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Bionomics of rice moth, *Corcyra cephalonica* (st.) on groundnut variety TG – 37

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Abstract

The bionomics of *Corcyra cephalonica* (St.) was studied under controlled conditions (temperature $28 \pm 2.33^\circ\text{C}$ and relative humidity $64 \pm 6.30\%$) in the laboratory. The seed material of the commonly cultivated groundnut varieties in Konkan region *i.e.* TG - 37 was selected for the present investigation. The average 345 eggs were deposited by the female moth emerged from variety TG - 37. Average oviposition period, incubation period and hatching percentage were 3.90 days, 4.50 days and 94.33 per cent, respectively. Average larval and pupal period were 41.10 days and 10.70 days. The total development period was 53.90 days. The average weight, length and breadth of larva on TG - 37 were 30.00 mg, 12.00 mm and 1.60 mm, respectively, while average weight, length and breadth of pupa were 26.93 mg, 8.50 mm and 1.80 mm, respectively. The average weight, length and wingspan of adult male were 14.49 mg, 7.00 mm and 14.90 mm, respectively, while it was 20.54 mg, 9.20 mm and 16.25 mm in female moth. The average longevity of male and female was 8.40 days and 7.00 days, while the sex ratio of rice moth was 1:1.11.

Keywords: Average oviposition period, incubation period, sex ratio, rice moth and biology

1. Introduction

Groundnut, *Arachis hypogaea* L. 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) [12].

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) [9]. *Corcyra cephalonica* Stainton causes loss by feeding on stored groundnut. Females scatter their eggs among the produce. The larvae of *C. Cephalonica* are capable of damaging intact kernels and feed both on the surface and within seeds. They spin a tough silken fiber, webbing together kernels, frass, and cast larval skins. Pupation takes place either within the food source, in sacking, or in crevices in storage structures (Dick, 1987) [3]. Mbata (1989) [7] studied the biology of *C. cephalonica* on different food stuff like groundnut, cocoa, maize, rice and cowpea. Among the major pests of stored groundnut, rice moth, *C. cephalonica* is considered to be an important pest. Hence the present work was aimed at studying aspects of the bionomics of *C. cephalonica* on crushed groundnut kernels variety TG -37.

2. Materials and Methods

The present investigation was conducted during 2014-2015 at the Biological control laboratory, Department of Agril. Entomology, College of Agriculture, Dapoli- 415712, Ratnagiri, (M.S.). 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) [3]. 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 and humidity (temperature 28 ± 2.33 °C and relative humidity 64 ± 6.30). Crushed groundnut kernels of variety TG – 37 was kept in petri dishes. First instar larva was released into the each petri dish. In each case, hundred sets were 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, adult weight, length and wingspan and sex ratio.

3. Results and Discussion

3.1 Biology of rice moth, *C. cephalonica*

Moths generally mated soon after emergence. The freshly laid eggs having white surface which was sculptured and at one end there was a short nipple-like process. The eggs were oval. The eggs were laid in cluster. The data pertaining on the bionomics of different stages of rice moth, *C. cephalonica* are presented in Table 1.

The average 345.00 eggs were deposited by the female moth emerged from variety TG - 37. The observations are in accordance with Waghmode (1998) [13] who noticed that the average number of eggs laid by the female moth ranged from 246.12 to 361.75 with a mean 305.08 on different groundnut varieties. Haritha *et al.* (2000) [6] reported that the average fecundity of the rice moth was higher (277 eggs) on groundnut kernels than on pods (229 eggs).

Average oviposition period, incubation period and hatching percentage were 3.90 days, 4.50 days and 94.33 per cent, respectively. Present results when viewed in the light of existing works find support from Gailad (1987) [4] who reported that the oviposition period of rice moth on different rice varieties ranged from 2 to 6 days with an average 4.08 days. Waghmode (1998) [13] reported that the mean oviposition period, incubation period and hatching percentage were of *C. cephalonica* on groundnut ranged from 3 to 8 days with an average 4.65 days, 4.0 to 4.5 days with a mean 4.33 days and 88 to 100 with a mean of 94.66 per cent respectively. Haritha *et al.* (2000) [6] noticed that average oviposition period of *C. cephalonica* on groundnut was 6 days. Rupnar (2009) [11] noticed that the mean incubation period and hatching percentage of *C. cephalonica* ranged from 3.55 to 4.33 days with an overall mean of 3.83 days and 84.44 to 97.77 with an overall mean of 91.32 per cent.

The larvae had a pale whitish abdominal cuticle. The full grown sixth instar larva was elongated and spined a closely woven, very tough and double layered cocoon in which it developed into a dark brown pupa. Average larval and pupal period were 41.10 days and 10.70 days. The pest completed its life cycle in four stages *viz.*, egg, larva, pupa and adult. The total development period was 53.90 days. Present result more or less corroborate with Waghmode (1998) [13] reported average larval period ranged from 30.82 to 40.60 days with mean 36.44 days and average pupal period of *C. cephalonica* ranged from 8.50 to 10.45 days with a mean 9.35 days as well as it required 46.37 to 58.25 days with a mean 50.30 days to complete one generation on different groundnut varieties.

The male and female moths obtained were identified and separated on the basis of their external characters. The labial palp 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 8.40 days and 7.00 days, while the sex ratio of rice moth was 1:1.11. Similar results were observed by Waghmode (1998) [13] and he noticed that the average longevity of male and female moths ranged from 8.00 to 11.25 days with a mean 9.31 and 6.25 to 8.12 days with a mean 7.12 days, while sex ratio *C. cephalonica* ranged from 1:0.71 to 1:1.54 with a mean 1:1.11 respectively on different groundnut varieties.

3.2 Morphological measurements of different stages of rice moth, *C. cephalonica*

The data pertaining on the morphological measurements of different stages of rice moth, *C. cephalonica* are presented in Table 2. The average weight, length and breadth of larva on TG - 37 were 30.00 mg, 12.00 mm and 1.60 mm, respectively, while average weight, length and breadth of pupa were 26.93 mg, 8.50 mm and 1.80 mm, respectively. The observations made in the present studies are in line with the observations made by Waghmode (1998) [13] who reported that the weight of larva ranged from 20.11 to 35.42 mg with a mean 26.89 mg. According to Pawar (2011) [8] length of full grown larva ranged from 12.88 to 14.26 mm. Bhubaneshwari Devi (2013) [2] reported that the mean larval breadth was 1.59 ± 0.07 mm. Raut (2010) [10] revealed that the mean pupal weight was 26.8 mg. Gejage (2011) [5] reported that the length of pupa ranged from 6.90 to 11.33 mm with a mean 9.36 mm. Pawar (2011) [8] reported that the breadth of pupa ranged from 1.16 to 1.57 mm.

The average weight, length and wingspan of adult male were 14.49 mg, 7.00 mm and 14.90 mm, respectively, while it was 20.54 mg, 9.20 mm and 16.25 mm in female moth. Most of the measurements corroborate with the observations recorded by Waghmode (1998) [13] observed that the mean weight of *Corcyra* male and female were 15.22 and 18.03 mg, respectively on different groundnut varieties. Bhandari and Regmi (2014) [1] reported that the length of male and female ranged from 8.88 to 10.18 mm and 9.39 to 12.10 mm, while male and female wingspan ranged from 10.32 to 12.88 mm and 12.30 to 14.89 mm, respectively on different diets.

Table 1: The duration of different life stages and sex ratio of *C. Cephalonica*

Stages	Duration (Days)
Oviposition Period	3.90
Incubation Period	4.50
Hatching percentage	94.33
Larval period	41.10
Pupal period	10.70
Total development period	53.90
Adult longevity	
Male	8.40
Female	7.00
Sex ratio	1:1.11

Table 2: Morphological measurement of different life stages of *C. Cephalonica*

Stages	Weight (mg)	Length (mm)	Breadth/ Wingspan (mm)
Larva	30.00	12.00	1.60
Pupa	26.93	8.50	1.80
Adult			
Male	14.49	7.00	14.90
Female	20.54	9.20	16.25

Conclusion

From the present studies, the seed material of the commonly cultivated groundnut varieties in Konkan region *i.e.* TG - 37 was selected for investigation. The average 345 eggs were deposited by the female moth emerged from variety TG - 37. Average oviposition period, incubation period and hatching percentage were 3.90 days, 4.50 days and 94.33 per cent, respectively. Average larval and pupal period were 41.10 days and 10.70 days. The total development period was 53.90 days. The average weight, length and breadth of larva on TG - 37 were 30.00 mg, 12.00 mm and 1.60 mm, respectively, while average weight, length and breadth of pupa were 26.93 mg, 8.50 mm and 1.80 mm, respectively. The average weight, length and wingspan of adult male were 14.49 mg, 7.00 mm and 14.90 mm, respectively, while it was 20.54 mg, 9.20 mm and 16.25 mm in female moth. The average longevity of male and female was 8.40 days and 7.00 days, while the sex ratio of rice moth was 1:1.11.

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