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Biology and Relative Proportions of *Brachymeria* Pupal Parasitoids of *Opisina arenosella*

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Among six species of *Brachymeria* parasitising the pupae of coconut leaf eating caterpiller, *Opisina arenosella* Wlk., *Brachymeria nephantidis* Gahan and *B. lasus* Walker are found the most effective species under Mahuva conditions of Gujarat State during the year, 1984-85. Joy and Joseph (1973) reported *B. nosatoi* Habu, and *B. nephantidis* Gahan as the most important pupal parasitoids of the pest. Very little information on the biology of these species is available from the published literature. Some studies on the biology of *B. nephantidis* as pupal parasitoids of the pest has been done by Satpathy and Rao (1972) and Joy and Joseph (1973), but no work on the biology of both the parasitoids has been done in Gujarat. Therefore, the present studies on biology and relative intensity of parasitisation of parasitoids, *Brachymeria nephantidis* and *B. lasus* were made under Mahuva conditions. The results obtained from these studies are presented in the paper.

Initial culture of *B. nephantidis* and *B. lasus* for biological studies was obtained from field collected *Opisina* pupae kept under observations for parasitoid emergence. The adults of both the species were distinguished by an identical coloured mark on the tibiae of hind legs. Further one pair of parasitoid was confined in a glass tube measuring 10 x 2.5 cm. Honey was provided as food for parasitoids which were kept on a piece of wax coated paper. The tube containing parasitoids were kept in subdued sunlight (to stimulate mating) for 10-15 minutes daily for about 3-4 days after which only the host pupae were offered for oviposition. The parasitised host pupae were replaced daily by freshly host pupae. The parasitised pupae were transferred in conical flask and kept for adult emergence. Emergence of parasitoids from total exposed host pupae was counted as fecundity of a single female parasitoid. The study was carried out under room temperature varied 22.8 to 31.7°C and relative humidity 22 to 70 per cent. Egg to adult period, fecundity, longevity and sex retios of both the parasitoids were recorded (Table 1).

For determining the relative intensity of parasitism of both the parasitoids, the collections of *Opisina* pupae were made from the infested coconut orchards at Plantation Crops Research Station, Mahuva at regular

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TABLE 1

Biology of *Brachymeria nephantidis* and *B. lasus* when reared on *Opisina arenosella*.

Particular	*Nos. observed*	*B. nephantidis*	*Nos. observed*	*B. lasus*
Egg-adult period (days)	18	21.13 (20.24)	17	17.29 (17-18)
Longevity (days)			5	54.60 (49-69)
Female	5	46.80 (23-68)	5	45.20 (37-66)
Male	5	37.20 (11-65)		
Fecundity (eggs/female)	5	22.40 (10-38)	5	39.80 (27-52)
Sex ratio (Female : Male)	112	1.24 : 1.00	232	1.00 : 5.63

*Figures in parenthesis indicate the range.

intervals atleast on 15th each month. The pupae collected were kept in conical flasks for daily observation on emergence of adult and parasitism/month was worked out. Percentage

TABLE 2

Parasitism and sex ratio of *Brachymeria nephantidis* and *B. lasus* during different months of the year, 1985-86.

Month	*No. of pupae obseved*	*Total parasitism (%)*	*Parasitism (%)*		*Sex ratio (Female : Male)*	
			B. nephantidis	*B. lasus*	*B. nephantidis*	*B. lasus*
Sept. – October, 85	542	14.02 (76)*	1.47 (8)	12.55 (68)	1.67 : 1.00	1.00 : 2.16
November, 85	450	26.00 (117)	6.22 (28)	19.78 (89)	1.15 : 1.00	1.00 : 2.00
December, 85	777	4.76 (37)	3.49 (27)	1.27 (10)	1.86 : 1.00	1.00 : 1.00
January, 86	600	9.33 (56)	8.02 (49)	1.31 (7)	1.58 : 1.00	1.33 : 1.00
February, 86	35	20.00 (7)	20.00 (7)	0.00 (0)	2.50 : 1.00	0.00 : 0.00
March, 86	163	12.88 (21)	10.43 (17)	2.45 (4)	1.43 : 1.00	3.00 : 0.00
April, 86	33	12.12 (4)	12.12 (4)	0.00 (0)	0.00 : 0.00	0.00 : 0.00
May, 86	145	7.58 (11)	7.58 (11)	0.00 (0)	1.20 : 1.00	0.00 : 0.00
June, 86	94	0.00 (0)	0.00 (0)	0.00 (0)	0.00 : 0.00	0.00 : 0.00
July, 86	173	1.73 (3)	1.73 (3)	0.00 (0)	0.00 : 3.00	0.00 : 0.00
August, 86	30	0.00 (0)	0.00 (0)	0.00 (0)	0.00 : 0.00	0.00 : 0.00

Figures in parentheses indicate the actual number of pupae parasitised by individual species.

of total parasitisation by individual species of parasitoids were recorded every month of the year, 1985-96. Sex ratios of both parasitoids were also recorded monthly. Data collected are presented in Table 2.

1. Biology

(a) Egg-adult period

The duration of egg to adult emergence of *B. nephantidis* was on average 21.23 days, having range of 20-24 days while they were 17.29 days with a range of 17-18 days in case of *B. lasus*. Satpathy and Rao (1972) reported the development period of immature stages of *B. nephantidis* to be 16-18 days. The similar period in case of *B. lasus* was also reported by Joy and Joseph 1973.

(b) Fecundity

Fecundity of *B. nephantidis* was on an average 22.40 with a range of 10-38 and 27-52 with an average of 39.80 in case of *B. lasus*. Thus *B. lasus* had the higher fecundity than *B. nephantidis*. According to Satpathy and Rao (1972), *B. nephantidis* female laid 15-23 eggs during its life-span.

(c) Longevity

The females and males of *B. nephantidis* survived for 23-68 and 11-65 days with an average of 46.80 and 37.20 days, respectively, whereas in case of *B. lasus* females and males survived for 49-69 days and 37-66 days with an average of 54.60 and 45.20 days, respectively. Joy and Joseph (1973) reported the longevity of females and males of *B. nephantidis* to be 40- 80 and 25-60 days, respectively and 40-70 and 20-50 days, respectively in case of *B. nosatoi*.

(d) Sex ratio

The sex ratios of *B. nephantidis* and *B. lasus* was observed to be 1.24 females : 1 male and 1 female : 5.63 males, respectively when they were reared in laboratory. Under field conditions the females of *B. nephantidis* outnumbered males almost all the months of the year except April and July while in case of *B. lasus* males outnumbered females in September - October and November and onward females preponderated to males in the active months. Joy and Joseph (1973) reported that *B. nosatoi* females slightly outnumbered males (54 females : 49 males) in the field conditions.

2. Relative intensity of parasitism

Observations on the parasitism by *B. nephantidis* and *B. lasus* during different months of the year, 1985-86 are presented in Table 2. It is clear that parasitism by *B. lasus* dominated (12.55 – 19.79%) over *B. nephantidis* (1.47 – 6.22%) during the month of September to November and onward *B. nephantidis* was found dominant (2.32 - 20.00%) over *B. lasus* (1.27 - 2.45%). *B. lasus* disappeared in the months of April to August while the parasitism by *B. nephantidis* was observed in more or less of same intensity throughout the year.

Pillai and Nair (1981) reported that the aggregate parasitism of *Opisina* pupae at Kayangulam area was 51.73 per cent which included 29.60% by *B. nosatoi*, 13.90% by *B. nephantidis* and 0.62% by *B. lasus*. They also reported that *B. nephantidis* maintained a more or less steady population almost throughout the period.

The study concluded that *B. lasus* was found to be preponderated to *B. nephantidis* for short development period, higher fecundity and field activity. Joy *et al.*, (1978) reported also the shorter development period for *B. lasus* (10-17 days) as compared to *B. nephantidis* (13.-18 days).

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