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EFFECT OF DIFFERENT HOSTS ON THE BIOLOGY OF *CORCYRA CEPHALONICA* STAINTON

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ABSTRACT

An experiment was conducted under laboratory conditions in the Department of Entomology, Rajasthan College of Agriculture, Udaipur during, 2010 to 2011 with a view to study the biology of *C. cephalonica* on different hosts (maize, sorghum, rice, wheat, pearlmillet, oat and groundnut). The results revealed that minimum hatching (4.25 days) and larval period (32.50) days was recorded on pearl millet and maize, while maximum hatching (5.5 days) and larval period (45.25 days) was recorded on oat. The maximum larval (52.25 mg) and pupal weight (38.50 mg) was recorded on pearl millet, while, minimum larval (38.50 mg) and pupal weight (32.00 mg) were recorded on oats. The maximum adult emergence was recorded on pearlmillet (79.00%) and minimum on groundnut (65.00%). The Growth Rate Index was maximum on pearlmillet (1.71) and minimum on groundnut (1.07). The highest fecundity (302.50 eggs/female) was recorded on maize and minimum on groundnut (225.50 eggs/female). The maximum longevity period of female (7.25 days) was recorded on wheat and minimum on sorghum (4.50 days); whereas, the maximum adult male longevity was (10.25 days) recorded on pearlmillet and minimum on sorghum (8.00 days). The minimum developmental period was recorded on pearlmillet (46.25 days) and maximum on oats (61.25 days).

Key words: Biology, *Corcyra*, development period and fecundity, hosts

INTRODUCTION

Many insects and mites are known to infest-maize grains in storage, few of which are major or primary pests. Among these, the rice moth, *Corcyra cephalonica* Stainton (Lepidoptera: Galleriidae) is one of the most important pests of stored maize, distributed in Asia, Africa, North America and Europe. It feeds on many hosts, *viz.*, rice, sorghum, wheat, groundnut, gram, cotton seed, *etc.* The larvae cause damage to grain by feeding under silken webs. When infestation is high the entire stock of grain gets converted into a webbed mass. Ultimately, a characteristic fowl odour is developed and the grain rendered unfit for human consumption. The pest cause both quantitative and qualitative losses. Hence, the biology of this pest was studied on different stored grain hosts.

MATERIALS AND METHODS

The test insect eggs were obtained from Bio–control Research Laboratory, Department of Entomology, Rajasthan College of Agriculture, Udaipur. One Cubic centimeter (one c.c.) eggs were released in the containers containing 3kg of broken maize grains. These grains were conditioned for 24 hours at 28±2º C and 75±5 per cent RH before use. The culture was maintained in culture box and plastic containers consisting of glass jars lined with black folded thick paper on the sides and blotting paper at the bottom. A cotton plug soaked in 5 per cent sucrose solution was provided in the jars for the adult moths to increase the fecundity of moth (Pareek and Kushwaha, 1971). The chamber was covered with double layer of muslin cloth after releasing freshly emerged active adults. The egg laying chambers were kept in an incubator at 28±2º C and 75±5 per cent RH. Most of the eggs were laid between the double layer of muslin cloth from where these were collected daily with the help of a soft brush and kept in separate Petri dishes. The time and date of egg laying were recorded in order to select the eggs of known age that ensured continuous supply of eggs needed for the present study. Eggs which were not used for experimentation were kept separately for hatching and their date of hatching was recorded. The newly hatched larvae were kept date wise in plastic containers and food was provided. The newly hatched larvae when required were taken from dated culture for further experimentation. The study of effect of the hosts on the biology of *C. cephalonica* was done on seven different hosts *viz*., maize, sorghum, rice, wheat, pearl millet, oats and groundnut purchased from local market. These seeds were conditioned before use as described in maintenance of insect culture. From each host 200g of grains were taken in plastic containers with four replications, twenty newly

hatched (0–24 hours old) larvae of *C. cephalonica* were released in each container. The mouth of containers was covered with muslin cloth and tightened with rubber band. The following observations were recorded to compare the effect of hosts on the biology of *C. cephalonica* (1) hatching period (days), (2) larval period (days) and weight (mg) (3) pupal period (days) and weight (mg) (4) adult emergence (%), (5) growth Rate Index, (6) fecundity (Eggs/ Female) and adult longevity (days). The larval period was worked out by recording the date of hatching and date of formation of silken web in the food. The period between web formation and adult emergence was considered as pupal period. Larval and pupal weight was determined with help of electronic balance. For recording the fecundity and ovipositional period adults that emerged from the larvae developed on treated food were kept in separate jar for egg laying. The total number of eggs laid by each female was counted daily till the death of female in each treatment. A random sample of 50 eggs was taken from each replication and placed in separate containers and hatching period was worked out. The longevity of male and female adults and total number of adults emerged from different hosts were recorded. The growth rate index was worked out using the following :

$$\text{Growth Rate Index} = \frac{\text{Per cent adult emergence}}{\text{Total developmental period}}$$

RESULTS AND DISCUSSION

Data on the biology of *C.cephalonica* on different hosts (Table 1) revealed that the minimum hatching period was observed on pearlmillet and maize with a mean of 4.25 and 4.25 days, which was at par with sorghum (4.50 days), rice, wheat and oat (4.75 days) and maximum on groundnut (5.50 days). Earlier, Prakash and Senthilkumar (2005) reported that the shortest incubation period of 4.21 days was recorded on *P. americanum*, followed by *O. sativa* (5.32 days) and *S. bicolor* (7.41 days). In present investigation, minimum larval period (32.50 days) was recorded on pearlmillet and maximum was on oat (45.25 days). This finding is in close conformity with the findings of Deulkar*et al.* (2012) who reported that the least larval development period of 30.86 days was observed on bajra based diet. The maximum larval weight of 52.25 mg was recorded with pearlmillet; while, minimum on oat (38.50 mg). Earlier, Uberoi (1961) reported that the flour of pearl millet and broken grain of wheat proved to be best media for the growth of the larvae. The minimum pupal period was recorded on pearl millet and maize (9.50 days), which was at par with sorghum and wheat (9.75 days) and rice (10.25 days); whereas, maximum on oat (11.25 days). This finding is in close conformity with the findings of Deulkar*et al.* (2012) who reported that the least pupal period of 4.70 days was on bajra based diet.

The maximum pupal weight of 38.50 mg was recorded on pearlmillet, which was at par with sorghum and wheat (37.00 mg) and maize (36.00 mg) and minimum was on oat (32.00 mg). The maximum adult emergence was recorded on pearlmillet (79.00%) which was at par with maize (78.00%) and sorghum (76.00%); while minimum was on groundnut (65.00%). Earlier, Nathan *et al.* (2006) observed that the per cent adult emergence was significantly higher for millet–reared than for sorghum–reared larvae. Similar observations were recorded by Pallavi *et al.* (2006) who reported that among the various diets, bajra, bajra + nagali, maize + nagali were found most promising diet which favourably influenced the moth emergence.The Growth Rate Index was maximum on pearlmillet (1.71) which was at par with maize (1.41) and sorghum (1.38) and minimum was on groundnut (1.07). Earlier, Sahayaraj*et al*. (2001) reported that the bajra fed group had higher growth index (1.61).The maximum number of eggs were laid by female when insect was reared on maize (302.50 eggs/female), which was at par to pearlmillet (292.75) and sorghum (292.50); while, minimum (225.50 eggs/female) when insect reared on groundnut. This finding is in close conformity with the findings of Pallavi *et al.* (2006) who observed that bajra, bajra + nagali, maize + nagali were found most promising diet which favourably influenced the fecundity. The maximum adult male longevity was recorded on pearlmillet (10.25 days) which was at par with maize and wheat (9.75 days) and minimum was on sorghum (8.00 days). Whereas, the maximum longevity period of female was recorded on wheat (7.25 days) which was at par with pearlmillet and rice (6.25 days) and minimum with sorghum (4.50 days). Earlier, Pallavi *et al.* (2006) reported that the maximum longevity of male moth was 10.1 days when reared on bajra and bajra + nagali; whereas, the maximum longevity of female moth was 7.1 days when the test insect was reared on wheat. In case of adult emergence the minimum developmental period was recorded on pearlmillet (46.25 days) which was at par with maize (55.25 days) and maximum on oat (61.25 days). This finding is in close conformity with the findings of Pathak *et al*. (2010) who reported minimum development period of 47.62 days in pearl millet and maximum on 51.23 days with sorghum + maize. Similarly, Deulkar *et al.* (2012) reported that the least total developmental period of 38.33 days was recorded on bajra 2.5kg + groundnut 100 g.

Table 1. Effect of different hosts on biology of *Corcyra cephalonica* Stainton

Hosts	Hatching period (days)	Larval period (days)	Larval weight (mg)	Pupal period (days)	Pupal weight (mg)	Adult emergence (%)	Growth rate index	Fecundity (No. of eggs/ female	Adult longevity (days)		Development period (days)
									Male	Female	
Maize	4.25	41.50	46.00	9.50	36.00	78.00 (62.07)	1.41	302.50	9.75	5.25	55.25
Sorghum	4.50	40.75	46.75	9.75	37.00	76.00 (60.69)	1.38	292.50	8.00	4.50	55.00
Rice	4.75	42.50	43.00	10.25	34.00	68.00 (55.57)	1.18	231.00	8.50	6.25	57.50
Wheat	4.75	43.25	42.00	9.75	37.00	69.00 (56.18)	1.20	268.25	9.75	7.25	57.75
Pearlmillet	4.25	32.50	52.25	9.50	38.50	79.00 (62.75)	1.71	292.75	10.25	6.25	46.25
Oat	4.75	45.25	38.50	11.25	32.00	66.00 (54.34)	1.08	228.75	8.75	5.50	61.25
Groundnut	5.50	44.50	40.75	10.75	33.75	65.00 (53.74)	1.07	225.50	8.50	5.00	60.75
S.Em. ±	0.338	0.727	0.769	0.177	0.616	0.840	0.016	5.140	0.233	0.237	0.97
C.D. (P=0.05)	0.997	2.139	2.263	0.520	1.810	2.469	0.047	15.124	0.686	0.697	2.86

Data in parentheses are angular transformed values

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