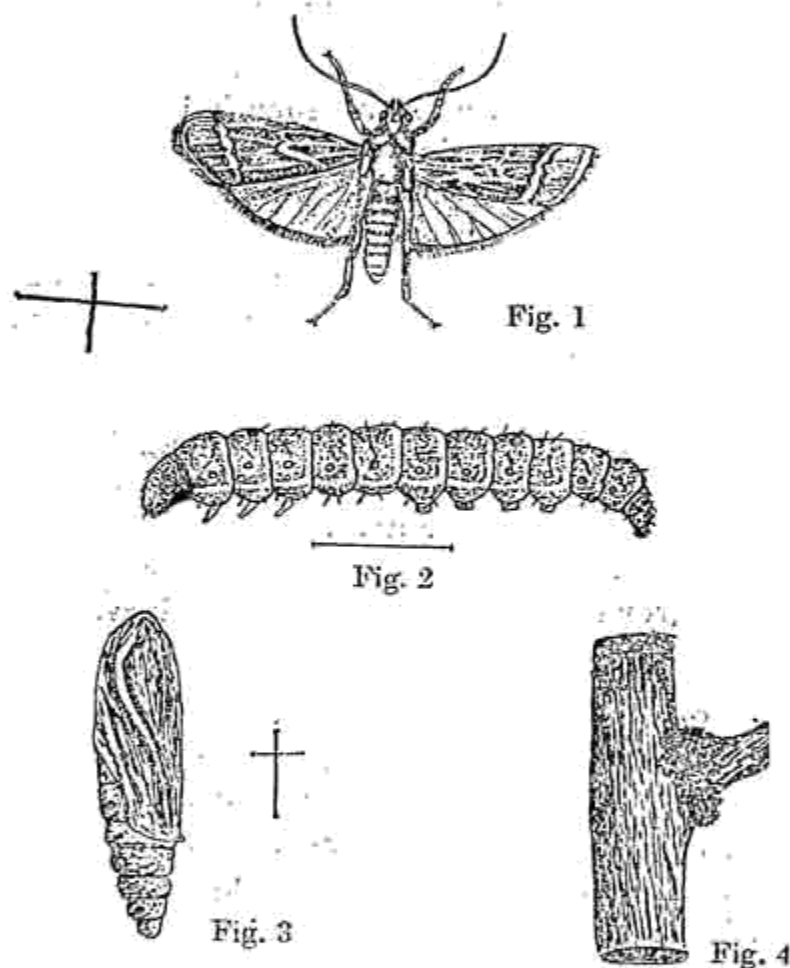


Plate — Figures showing the various life stages of *Euzophera perticella* Rag. — the brinjal stem borer.

Fig. 1 — adult moth; Fig. 2 — full grown larva; Fig. 3 — pupa; Fig. 4 — a part of the attacked stem showing the frass of excrement oozing out of the hole of the attacked stem. The hair lines indicate the natural size of the various stages of the pest.

*Larva*: The first instar larva is about 2 m. m. in length and 0.25 m. m. in breadth. It feeds on the exposed parts for a few minutes and then enters a petiole or stem. The larva lies curled up in the hollow which it has eaten out. The little caterpillar looks more or less cylindrical in shape, gradually tapering towards

the posterior region from about two-thirds of the body length. The head is brown, the prothoracic shield sepia brown and the rest of the body translucent, creamy white. The body is covered with hairs arising singly.

The second instar larva is about 4 m. m. long and 1 m. m. broad.

The third instar larva is  $9 \times 2$  m. m. in size. The prothorax is dotted with brown spots.

The larva gets full grown in the fourth instar when it spins a long cocoon of thin dirty white silk inside the tunnel where it was feeding. When the time of moulting draws near at the end of each instar, the caterpillar becomes sluggish, curves round and stops feeding. The colour of the head and prothorax becomes blackish brown. The skin between the head and prothoracic regions gets stretched and ruptures. By gradual contraction of the body the ecdysed skin is pushed back and cast off. The head capsule which is now an outer coat of the head is dashed against the surface where the caterpillar is resting and is gradually shaken off by the help of the pair of anterior appendages. Each process of moulting takes about an hour. The larva undergoes four or five moults before it is full grown and the duration of larval stage varies from 26 to 58 days.

*Cocoon*: When ready to pupate the caterpillar spins a thin, delicate, dirty white or brown cocoon, about 30 m. m. in length and 4 m. m. in diameter, generally inside the tunnel in which it was feeding. The tunnel is about 40—50 m. m. in length and 4 m. m. in diameter, brown looking and located usually in the central part of the stem. The cocoon thus forms the lining of almost the entire tunnel. The caterpillar pupates in this cocoon.

*Pupa*: The pupa is smooth, elongated, cylindrical and delicate. Its colour is light brown and the posterior margin of the 7th abdominal segment is brown and in 8th segment below the spiracles there are two black spines. It measures 14 to 20 m. m. in length and 3 to 4 m. m. in breadth across the third abdominal segment. The pupal period lasts from 9 to 16 days.

*Adult*: The moths come out of the pupa and fly about. Mating generally takes place at night and two to four hours after mating the eggs are laid.

**Seasonal History:** The moths appear towards the middle or end of March and all the stages of the pest are present in the fields from March to middle of October. The insect spends the winter from beginning of November to the beginning of March in hibernation as a caterpillar. It starts pupating by the second week of March and the moths keep on emerging upto the third week of May. The moths which lay the eggs by the end of May are very few in number, but are the ones which are responsible for the infestation of the next brinjal crop. The caterpillars that hatch out of these eggs bore their way into the tender shoots of the food plants and after feeding for sometime they descend downwards and begin to bore the main stem just above the ground. They keep on feeding upon the old plants till the beginning of July when they either come out of the tunnel where they were feeding and pupate on the plant or they crawl down to the soil and make cocoon in the crevices of the soil or they may pupate in the tunnel itself in a long cocoon. Mostly they pupate in the tunnel itself. Moths come out of the pupae in about two weeks and after mating at night start laying eggs on newly planted seedlings or on the tender shoots of the growing plants.

**Control:** (A) *Cultural:* (1) Ratooning of brinjal should be avoided because the ratoon brinjals harbour the pest and are mainly responsible for its multiplication.

(2) Dry brinjal plants should be burnt soon after up-rooting. After harvest specially during the winter, the brinjal plants along with their leaves etc. should be removed and burnt in a heap to destroy the hibernating borers.

(3) During spring months the brinjal plants must be kept under constant watch and every newly attacked stem or shoot should be collected along with borers and destroyed in order to kill the borers.

(B) *Chemical:* Endrin 0.02% sprayed soon after the pest has appeared and then repeated every three weeks up to a month before harvest has given very good results. Application of 0.25% D. D. T. has also proved very satisfactory. First application should be made soon after the pest has been noticed. The application should be repeated at fortnightly intervals till a month prior to harvest.

#### REFERENCES

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