

Some aspects of the biology of *Sesamia inferens*: A major stem borer pest of maize in Raipur, Chhattisgarh

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ABSTRACT :

Biology of *Sesamia inferens* i.e., fecundity, incubation period, larval period, pupal period and longevity of adult were observed on maize hybrid NMH-777 and found that single adult female lays about 92-185 eggs in several egg masses in to the upper surface of leaf sheath. The incubation period ranged from 5-7 days with an average of 5.95 days. The total larval period of about 28 to 34 days with an average of 30.30 days were observed. The pupal stage lasts from 10-14 days, with an average of 12.00 days in February and March. The adult female live for 6 to 8 days while the males are about 4 to 6 days.

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INTRODUCTION

Maize (*Zea mays* L.), a major cereal crop belonging to the family Poaceae, grown primarily for its kernel, originated from South America, from where it was taken to all parts of the world (Galinath, 1992 and Gonzalez, 2001).

Maize crop is subjected to attack by over 130 insect pests during different stages of its growth. However, only about a dozen are quite serious (Siddiqui and Marwaha, 1993). Among them some important lepidopteran stem borers seriously limit potentially attainable maize yields by infesting the crop throughout its growth, from seedling stage to maturity. The scenario with respect to insect pests of this crop has changed a lot in the recent past owing to increased area under single

cross hybrids and monocropping practiced by the farmers using indiscriminate quantity of insecticides and chemical fertilizers. Insects attack maize throughout the cropping cycle and during storage, resulting in as little as 10 per cent to complete loss (Bergvinson *et al.*, 2002).

The pink borer, *Sesamia inferens* (Walker), is an important pest of graminaceous crops. During the winter season pink borer with more extensive coverage, may cause damage upto 78.9 per cent to the crop. It is a pertinent point to note that productivity of maize in peninsular India is higher than the northern states and that of winter maize (3.22 t/ha) is higher than the rainy season maize (1.74 t/ha). Thus, to stabilize the maize production effective control of pink borer is of immense importance (Santosh *et al.*, 2012). In Chhattisgarh region

the occurrence of pink stem borer on the maize crop as major insect pest has been reported but intensive entomological studies on the maize crop has been not done. For effective control of an insect pest, knowledge of its life history, biology and ecology are critical (Sampson and Kumar, 1984).

MATERIAL AND METHODS

Nucleus culture of pink stem borer *S. inferens* :

The larvae and pupae of *S. inferens* collected from maize fields of Research farm IGKV, Raipur and were kept separately in glass jars (10 x 15 cm) under same poly house conditions as described earlier. In the initial stages leaves were used as food for the developing larvae but the later instars were fed on stem portions of older maize plants. The top of each jar containing larvae and pupae was covered with muslin cloth and secured with rubber bands. The larvae were transferred to another clean jar containing fresh food for every 2-3 days till all the larvae pupated.

The pupae thus, collected from each jar were kept separately for the emergence of moth. The moths (male and female in equal numbers) after emergence were kept in ovipositional glass jars which properly lined with fine white paper and were allowed to lay eggs on maize leaf sheath of 15 days old plant.

Four days after release of the moths the plants were removed and the leaf sheaths containing egg portion were cut and kept for further studies. These eggs were used as nucleus culture for mass rearing of *S. inferens*. The reared insect stages were utilized for the study of the biology of pink stem borer.

Biology of *S. inferens*.

The biology of pink stem borer, *S. inferens* was studied under poly house conditions in 25°C+2°C temperature and 70 + 5 per cent RH. Twenty larvae

were provided with maize hybrid NMH-777 stem pieces for feeding. Stem pieces were replaced with fresh food every day. Observations were made twice a day to record incubation, larval and pupal periods separately.

Male and female adults emerged on maize were allowed to mate separately and confined on leaf sheath in glass jar for egg laying. The eggs laid on maize were kept separately and the incubation period was recorded. Separate sets of five pairs of moth were kept to record the adult longevity. Honey solution was provided as adult food.

RESULTS AND DISCUSSION

Observation was made twice a day to record incubation, larval and pupal period separately.

The following biological parameters were observed:

Eggs:

A single adult female lays about 92-185 eggs in several egg masses in to the upper surface of leaf sheath. Even under field conditions the moth laid the eggs in similar way. The eggs is creamy white in colour and semi-globular, being flattened on the dorsal surface. By about the third day the eggs change to a light pinkish colouration. Unfertilized eggs turn dark, shrivel up and fail to develop. The incubation period ranged from 5-7 days with an average of 5.95 days (Fig.1 and Table 1).

Larva:

S. inferens larvae of early instars, mid and late instars larvae were observed. The larvae after hatching fed on epidermal layer of the leaf sheaths. The fourth instar onwards was reared on soft stem in glass jar. The final instar larva measures about 28.5 mm to 34.5 mm in length and purple-pinkish in colour on dorsal side and white on ventral side with brown head and is popularly known as the pink stem borer. Final instar larvae shrink its body and stop feeding and after 1-2-days convert into

Table 1: Duration of different life stages of maize pink stem borer, *S. inferens* on maize under poly house conditions

Biological stages/ features	Range (days)	Mean
Fecundity	92-185	130.75
Incubation period	5-7	05.95
Larval period	28-34	30.30
Pupal period	9-12	09.90
Total life cycle (Egg to adult emergence)	42-53	46.40
Adult longevity		
Female	6-8	6.85
Male	4-6	5.00

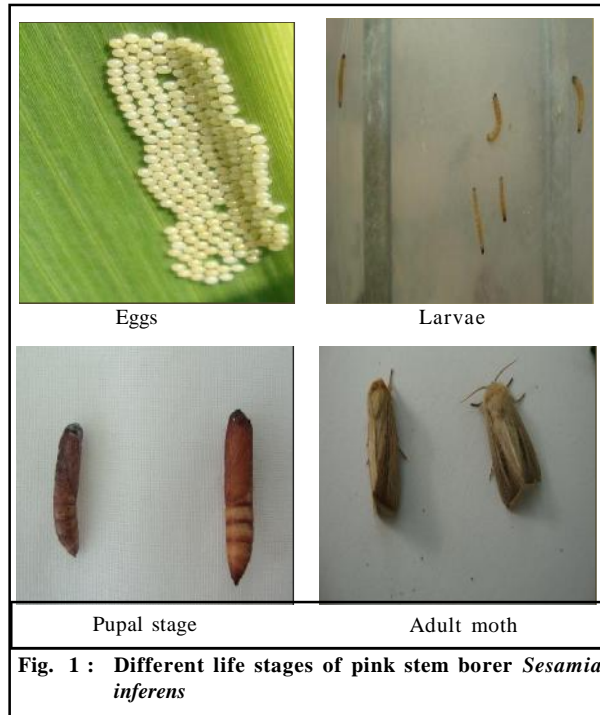


Fig. 1 : Different life stages of pink stem borer *Sesamia inferens*

pupae. The total larval period of about 28 to 34 days with an average of 30.30 days were observed (Fig.1 and Table 1).

Pupa:

The pupae were robust and light brown in colour with a purplish tinge on the head region. Abdominal spiracles were very prominent with slit like opening and slightly raised. The sex of the borer can easily be distinguished during this stage. Males are smaller with tapering abdomens and carry two small bumps in front of the genitalia, while the females are larger with broad abdomen and without any marking. The pupal stage lasts from 9-12 days, with an average of 9.9 days in February and March (Fig.1 and Table 1).

Adult:

Moths were straw coloured with a mid longitudinal dark brown broad triangular streak. The male moth was slightly smaller than the female. Pectinate antennae found in males and filiform in females. The adult female live for 6 to 8 days while the males are about 4 to 6 days

These findings are in agreement with the findings of Joshi *et al.* (2009) who studied that the adult moths

were straw coloured with mid longitudinal dark brown broad triangular streak. The male moth was slightly smaller than the female and had pectinate antenna. The longevity of the female moth varied from five to seven days with an average of 6.1+ 0.78 days. Whereas, in case of male it took three to five days with an average of 4.4 + 0.75 days. The present findings are also in agreement with the results of Rajendra (1976) who reported that the adult lived for five to seven days on sugarcane. Recently, Nagarjuna *et al.* (2015) studied the biology of *S. inferens*; they reported that the incubation period ranged from five to six days. The larval stages passed through six instars and the total larval period ranges from twenty three to thirty nine.

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