



ISSN (E): 2277-7695  
ISSN (P): 2349-8242  
NAAS Rating: 5.23  
TPI 2022; 11(11): 2263-2268  
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[www.thepharmajournal.com](http://www.thepharmajournal.com)

Received: 09-09-2022  
Accepted: 14-10-2022

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## Comparative biology of rice moth, *Corcyra cephalonica* (Stainton) (Lepidoptera: Pyralidae) on rice varieties

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#### Abstract

The laboratory studies on “Comparative biology of rice moth, *Corcyra cephalonica* (Stainton) (Lepidoptera: Pyralidae) on rice varieties” were carried out at laboratory of the Department of Agricultural Entomology, College of Agriculture, Dapoli, Dist. Ratnagiri 415 712 (Maharashtra). Two new rice varieties viz., Ratnagiri-7 (red rice) and Ratnagiri-8, recently released for cultivation in Konkan region of Maharashtra were selected and used for studying various aspects of biology of pest, growth and developmental characters of *C. cephalonica* infesting rice grains. The average fecundity, oviposition and incubation periods, hatching percentage, larval and pupal periods were recorded as 300.08, 4.12 and 4.02 days, 91.76 per cent, 32.91 and 9.04 days, respectively. The mean developmental period was found to be 51.90 days. The mean adult longevity for male and female adult was 9.51 and 7.67 days, respectively, whereas, mean sex ratio, per cent adult emergence and growth index was observed to be 1.09, 87.49 per cent and 1.68, respectively.

**Keywords:** Rice, biology and *C. cephalonica*

#### 1. Introduction

Rice (*Oryza sativa* L.) is considered as the most important staple food for more than half of the world population and extensively grown worldwide. It provides 70 per cent body calorie intake to the consumer. Rice is the important crop of India which occupies 22 per cent of gross cropped area of the country. It contributes 43 per cent of total food grain production and 46 per cent of total cereal production. Rice continues to play vital role in the national food grain supply. Out of the total food grains produced in our country, about 70 per cent is stored in rural areas for varying periods of time for food, feed, seed and future sale purpose. Several hundred species of insects have been reported to cause considerable damage to stored grains and their products (Cotton, 1963) [5]. Amongst them, *Corcyra cephalonica* (Stainton) (Lepidoptera; Pyralidae) commonly known as rice moth or flour moth is one of the most destructive and cosmopolitan pests of stored cereals, pulses, and their products. Rice moth is a real threat to milled rice when stored over a period of month. The larvae damage the stored food by feeding and leaving silken threads wherever they move. These threads are left over on the commodity forming dense, tough and durable webbing. Heavy infestation makes the food tightly webbed together with larval galleries, cocoons, frass, frothy mass and excreta (Kamel and Hussanein, 1967) [12]. The contamination of food in this way has greater economic importance than larval feeding. Among major pests of stored rice, rice moth, *Corcyra cephalonica* is considered to be an important pest. Therefore, the present work was aimed at studying aspects of “Comparative biology of rice moth, *Corcyra cephalonica* (Stainton) (Lepidoptera: Pyralidae) on rice varieties.”

#### 2. Materials and Methods

##### 2.1 Culture of *C. cephalonica*

The initial culture of rice moth, *C. cephalonica* was procured from Regional Coconut Research Station, Bhatye, Taluka and Dist. Ratnagiri and maintained in the Department Laboratory for obtaining permanent culture. The grains of recently released rice varieties (Plate 1) Ratnagiri-7 (red rice) and Ratnagiri-8 was obtained from Agricultural Research Station, Shirgoan, Taluka and Dist. Ratnagiri (Maharashtra). The husk was removed by using electrical dehusking machine (huller) available locally. After dehusking, material was then tested for moisture content by oven dry method. The moisture content of grain was maintained in between 12.65 to 13.95 per cent and were further used for the experimental study. The rice grains infested by *C. cephalonica* were identified using the taxonomic key given by Dick (1987) [7].

The eggs from initial culture were kept along with some healthy rice grains in the glass jars (41 cm height and 30 cm diameter) the open end of which were closed with muslin cloth and secured firmly with rubber band. The jars were observed regularly and emerging moths were collected and transferred into another glass jars containing healthy rice grains. Thus, a series of glass jars containing healthy grains 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 all experiments. All the studies were conducted at room temperature and humidity (temperature  $28.0 \pm 2.33$  °C and relative humidity  $64.00 \pm 6.30\%$ ).

## 2.2 To study the comparative biology of rice moth, *Corcyra cephalonica* (Stainton) (Lepidoptera: Pyralidae) on rice varieties

### 2.2.1 Developmental period of rice moth, *C. cephalonica*

About 50 grams of rice grains of two selected varieties of rice were taken separately into plastic bottles (9.0 cm height and 7.0 cm diameter). Freshly laid eggs of *C. cephalonica* were collected from the laboratory culture and glued on a strip of paper (2.5 cm in length and 2.5 cm in width). One such strip was placed inside each plastic bottle. The mouth of each bottle was secured firmly with plastic cap having small pinholes for aeration. From this the observations on oviposition period, fecundity, incubation period, hatching percentage, larval period, larval weight, pupal period, pupal weight, total development period, per cent adult emergence, sex ratio, adult longevity and growth index were recorded by following standard techniques. The data thus obtained were averaged out and presented.

### 2.2.2 Oviposition period, fecundity, incubation period and per cent hatching

Ten females emerged from each variety were kept separately into plastic containers. The number of days taken by each female moth from first to last egg laid was counted to record oviposition period. Fecundity was recorded by counting total number of eggs laid per ten female moths emerged from each variety and mean fecundity was worked out. The number of days from egg laying to hatching was recorded to work out incubation period. The number of eggs hatched was counted to arrive at per cent hatching.

### 2.2.3 Larval period, Larval weight, larval length and breadth

To study the larval duration, ten newly hatched larvae per treatment were kept separately in test tubes (7.5 cm in length and 1.2 cm in diameter) containing 5 grams grain of respective rice variety (Plate 2). The mouth of test tube was closed firmly with cotton plug. The total larval period was determined from the date and time of hatching of eggs to the date and time of cessation of feeding. The weight of ten full grown larvae of *C. cephalonica* per treatment were recorded separately on electronic weighing balance and mean weight of each larva per treatment was worked out and presented. To workout length and breadth of larva, ten full grown larvae were measured with the help of scale and mean length and breadth was worked out.

### 2.2.4 Pupal period, pupal weight, pupal length and breadth

Ten pupae were kept under observation and the number of

days from pupation to till adult emergence were counted and mean pupal period was worked out. Ten pupae were weighed on electronic weighing balance and mean weight was worked out. To workout length and breadth of pupa, ten full grown larvae were measured with the help of scale and mean length and breadth was worked out.

### 2.2.5 Sex ratio, adult longevity, weight, length and wingspan of adult moth

Sex ratio was calculated by counting number of male and female moths emerged in each treatment. Ten male and female moths emerged from each variety were kept in separate plastic container to record adult longevity. Mean longevity of male and female moths was recorded separately by counting the number of days from emergence till death. Ten male as well as female moths were weighed on electronic weighing balance separately to work out mean weight of male and female moth. To work out length and wingspan of adults, ten male and female moths were measured with the help of scale and mean length and wingspan was worked out.

### 2.2.6 Total development period, Per cent adult emergence and Growth index

The period from egg laying to the emergence of adult was recorded to calculate the total development period and thus, average total development period was worked out. The number of moths emerged from the actual number of pupae examined per treatment were counted. On the basis of this data, per cent adult emergence in each variety of rice was calculated. Growth index was calculated by using formula given by Dhotmal, 1981 [6].

$$\text{Growth index} = \frac{\text{Per cent adult emergence}}{\text{Mean development period}}$$



Ratnagiri-7

Ratnagiri-8

Plate 1: Newly released varieties of rice

Plate 2: Study on biology of *C. cephalonica*

### 3. Results and Discussion

#### To study the biology of rice moth, *Corcyra cephalonica* (Stainton) (Lepidoptera: Pyralidae) on rice varieties”.

The present investigation entitled “Biology of rice moth, *Corcyra cephalonica* (Stainton) (Lepidoptera: Pyralidae) on rice varieties” was conducted in the laboratory of Department of Agricultural Entomology, College of Agriculture, Dapoli, Dist. Ratnagiri 415 712 (Maharashtra) during the year 2021-22. During present investigations, two new rice varieties viz., Ratnagiri-7 (red rice) and Ratnagiri-8, recently released for cultivation in Konkan region were selected to study the comparative biology of *C. cephalonica*, the important pest of stored rice. The results of laboratory studies conducted on comparative biology of *C. cephalonica* are presented below.

#### 3.1 Fecundity, oviposition period, incubation period and per cent hatching

The male and female moths generally mated soon after emergence. The freshly laid eggs were glistening, pearly white in colour with irregular sculptured surface. The eggs were oval in shape, gently rounded at one end and pointed at the pedicel end with brownish tinge. The eggs were laid in cluster. Observation on fecundity of rice moth emerged from two rice varieties are presented in Table 3.1.

The perusal of data on fecundity of *C. cephalonica* reared on new rice varieties viz., Ratnagiri-7 and Ratnagiri-8 indicated that the mean number of eggs laid by female was 300.08. The maximum number of eggs (312.48) were deposited by the female moth emerged from Ratnagiri-8, while the minimum number of eggs (287.67) were recorded in case of female moth emerged from variety Ratnagiri-7. The observation on fecundity of rice moth,

*C. cephalonica* are in harmony with Mbata (1989) [14] who found that highest (330.5) number of eggs were deposited by female moth developed on rice grains. Jhala *et al.* (2019) [10] also recorded average number of eggs laid by female moth developed on rice was 292.50.

The mean oviposition period was 4.12 days on two rice varieties. The maximum oviposition period of 4.35 days was observed in female moths emerged from variety Ratnagiri-7, while it was minimum (3.98 days) in case of the female moth emerged from the variety Ratnagiri-8. The mean incubation period was observed as 4.05 days. Kamble (2005) [11] found that mean oviposition period of *C. cephalonica* on different cereal grains was ranged from 2.8 to 4.9 days with an average of 3.73 days. Rupnar (2009) [18] also reported that the mean oviposition period varied from 3.00 to 4.33 days on ten different varieties of rice which supports the present findings.

The mean incubation period was observed as 4.05 days The minimum incubation period of 3.84 days was recorded in case of eggs which were laid by the female moth emerged from variety Ratnagiri-8 and maximum incubation period of 4.26 days was observed in case of eggs which were laid by the female moth emerged from variety Ratnagiri-7. The duration of incubation period observed in female moths emerged from rice variety Ratnagiri-7 was comparatively longer than the variety Ratnagiri-8. Rupnar (2009) [18] observed that the mean incubation period was varied from 3.55 to 4.33 days with a mean 3.83 days on different varieties of rice. Lo *et al.* (2020) [13] also found that the mean incubation period on rice was 4.8±0.42 days.

At the time of hatching, the eggs turned yellowish in colour. The mean hatching percentage of *C. cephalonica* on two rice

varieties was found to be 91.76 (Table 4.1). The maximum (93.89) hatching percentage was observed in case of eggs laid by female moth emerged from variety Ratnagiri-8, whereas it was minimum (89.66) in eggs which were observed to be laid by female moth emerged from the variety Ratnagiri-7 with overall mean of 91.76 per cent. From the recorded data, it was observed that per cent hatching of eggs which were laid by female moths emerged from variety Ratnagiri-8 was comparatively higher than the eggs which were laid by female moths emerged from variety Ratnagiri-7. The present findings are in conformity with those reported by Gailad (1987) [8] who observed that the per cent hatching of eggs ranged from 86.60 to 100.00 with a mean of 95.66 on rice. Menge (2016) [15] found that the per cent hatching of eggs of *C. cephalonica* varied from 93.20 to 97.93 with a mean of 95.15 on different groundnut varieties.

#### 3.2 Larval period, larval weight, larval length and breadth

The larvae were creamy white in colour with prominent broad yellowish-brown head. The prothoracic shield was very distinct and light yellow in colour. The larval development was found inside the grain cluster. The durations of each larval instar and total larval period in days are presented in table 3.1. There was total six instars observed during the development of *C. cephalonica* on two rice varieties. The duration of I<sup>st</sup>, II<sup>nd</sup>, III<sup>rd</sup>, IV<sup>th</sup>, V<sup>th</sup> and VI<sup>th</sup> larval instars were found to be 3.27, 4.21, 5.40, 8.35, 6.46 and 7.11 days, respectively on variety Ratnagiri-7, whereas, on Ratnagiri-8 variety the durations were 3.00, 4.10, 5.21, 6.39, 6.21 and 6.10 days, respectively for those six instars. The mean larval period was recorded as 32.91 days in two rice varieties. It was also observed that the larvae took a longer duration of 34.80 days to complete its development on Ratnagiri-7 variety of rice as compared to Ratnagiri-8 where the larval development was completed in shorter duration of 31.01 days. Overall, the durations of all the larval instars were observed shorter in rice variety Ratnagiri-8 as compared to Ratnagiri-7. The larvae grown on rice variety Ratnagiri-8 completed its larval period early as compared to larva developed on variety Ratnagiri-7. It might be due to host unsuitability. The present findings on larval period are in conformity with those recorded by Ashwani Kumar *et al.* (2002) [1] who reported the total larval period of 35.75 days on rice. The data on instar wise larval period in present study are also in line with Rupnar (2009) [18], who recorded mean duration of I<sup>st</sup>, II<sup>nd</sup>, III<sup>rd</sup>, IV<sup>th</sup>, V<sup>th</sup> and VI<sup>th</sup> larval instars of *C. cephalonica* as 3.03, 4.03, 5.76, 7.80, 6.99 and 7.33 days, respectively and overall mean larval period of 34.97 days.

The observation recorded on weight, length and breadth of full-grown larva are presented in table 4.2. It was observed that the mean weight of full-grown larva was noticed to be 24.26 mg on two rice varieties. The maximum (24.72 mg) larval weight was recorded on Ratnagiri-8. Minimum (23.81 mg) larval weight was recorded in Ratnagiri-7. Menge (2016) [15] noticed that average larval weight varied from 26.00 to 35.69 mg with a mean of 30.56 mg on three groundnut varieties

The average length of the larva was recorded to be 12.50 mm. The maximum (12.90 mm) larval length was recorded on rice variety Ratnagiri-8. Minimum (12.10 mm) larval length was found in case of larva developed on Ratnagiri-7. Raut (2010) [17] reported that the mean larval length ranged from 9.58 to 17.70 mm with a mean of 13.64. Gejage (2011) [17] found that

length of larva varied from 10.11 to 16.87 mm, with a mean of 13.10 mm. Menge (2016) [15] also recorded average larval length of *C. cephalonica* in the range of 12.10 to 12.90 with a mean of 12.50 mm which supports the present study.

The average breadth of larva was observed to be 1.70 mm. The maximum larval breadth was recorded on Ratnagiri-8. Minimum larval breadth was noticed on Ratnagiri-7 (1.60 mm). The observations pertaining to larval breadth agree with those of Raut (2010) [17] who observed that the breadth of larvae ranged from 0.88 to 1.50 mm with a mean of 1.19 mm. Pawar (2011) [16] reported that the breadth of larva ranged from 1.24 to 1.41 mm. Bhubaneshwari Devi *et al.* (2013) [4] found that the mean larval breadth was  $1.15 \pm 0.07$  mm.

### 3.3 Pupal period, pupal weight, pupal length and breadth

The full-grown VI<sup>th</sup> instar larva was elongated and spinned a closely woven, very tough and double layered cocoon in which it developed into a dark brown pupa. The observations regarding pupal period are presented in table 4.1. The perusal of data revealed that the mean pupal period was found to be 9.04 days (Table 4.1 and Fig 4.3). The pupal period was found maximum (9.35 days) on variety Ratnagiri-7 and minimum (8.73 days) on variety Ratnagiri-8. These recorded observations showed that it took a longer duration to complete the pupal development on variety Ratnagiri-7 (red rice) as compared to Ratnagiri-8. Rupnar (2009) [18] noticed that the pupal period ranged from 6.27 to 10.77 days with a mean of 8.34 days on different rice varieties. Bhubaneshwari Devi *et al.* (2013) [4] reported that pupal period varied from 9 to 16 days. Jhala *et al.* (2019) [10] also found the pupal period of 9.50 days on rice.

The observation recorded on weight, length and breadth of pupa are presented in table 3.2. The mean weight of pupa was 19.88 mg. The maximum pupal weight of 20.21 mg was recorded from pupa developed on variety Ratnagiri-7, while minimum pupal weight of 19.54 mg was recorded from pupa developed on variety Ratnagiri-8 (Table 4.2). Overall, the pupal weight recorded on Ratnagiri-7 was comparatively high as compared to pupal weight recorded on Ratnagiri-8 variety of rice. Kamble (2005) [11] reported that the mean pupal weight was 33.34 mg. Rupnar (2009) [18] found the mean pupal weight of *C. cephalonica* ranging from 17.60 to 21.6 mg with an overall mean of 19.95 mg on ten different varieties of rice.

The average length of pupa was noticed to be 9.45 mm. The maximum (10.00 mm) pupal length was recorded on variety Ratnagiri-8. Minimum (8.90 mm) pupal length was recorded on Ratnagiri-7. More or less similar data on length of pupa is reported by Raut (2010) [17] where the mean pupal length ranged from 7.1 to 12.4 mm with a mean of 9.75 mm. The average breadth of pupa was observed as 1.85 mm. The maximum (1.90 mm) pupal breadth was recorded on variety Ratnagiri-8, whereas minimum (1.80 mm) pupal breadth was observed on variety Ratnagiri-7. The data recorded on pupal breadth is in close agreement with those of Raut (2010) [17] who reported that the breadth of pupa ranged from 1.11 to 1.34 mm with a mean of 1.22 mm.

### 3.4 Adult longevity, sex ratio, weight, length and wingspan of adult moth

The male and female moth was identified based on the description given by Dick (1987) [7]. The male and female

moths obtained were identified and separated on the basis of their external morphological characters. In case of female, the labial palps pointed directly forward and were long and pointed, whereas, in males they were found short and inconspicuous. The observation on longevity of male and female moths and sex ratio are presented table 3.1.

The perusal of data on adult longevity indicated that the male and female moths survived on an average 9.51 and 7.67 days, respectively. The male moths survived for a longer period than the female moths. The maximum (9.74 days) longevity was found in case of male moths emerged from the variety Ratnagiri-7, while it was minimum (9.28 days) in case of male moths emerged from the variety Ratnagiri-8. Similarly, the maximum (7.89 days) female longevity was noticed in case of female moths emerged from the variety Ratnagiri-7, whereas it was minimum (7.45) in respect to female moths emerged from the variety Ratnagiri-8.

The mean sex ratio of *C. cephalonica* was observed to be 1:1.09. The sex ratio was found to be maximum (1:1.12) on the variety Ratnagiri-8 and minimum (1:1.05) on the variety Ratnagiri-7.

The observations recorded on weight, length and wingspan of adult moths (Table 3.2) showed that adult female have maximum weight, length and wingspan as compared to male adult developed from both the rice varieties. The mean weight of adult male was observed as 13.39 mg, whereas, mean weight of adult female was found to be 19.50 mg. Maximum (14.67 and 20.76 mg) weights of male and female moth were recorded in case of the adult moths emerged from rice variety Ratnagiri-8, while minimum (12.10 and 18.23 mg) male and female weights were recorded in case of adult moths emerged from Ratnagiri-7. The findings on weight of adult moths are more or less similar to Bernardi *et al.* (2000) [2], who noticed that the average weight of adult male and female ranged from 12.22 to 17.33 and 21.38 to 33.73 mg, respectively. Menge (2016) [15] also revealed that the weight of male and female moth ranged from 11.77 to 16.73 mg with a mean of 14.33 mg and 18.96 to 21.77 mg with a mean of 20.42 mg, respectively on different groundnut varieties.

The average length of an adult male and female moth was recorded as 7.60 and 9.35 mm, respectively. The maximum (8.00 to 9.40 mm) lengths of male and female moth were recorded in case of the adult moths emerged from variety Ratnagiri-8. The minimum (7.20 and 9.30 mm) lengths of male and female moth were observed in case of the adult moths emerged from variety Ratnagiri-7. The data recorded during present study are in conformity with Bhubaneshwari Devi *et al.* (2013) [4] who reported that the mean length of male and female were 10.75 and 12.24 mm, respectively.

The mean wingspan of adult male and female moths was noticed to be 15.43 mm and 18.03 mm, respectively within two rice varieties. The maximum (15.43 and 19.10 mm) wingspan of male and female moth were recorded in case of the adult moths emerged from variety Ratnagiri-8, while minimum (15.00 and 16.95 mm) male and female moth wingspan was recorded in case of the adult moths emerged from the variety Ratnagiri-7. The perusal of data on adult wingspan is in close agreement with Bhandari and Regmi (2014) [3] where the male and female wingspan ranged from 10.32 to 12.88 and 12.30 to 14.89 mm, respectively. Menge (2016) [15] observed the overall mean wingspan of adult male and female to be 15.21 and 17.66 mm, respectively.

### 3.5 Total development period, Per cent adult emergence and Growth index

Rice moth completed its life cycle in four stages *viz.*, egg, larva, pupa and adult (Plate 12). During the present investigations, total development period was recorded and data are presented in table 3.1 and depicted in figure 4.4.

Total mean development period was recorded to be 51.90 days. The total development period was found maximum (54.47 days) on Ratnagiri-7, while it was observed minimum (49.80) on Ratnagiri-8. It was noticed that the variety Ratnagiri-7 (red rice) showed some amount of resistance for the development of rice moth where the total developmental period was extended for approximately 4.67 days as compared to Ratnagiri-8. The findings of the present study corroborate with those of Gailad (1987) [8] who reported total development period of *C. cephalonica* ranging from 50.48 to 72.40 days with a mean of 56.32 days on different rice varieties. Rupnar (2009) [18] further noted that average total development period of rice moth was varied from 46.31 to 63.92 days with an overall mean of 53.38 days on ten different varieties.

Data indicated that overall mean per cent adult emergence of *C. cephalonica* in two varieties of rice under test was 87.49. The maximum per cent adult emergence was noticed in rice

variety Ratnagiri-8 (88.32). The minimum per cent emergence of moths was observed in Ratnagiri-7 (86.65). However, the differences in emergence of rice moth between new varieties of rice were non-significant. The data recorded on growth index of *C. cephalonica* calculated from per cent adult emergence and mean developmental period on two new rice varieties (Table 3.1) indicated that the mean growth index was found to be 1.68. It was found to be higher in variety Ratnagiri-8 indicating that it was more suitable for feeding, growth and development of *C. cephalonica* as compared to rice variety Ratnagiri-7 (red rice).

The observations recorded on per cent adult emergence and growth index of *C. cephalonica* were in conformity. The observations recorded on per cent adult emergence and growth index of *C. cephalonica* were in conformity with those of Gailad (1987) [8] who reported that the mean per cent adult emergence was to the tune of 82.83 when the pest was grown on ten different rice varieties, whereas, the maximum growth index was found on rice variety Mahasuri (1.7578) and minimum growth index on K-184 (0.5911). Rupnar (2009) [18] further recorded the mean per cent adult emergence and growth index ranged from 80.97 to 92.10 with a mean of 85.84 and 1.36 to 1.78 with a mean of 1.61, respectively on ten different rice varieties.

**Table 1:** Duration of different developmental stages of *C. cephalonica* on new rice varieties

Stages	Particulars	Variety		Mean
		Ratnagiri-7	Ratnagiri-8	
Egg	Fecundity	287.67	312.48	300.08
	Oviposition period (Days)	4.35	3.98	4.12
	Incubation period (Days)	4.26	3.84	4.05
	Hatching per centage (%)	89.66	93.89	91.76
Larva	1 <sup>st</sup> instar (Days)	3.27	3.00	3.14
	2 <sup>nd</sup> instar (Days)	4.21	4.10	4.16
	3 <sup>rd</sup> instar (Days)	5.40	5.21	5.31
	4 <sup>th</sup> instar (Days)	8.35	6.39	7.37
	5 <sup>th</sup> instar (Days)	6.46	6.21	6.36
	6 <sup>th</sup> instar (Days)	7.11	6.10	6.61
	Total larval period	34.80	31.01	32.91
Pupa	Pupa (Days)	9.35	8.73	9.04
Total development period		54.47	49.80	51.90
Adult	Male longevity (Days)	9.74	9.28	9.51
	Female longevity (Days)	7.89	7.45	7.67
	Sex ratio (Male=1) Male: Female	1.05	1.12	1.09
	Per cent adult emergence	86.65	88.32	87.49
Growth index		1.59	1.77	1.68

**Table 2:** Morphometrics of different developmental stages of *C. cephalonica* on new rice varieties

Sr. No.	Variety	Average weight (mg)				Average length (mm)				Average breadth/wingspan (mm)			
		Larva	Pupa	Adult		Larva	Pupa	Adult		Larva	Pupa	Adult	
				Male	Female			Male	Female			Male	Female
1	Ratnagiri-7	23.81	20.21	12.10	18.23	12.10	8.90	7.20	9.30	1.60	1.80	15.00	16.95
2	Ratnagiri-8	24.72	19.54	14.67	20.76	12.90	10.00	8.00	9.40	1.80	1.90	15.85	19.10
	Mean	24.26	19.88	13.39	19.50	12.50	9.45	7.60	9.35	1.70	1.85	15.43	18.03

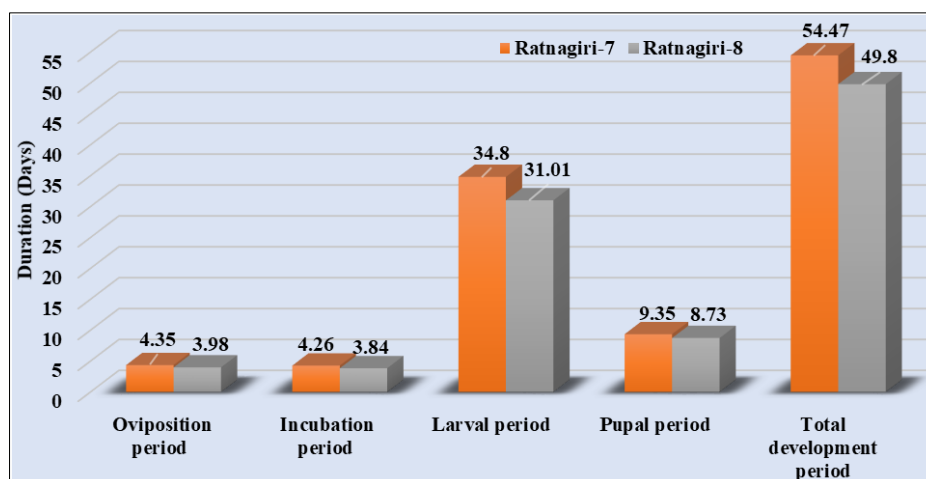


Fig 1: Duration of different developmental stages of *C. cephalonica* on new rice varieties

#### 4. Conclusion

The considerable differences in the fecundity, larval period and per cent adult emergence of *C. cephalonica* were noticed during the present study which possibly may be due to dissimilar nutritional status of test varieties. On the basis of minimum developmental period and higher growth index rice variety Ratnagiri-8 was appeared to be more preferred by the pest. The maximum developmental period and minimum growth index observed in Ratnagiri-7 indicated its unsuitability for feeding by *C. cephalonica*.

#### 5. Acknowledgements

Author is thankful to, Department of Agricultural Entomology, College of Agriculture, Dr. B. S. Konkan Krishi Vidyapeeth, Dapoli-415712, Dist-Ratnagiri, Maharashtra (India), to provide necessary facility and valuable suggestion during investigation.

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