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Review Article

Recent Advances in Rearing of the Laboratory Host- Rice Moth, *Corcyra cephalonica* Stainton

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ABSTRACT

Rice moth, Corcyra cephalonica (Stainton) is being utilized in various bio-control research, developmental and extension units for mass production of number of natural enemies. The rice meal moth, C. cephalonica ranks first in the mass culturing of entomophagous insects due to its amenability to mass production, adaptability to varied rearing conditions and its positive influence on the progeny of the natural enemies. Production of rice moth nutritional requirements have to be taken into account because nutritional deficiencies have been linked with such vague symptoms like poor growth rate, lowered fecundity or reduced body weight. As it is one of the most factitious hosts for Trichogramma production in several countries of the world. In this direction, various dietary formulations were developed in the present study with solo grains and their combinations and the effects of these formulations on the growth, development, reproduction of C. cephalonica evaluated in laboratory condition.

Keyword: *Rearing of Rice moth, Biological control, Mass multiplication of laboratory host.*

INTRODUCTION

The rice moth (*Corcyra cephalonica*) commonly called as "flour moth" or "grain moth" belongs to family Pyralidae of Order Lepidoptera. It is small moth used as host for mass multiplication of certain bio-control agent which can also become a significant storage grain pest. Its caterpillars feed not only on dry plant stuffs such as seeds including cereals (e.g. rice) but also on flour and dried fruits. Though with commencement of chemical pesticides, pest management problems resolved easily and way more economic but still but its hidden hazards are now visible.

Indiscriminate use of synthetic insecticides has induced many adverse effects such as insecticide resistance, resurgence, flare-up, large scale outbreak of secondary pests, destruction of natural enemies & beneficial insects like honeybees, environmental pollution, pesticide residue in crop & environment, bio accumulation & bio magnification in food chain and higher cost of cultivation cumulatively destroying the balance of ecosystem.

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In this respect, a stable, eco-friendly alternative pest management system should be undertaken which integrates different pest management techniques in which biological control plays the major role.

For effective utilization of biological control, biotic agents are required to be mass multiplied in the laboratory followed by field release through augmentation followed by conservation.

In 1865 Stainton has given the earliest reference on this rice moth and names it as *Melissoblaptes cephalonica*. Later on renamed as *Corcyra cephalonica* by Ragnot in 1885 (Rao, 1954).

The eggs of rice moth can be used as an effective food for multiplication of egg parasitoids like *Trichogramma chilonis* nad larva can be used for mass multiplication of larval parasitoids like *Bracon hebator*. It is used as insect predator foods for the predators like *Chrysoperla zastrowi sillemi, Mallada boninensis*. Prasad et al. in 1982 and Patel et al. in 2012 has indicated that its larval stages can also be used for the mass multiplication of entomopathogenic nematodes. So presently mass multiplication of this laboratory host, Rice moth must be given due consideration for effective augmentation of those respective bio-control agents.

Though the mass multiplication of *C. cephalonica* has already been successfully established still further research must be undertaken and available information must be collected and implemented to this aspects. Therefore a review has been collected and depicted over here to fill-up the lacunae prevailing on this aspect.

RESULT AND DISCUSSION

A square shaped rearing box can be used made out of thick plywood of 10mm thickness. Generally the boxes are made with a dimension of 15"×15"×4". A lid is provided with a ventilator hole covered at both the sides with a 100mesh frash net.

An oviposition cage can be prepared by using a 25-30 liter capacity plastic bucket with lid. 40 mesh steel net is heat sealed by cutting out the bottom portion of the bucket. A window of 10"×6" is cut at one end of the bucket and covered by heat sealing with40 mesh steel net. A slit with a diameter as that of a test tube / specimen tube is cut at the centre of the lid and can be plugged with cotton.

Rao (1954) and Ray et al. (1990) reported lifespan was 48.6 and 62 days on Sorghum alone, respectively. Kumar and Kumar (2002) reported earlier moth emergence after 34 days of infesting media in all the treatments except in rice husk and rice where moths emerged on 46 and 48 days, respectively.

Uberoi (1961) reported that flour of pearl millet and broken grain of wheat proved the best media for the growth of this insect. A predominance of female over male was observed in the present study corroborates Shailaja et al. (2009). In the present study it was observed that there were significant differences in the adult longevities of *C. cephalonica* emerged from the different rearing media supports Allotey and Azalekor (2000). They recorded that the adult longevity ranged from 1.5±0.5 to 11.9±1.3 days for males and 1.5±0.5 to 16.5±1.2 days for females in different pulses. In the present work the longevity of adults ranged from 4.50-6.50 days for male and 3.805.50 days for female in different cereals and millet. The difference is mainly due to the food used as rearing media. Report on female longevity of 4.78 days on rice by Tauthong (1989) corroborates the findings of the present investigation. Sex ratio (M: F) The pooled data revealed that the female preponderance registered (0.97: 1) in T3 (sorghum + groundnut + powdered yeast) followed by 0.96: 1 in T4 (sorghum + gram + powdered yeast) and 0.87: 1 in T6 (sorghum + cowpea + powdered yeast) rearing media. The report of Sathpathy et al. (2003) corroborated with the present investigation.

Urs and Mookherjee (1966) studied the development of C. *cephalonica* on ground nut Arachis hypogeae, and 'til' Sesamum indicum. The percentage development of C. *cephalonica* on groundnut is higher (90.13%) compared to 'til' (66.85%). The number of

eggs laid per female on groundnut and 'til' is 255 and 159, respectively. The five hosts in the order of preference for C. *cephalonica* were: sorghum, maize, groundnut, rice and wheat (Sharma et al., 1978). Ayyar (1934) reported that the larvae of C. *cephalonica* developed more rapidly on maize (38 days) than on wheat, cotton seeds and groundnut-pods. It developed the slowest on cowpea (66 days). Studying the development of the larvae of C. *cephalonica* on different rearing media, Cheng et al. (1978) found that the poor media were husked rice (cooking rice) and wheat flo ur Russel et al. (1980) studied the development of C. *cephalonica* on whole sorghum and millet. The overall performance of C. *cephalonica* is better on millet than on sorghum.

Different workers have noted varying developmental period of *Corcyra* in different rearing media. Ingle et al. (2000) reported the reduced developmental period of *Corcyra* on bajra + mustard (38.33 days) or with bajra + cotton (39.33 days) or bajra + groundnut (40.66 days).

Allotey and Azalekor (1999) studied the life cycle of *Corcyra cephalonica* under ambient laboratory conditions (temperature range 27.5±300C and 60±73% R.H.) on groundnut, bambara groundnut and cowpea. The mean developmental period ranged from 33.2±0.2 to 45.3±1.8 days on whole, broken and powdered forms of the food media. Egg hatchability was found to be 83%, while adult longevity ranged from 1.5±0.5 to 11.9±1.3 days for males and 1.5±0.5 to 16.5±1.2 days for females.

Bernardi et al. (2000) found that the diets with wheat germ and yeast proved to be the most adequate for rearing the moth as this reduced the total (egg-adult) cycle (62.70±10.29 days). In the present study the duration was 54.09 days, shorter than the earlier case. They further added that on diet consisting of rice bran and yeast the duration was 70.16 ± 5.34 days but in present study the period was only 52.00 days. The duration of larval pupal period was recorded maximum on scented rice (56.17 days), followed by wheat (48.33 days) and maize (45.34 days) which is in close agreement with the studies made by Ayyar (1934) who recorded total larval period of 53 days on paddy, 38 days on maize, 42 days on wheat. While Tauthong (1989) recorded only 42.53 days of larval-pupal period in rice, which is shorter than the present result as well as the findings of earlier works.

Shailaja et al. (2009) recorded the average duration of egg; larva and pupa of 4.84, 33.67 and 12.34 days respectively on proso millet. The total developmental period occupied, 41 to 59 days with an average of 41.95±2.68 days on foxtail millet as reported by Jagdish et al. (2009). In the present study the duration was 42.17 days in Italian millet confirms the findings of earlier works. Combination with maize based diet didn't express any positive performance in respect of accelerating the growth factor of *Corcyra cephalonica* as opined by Tirthakar et al. (2006) corroborate the present study.

According to Allotey and Azalekor (2000) the mean developmental period was ranged from 33.2±0.2 to 45.3±1.8 days confirmed the findings of the present investigation where the period ranged from 37.83-56.17 days in different rearing media.

Tiwari and Khan (2003) reported delayed moth emergence (47 days) when *Corcyra* was reared on maize alone, while it was shortest (36 days) when was reared on maize + yeast. They also concluded that yeast was quite favorable protein source showed fast development in moths (36 days).

Nathan et al. (2006) reported that the rearing of C. *cephalonica* larvae on a high-quality nutritional source resulted in high-quality eggs. They found that the performance and the adult emergence percentage were higher when the food was millet followed by wheat and rice is at par with the findings of the present study.

After preparation these two primary components mass multiplication can be initiated. Good, sound and healthy maize and sorghum should be used as the food for the larva which must be free from insecticides. Then those grains will be milled to make 3-4

pieces from each grains followed by heat sterilization in an oven at 100^0C for 30 minutes to kill the existing insects present previously in the grain which may otherwise compete for food and space with rice moth.

For mass multiplication of rice moth GFS 5 and GHB 732 are proved to be the most suitable varieties of sorghum and pearl millet respectively (Saneera, 2013).

Rizwana and Ayesha in 2015 revealed that larval weight was highest (60.4 mg) in diet D5 (Sorghum, Millet and Maize + Groundnut +Vitamin E); and moderate larval weights were recorded in diet D2 (Sorghum, Millet and Maize + Groundnut) and D3 (D2 + Vitamin B), i.e. 58.8 mg and 51.2 mg respectively. Development of *C. cephalonica* was faster in diet D2 and D5 in comparison to other diets. Egg to adult emergence was faster in diet D2 and D5; and both these diets were found to perform better as compared to other diets in other parameters like fecundity, female weight, and food efficiency index and egg weight. Maximum moth emergence i.e. 66.2% was observed in diet D2 followed by diet D5 having moth emergence of 64.6%. Diet D1 (Sorghum, Millet and Maize), D3, and D4 (D2 + Vitamin H) showed lower moth emergence i.e. 50.0%, 50.8% and 50.6% respectively. Highest food efficiency index was also recorded in case of diet D5.

Pathak et al. observed maximum moth emergence when reared on sorghum (37.02%) whereas Mehendale et al. reported that maximum moth emergence when diet prepared with sorghum, groundnut and powdered yeast (52%).

Kumar and Kumar indicated 37.04% and 31.99% of adult emergence from 4000 *C. cephalonica* eggs from 2 kg of sorghum and pearl millet respectively. So diet formulation, wherein different vitamin supplements were added, showed better results than most of the previously reported findings.

Highest fecundity was recorded in diet D5 followed by diet D2 and diet D4 (Rizwana & Ayesha in 2015).

Kumar recorded the fecundity of 364.4, 160.2, 111.2, 438.2, 438, 384.4 and 329.6 eggs per female in case of *C. cephalonica* reared on gram, sorghum, wheat, mustard, cotton, sesamum and groundnut respectively indicating higher egg laying in protein rich media than in cereals alone.

Haritha et al. has recorded average fecundity of 211 eggs per female in case of groundnut. Lowest fecundity in diet D1 might be due to absence of vitamins and the highest fecundity in diet D5 showed the importance of vitamin E in rearing media. As shown in Table 4, maximum weight of 100 eggs was recorded in diet D5 (4.8 mg) followed by diet D2 (4.2 mg).

Senthil Nathan in 2006 has revealed in his studies that larva reared on millets were giving higher percentage of adult emergence and several fifth-instar food use indices (consumption index, relative growth rate, and efficiencies of conversion of ingested and digested food) as compared to sorghum diets. The nutritional indices for wheat- and rice-reared *C. cephalonica* larvae were intermediate between the indices for larvae reared on millet and sorghum. Even adult emergence and percentage 24-h survival of the parasitoid *T. chilonis* were significantly higher on eggs of *C. cephalonica* hosts which are reared on millet than on eggs of those reared on sorghum. These results suggest that the rearing of *C. cephalonica* larvae on a high-quality nutritional source resulted in high-quality eggs, which ultimately resulted in high-quality *T. chilonis* reared on those eggs. Such an effect has been modeled in ecological theory as a "bottom up cascade."

Bhandari and Regmi (2013) analyzed four cereals namely corn, rice, millet and wheat solely and mixed with groundnut to assess diet performance of C. *cephalonica*. Among the eight treatments, corn + groundnut were superior in almost all biological parameters of C. *cephalonica* followed by millet + groundnut.

Chaudhuri et al. (2015) studied variation in biological parameters of C. *cephalonica* (Lepidoptera: Pyralidae) with quality rearing media against four different types of locally available grains namely maize,

wheat, Italian millet and scented rice as solo and fortified with 3% dextrose and yeast. The insect had significantly shortest larval-pupal period when the food grains were fortified with dextrose followed by yeast and the period was longest in solo grains. The insect complete its life cycle within 51.28 days during August-October as compared to 54.67 days in May August. The period was longest in scented rice (64.71 days) and shortest in maize-dextrose (45.00 days). Adult emergence was the maximum during August - October (71.33%) and in wheat (solo as well as fortified). The sex ratio showed female dominance. Fortification of 3% dextrose and yeast increased female percent and thereby fecundity in Italian millet. Hence, Italian mill*et al*one or fortified with dextrose and yeast can be used as alternative food as rearing media for *Corcyra*.

Menge in 2017 cultivated groundnut variety Konkan Gaurav where she observed 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 longevity of male and female was 9.00 days and 6.10 days, while sex ratio of rice moth was 1:1.15.

Sorghum grains which are either partially broken or coarsely milled are found to be most preferable as compared to whole grains. 5% yeast fortified coarse sorghum grains provides best diet supplements followed by groundnut kernels (10%) which reduced the duration of larval stages of the factitious host. Casein @ 5 % and Glucose @ 5 % shows no significant influence to be used as diet supplements where as Protinex @ 5 % was not preferable by the larvae as it reduces the fecundity of the female moths. (Saneera, 2013).

Puja in 2018 observed that rearing of *Corcyra* in magnetic field for two hrs recorded maximum larval weight 1.52 mg in 2 and 0 hour, and maximum larval length 4.50 mm in treatment 6 hour. Magnetic treatment of 2 hr had positive effect and more than 4 hrs had negative effect on *Corcyra* larvae on the parameter under study and was at par with control. The interaction effect of magnetic field and di*et al*so indicates that there was good effect of 2 hrs magnetic field and sorghum diet on *Corcyra*. The study indicates that exposure period to magnetic field plays an important role on biology and the results provide suitable diets for mass rearing, thus contributing significantly for the large-scale production of C. *cephalonica*.

Arun kumar in 2018 indicated that the Diet T6 (sorghum 1000 g + groundnut 50 g) was found to outperform other dietary formulations as it resulted in lowest larval period (30.33 days), lowest pupation period (7 days), lowest total development period (47.33 days), highest adult emergence (82%), highest adult female emergence (52.11 days), highest male longevity (8.33 days), highest female longevity (9.67 days) and highest fecundity (312.33).

The rearing media to improve the mass production of C. *cephalonica* as a factitious host revealed three promising media viz., T3 (sorghum + groundnut + powdered yeast), T4 (sorghum + gram + powdered yeast) and T6 (sorghum + cowpea + powdered yeast) with heavier larvae in T3 (53.33 mg), T4 (52.50 mg) and T6 (54.50 mg). The heavier pupae were also recorded in T4 (34.67 mg), T6 (34.17 mg) and T3 (33.17 mg) while heavier female moths were recorded in T3 (39.33 mg), T4 (34.83 mg) and T6 (34.0 mg). The maximum moth emergence were in T3 (523.84), T4 (476.34) and T6 (470.0). Whereas, the maximum total females were noticed in T3 (266.17), T6 (251.50) and T4 (243.34). The maximum fecundity was recorded in *Corcyra* females emerged from T3 (611.54), T4 (494.28) and T6 (481.08). Moreover, the maximum projected egg laying was realized from the females emerged from T3 (8.14 cc), T6 (6.10 cc) and T4 (6.01 cc). The significantly maximum weight of 100

Corcya egg was exhibited with females emerged from T4 (3.73 mg), T6 (3.70 mg). The maximum length and breadth of egg was obtained from females emerged from T4 (0.70 and 0.40 mm), T6 (0.62 and 0.39 mm) and T3 (0.56 and 0.35 mm), respectively. However, no much detrimental impact on the life cycle of C. *cephalonica* were exhibited through modification of rearing media though the female preponderance (sex ratio as M: F) was noticed in T3 (0.97:1), T4 (0.96:1) and T6 (0.87:1). (Mehendale et al., 2014)

Corcyra cephalonica developed on all the food media. Moth emergence started after 34 days of infesting the media with *Corcya* eggs in all the treatments. The number of moth collected was recorded for forty days from the date of start of emergence from each cage. The emergence of moths continued even after forty days, but since the second generation moths were likely to emerge after forty days, the moth emerging after forty days was not included in the calculations. Maximum of 37.02 percent moths emerged from sorghum followed by pearlmillet and maize in which it was 31.89 and 25.12 percent respectively. Statistically, moth emergence in sorghum and pearl millet treatments was on par. Jalali and Singh (1992), used 5000 eggs percages (2.5 kg. of sorghum in each cage), and obtained12.8 percent recovery. It was observed that mixing of maize drastically reduced the moth emergence, in all the food media, but increased the weight of eggs. The most striking case was observed in pearlmillet, where the emergence was reduced from 31.89 to 25.12 percent when maize was mixed. When Sorghum was added to the mixture of Maize (9:1), Sorghum + Maize (8:2), and Pearl millet + Maize (9:1) the percent emergence of moths significantly increased from 25.12 to 36.23, 35.12 and 30.29respectively (Table-1). Rearing *Corcya* on efficient food media resulted in production of robust moths and robust eggs. The size of the egg was considered as one of the criteria for assessing the health of the insect. For rearing of egg parasitoids such as Trichogramma spp., utilization of robust host eggs is important. The weight of the egg, therefore, was considered as a measure of size of the egg. Maximum weight of 4.55 mg was recorded for 100 eggs laid by moths reared on maize, followed by 4.43, 4.29, 4.26 and 4.16 mg., from Sorghum + Maize (8:2), Sorghum + Maize(9:1), Sorghum+ Pearlmillet (9:1) respectively. The eggs from other diet media weighed lesser. Rao et al. (1980) reared C. *cephalonica* both in sorghum flour and sorghum flour mixed with rice husk. They recorded more larval weight when reared in the latter. Shorter development period is a desired trait in the mass production of any insect. The faster development of the insect indicates the efficiency of the rearing medium *Corcya* could develop in a shortest period of 47.62 days in pearl millet followed by 47.89, 49.23, 50.82, 50.83 and51.23 days in Pearl millet + Maize (9:1), Sorghum + Pearl millet (9:1), Sorghum + Maize (9:1), and Sorghum +Maize (8:2) respectively. The different rearing media weresuperior with respect to different biological parameters. Hence to determine the best medium, a food efficiency index was computed which clearly established the superiority of sorghum over other media, the next best food media being Sorghum + Maize (9:1) and Sorghum +Maize (8:2). (Santosh et al., 2010).

Ground kernels were more satisfactory for the development of C. *cephalonica* than whole kernels. Of the media used, ground milled rice was the best all-grain medium for support of *C. cephalonica*. It could be used as a culture medium in place of the standard medium. Millet was the best whole grain medium. Whole millet and ground milled rice provided the most rapid growth and shortest generation time. Rice should then be stored as paddy to reduce damage from *C. cephalonica.* (Osman, 1986).

Rice moth, *Corcya cephalonica* (Stainton) is being utilized in various bio-control research, developmental and extension units for mass production of number of natural enemies. The rice meal moth, *C. cephalonica* ranks first in the mass culturing of entomophagous insects due to its amenability

to mass production, adaptability to varied rearing conditions and its positive influence on the progeny of the natural enemies. Rice meal moth, *C. cephalonica* (Stainton) (Lepidoptera: Pyralidae) a stored grain pest has been proved to be one of the most efficient surrogate host for rearing a wide range of biological control agents.The moth C. *cephalonica* is one of the most used factitious hosts for *Trichogramma* production in several countries of the world. The adult moth is grey in colour and does not feed. Mated females lay from 100 to 200 eggs near food sources. Eggs hatch in 4-10 days. The larva however, constructs a feeding tube gallery, consisting of silken web and food particles, to stay feed and grow inside it. When they are fully-grown, they form dense white cocoons to pupate. Pupae are usually found in food or they may be found between pallets and sacks. Adults emerge from pupae within four to eight weeks and repeat their life cycle. Ecological zones of India at 28°C ± 2°C and 65 ± 5% Relative Humidity considering the economics as well as quality of eggs produced. Mass rearing of *C. cephalonica* on broken maize or sorghum grains mixed with 2% dried yeast powder is recommended. Production of rice moth nutritional requirements have to be taken into account because nutritional deficiencies have been linked with such vague symptoms like poor growth rate, lowered fecundity or reduced body weight. As it is one of the most factitious hosts for *Trichogramma* production in several countries of the world. In this direction, various dietary formulations were developed in the present study with solo grains and their combinations and the effects of these formulations on the growth, development, reproduction of *C. cephalonica* evaluated in laboratory condition. (Rashmi & Sonali, 2016).

The grains have to be sprayed with 0.1 % formalin @ 25-50 ml to prevent mould development. Apart from this, formalin also helps in maintaining grain humidity (14-16 %) which gets lost due to heat sterilization.

Bacterial growth can be prevented by treating those milled grains with Streptomycin sulphate @ 0.2 kg per 2.5 kg of the grain. Then those 2.5 kg of processed grains should be kept in the rice moth rearing boxes. Additional yeast powder @ 5 g must be added to each box with 2.5 kg grains to increase the fecundity of the female moths. Infest the boxes containing 2.5 kg grain with 0.5 cc of *Corcyra* eggs (about 10,000). Write the date of charging on the boxes and keep the boxes in the racks. Minimum of 1000 and maximum of 2000 eggs found to be optimum for charging one kilogram of rearing media in terms of adult emergence, fecundity and sex ratio of *C. cephalonica*.

The moths start emerging after forty days of charging and continue for two months. Initially 5-15 moths emerge daily which can increase up to 75-100 moths per day per box.

Collect the moths from the boxes with specimen tube and release them in the oviposition cage. Mechanical moth collection device may be used to collect large number of moths within a short time.

A reduction in the moth emergence occurs 100 days after initial infestation. The rearing boxes are reused after cleaning thoroughly. The contents of the discarded box should be properly burnt to prevent breeding of *Bracon hebator*, a larval parasitoid of rice moth.

Eggs are collected in a tray placed below the oviposition cage and passed through 40 mesh sieve and run over a slope of paper to eliminate scales and broken body parts.

The eggs are then treated with UV rays (30 W UV tube for for 30 minute at 2 feet distance) to kill the embryos if they are meant for production og *Trichogramma*, egg parasitoid or Chrysoperla predator. But the eggs which will be used for further mass multiplication of rice moths shouldn't be treated with UV radiation.

A band of sulphur dust should be spread inside the box on all the four sides under mite infestation.

CONCLUSION

From the present study it can be concluded that growth and reproductive potential of C. *cephalonica* can be increased by providing

optimum nutritional components in the diet. Present study evaluates the efficacies of various diet formulations and has successfully formulated diet combinations that not only resulted in high fecundity but also in production of robust eggs. Therefore the present findings will certainly provide input for finding out the optimum conditions for mass culturing of various parasitoids, of which C. *cephalonica* is a preferred host. Ground kernels were more satisfactory for the development of C. *cephalonica* than whole kernels. Of the media used, ground milled rice was the best all-grain medium for support of C. *cephalonica*. It could be used as a culture medium in place of the standard medium. Millet was the best whole grain medium. Whole millet and ground milled rice provided the most rapid growth and shortest generation time. Rice should then be stored as padi to reduce damage from C. *cephalonica*. Therefore, it can be concluded that though the primary food media for mass production of *Corcya* was wheat and maize but in this region Italian mill*et al*one or fortified with dextrose and yeast performed at par or better than wheat and maize in respect of all the biological parameters and finally on the fecundity i.e egg production. So, Italian mill*et al*one or fortified with dextrose and yeast can be used as alternative food for rearing of *Corcya*. C. *cephalonica* is polyphagous storage and grocery pest. The mixed diets (cereals + groundnuts) were significantly better than the solo cereals in almost all biological characters of C. *cephalonica*. Among treatment, corn + groundnut were superior to all the other diets followed by millet+groundnut. In some parameters, millet+groundnut were also superior but economically corn+groundnut is cheaper. The fecundity is considered as prime importance because of its utilization on egg parasitoid T. chilonis. High quality and quantity of eggs of C. *cephalonica* was obtained on corn + groundnut and millet + groundnut hereby recommended for mass production purpose. Hence, from the study, it is evident that the corn+groundnut is economically and biologically proved better option in production of robust eggs of *C. cephalonica*. The female moth has longer body length and wingspan as compared to male moth. Both male and female reared on mixed diet of corn and groundnut has maximum body length and wingspan, however body length and wingspan of moth reared on rice was minimum. Similarly, body weight of both female and male was highest on mixed diet of corn and groundnut and lowest on rice. There is high positive correlation between fecundity and female body weight. Since, the body weight of female moth was highest in mixed diet of groundnut and corn and there is positive correlation between fecundity and female body weight so the mixed diet of groundnut and corn is highly superior for mass production of *C. cephalonica*.

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