

Biology of Rice Moth *Corcyra cephalonica* (Stainton) on Groundnut Variety Konkan Gaurav

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Abstract

The biology of *Corcyra cephalonica* (Stainton) was studied under controlled conditions (temperature $28 \pm 2.33^\circ\text{C}$ and relative humidity $64 \pm 6.30\%$) in the laboratory. The commonly cultivated groundnut variety in Konkan region, i.e. Konkan Gaurav was selected for present investigation. The average 336 eggs were deposited by the female moth. Average oviposition period, incubation period and hatching percentage were 4.10 days, 4.35 days and 93.20% respectively. Average larval and pupal period were 37.90 days and 10.10 days. The total development period was 51.40 days. The average weight, length and breadth of larva were 26.00 mg, 12.60 mm and 1.65 mm respectively, while average weight, length and breadth of pupa was 23.42 mg, 9.20 mm and 1.80 mm respectively. The average weight, length and wing-span of adult male was 11.77 mg, 7.30 mm and 15.10 mm respectively, while it was 18.96 mg, 9.40 mm and 17.55 mm in female moth. The average longevity of male and female was 9.00 days and 6.10 days, while sex ratio of rice moth was 1:1.15. The results of this investigation will be useful for further studies on the pest infestation of this important oil seed crop of the region.

Keywords: Average oviposition, incubation, larval, pupal, total development period, longevity, sex ratio.

Groundnut, *Arachis hypogaea* L. is an important oilseed crop, is the native of South America. It is called as the king of oilseeds, wonder nut and poor men's cashew nut. Groundnut contains on an average 40.1 per cent of fat and 25.3 per cent of protein and is a rich source of calcium, iron and vitamin B complex like Thiamine, Riboflavin, Niacin and vitamin A (Thamaraikannan *et*

al. 2003). More than 100 insect species are known to live and feed on stored groundnut, some of which are of economic importance (Ranga Rao *et al.* 2010). Among the major pests of stored groundnut, rice moth *Corcyra cephalonica* (Stainton) is considered to be an important pest which causes loss by feeding on stored groundnut. Hence the present work was aimed at studying the biology of *C. cephalonica* on crushed groundnut kernels.

Material and Methods

The present investigation was conducted at the Biological Control Laboratory, Department of Agricultural Entomology, College of Agriculture, Dapoli, Ratnagiri, Maharashtra (India) during 2014-2015. The initial culture of rice moth, *C. cephalonica* was procured from Regional Coconut Research Station, Bhatye and maintained in the Departmental Laboratory for getting the permanent culture. The groundnut kernels infested by *C. cephalonica* were identified using the taxonomic key given by Dick (1987). The eggs from initial culture were kept along with some healthy groundnut kernels in the big glass jar, which was closed with muslin cloth. The jar was observed regularly and emerging moths were collected and transferred into another glass jar where the healthy groundnut kernels were kept. A series of glass jars containing healthy kernels were prepared and maintained to obtain healthy and required culture of *C. cephalonica* from the original nucleus culture. The density of population per jar was standardized to prevent overcrowding. Thus, permanent culture of *C. cephalonica* was maintained and used for further experimentation. Freshly laid eggs were used for experiments. All the studies were conducted at room temperature ($28 \pm 2.33^\circ\text{C}$) and relative humidity ($64 \pm 6.30\%$). Crushed groundnut kernels of variety Konkan Gaurav were kept in petri dishes. First instar larva were released into each petri dish. Set of such hundred petri dishes was prepared and kept under observation. The observations were recorded on fecundity, oviposition period, incubation period and hatching percentage, larval period, larval weight, length and breadth, pupal period, pupal weight, length and breadth, total development period, adult longevity,

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adult weight, length and wingspan and sex ratio.

Results and Discussion

Biology of rice moth

Moths generally mated soon after emergence. The freshly laid eggs had white surface which was sculptured and at one end there was a short nipple-like process. The eggs were oval and were laid in cluster. Average 336 eggs were deposited by the female moth. Haritha *et al.* (2000) reported that the average fecundity of the rice moth was higher (277 eggs) on groundnut kernels than on groundnut pods (229 eggs).

Table 1. The duration of different Biological parameters and sex ratio of rice moth *C. cephalonica*

| Biological parameters | Average period (Days) |
|--------------------------|-----------------------|
| Oviposition period | 4.10 |
| Incubation period | 4.35 |
| Larval period | 37.90 |
| Pupal period | 10.10 |
| Total development period | 51.40 |
| Adult longevity | |
| Male | 9.00 |
| Female | 6.10 |
| Sex ratio | 1.1:15 |

Average oviposition period, incubation period and hatching percentage were 4.10 days, 4.35 days and 93.20% respectively. Present results when viewed in the light of existing works find support from Gailad (1987) who reported that the oviposition period and incubation period of rice moth on different rice varieties ranged from 2 to 6 days and 4 to 4.5 days, respectively. The larvae had a pale whitish abdominal cuticle. The full grown sixth instar larva was elongated and spun a closely woven, very tough and double layered cocoon in which it developed into a dark brown pupa. Average larval and pupal period were 37.90 days and 10.10 days. The pest completed its life cycle in four stages viz., egg, larva, pupa and adult. The total development period was 51.40 days. Similar observations were recorded by Waghmode (1998) who reported average larval and pupal period ranging from 30.82 to 40.60 and 8.50 to 10.45 days respectively. The male and female moths obtained were identified and separated on the basis of their external characters. The

labial palps point directly forward and was long and pointed in the female, but short and inconspicuous in the male. The longevity of male moths was greater than that of female moths. The average longevity of male and female was 9.00 days and 6.10 days, while sex ratio of rice moth was 1:1.15. According to More (1995) the average male and female longevity ranged from 6.89 to 9.22 days and 6.56 to 7.89 days in different rice varieties. Waghmode (1998) reported that the sex ratio of *C. cephalonica* ranged from 1:0.71 to 1:1.54 with a mean 1:1.11 on different groundnut varieties.

Morphometry of different stages of rice moth

The average weight, length and breadth of larva on Konkan Gaurav were 26.00 mg, 12.60 mm and 1.65 mm, respectively, while average weight, length and breadth of pupa were 23.42 mg, 9.20 mm and 1.80 mm, respectively. The observations made in the present studies in respect of weight of larva and pupa was in line with the observations made by Waghmode (1998). The results were more or less similar with those of Gejage (2011)

Table 2. Morphometry of different stages of rice moth *C. cephalonica*

| Stages | Weight (mg) | Length (mm) | Breadth/ wing-span (mm) |
|--------|-------------|-------------|-------------------------|
| Larva | 26.00 | 12.60 | 1.65 |
| Pupa | 23.42 | 9.20 | 1.80 |
| Adult | | | |
| Male | 11.77 | 7.30 | 15.10 |
| Female | 18.96 | 9.40 | 17.55 |

The average weight, length and wingspan of adult male were 11.77 mg, 7.30 mm and 15.10 mm, respectively, while it was 18.96 mg, 9.40 mm and 17.55 mm in female moth. Most of the measurements corroborate with the observations recorded by Bhubaneshwari Devi (2013). According to Bhandari and Regmi (2014) the male and female wingspan ranged from 10.30 mm to 12.88 mm and 12.30 to 14.89 mm respectively.

Conclusion

The rice moth *C. cephalonica* is an important pest of groundnut in storage. While studying its biology on commonly cultivated groundnut variety Konkan Gaurav, it was observed that average total number of eggs laid

per female moth was 336 with an average hatching percentage 93.20. Average larval and pupal period were 37.90 days and 10.10 days. The total development period was 51.40 days. The average longevity of male and female was 9.00 days and 6.10 days, while sex ratio of rice moth was 1:1.15.

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