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Research Note

Cotesia flavipes Cameron parasitizing *Chilo partellus* (Swinhoe): Host-age dependent parasitism, cocoon formation and sex ratio

SUMAN MANJOO and N. K. BAJPAI*

Department of Entomology, Rajasthan College of Agriculture (MPUAT), Udaipur

** Corresponding author E-mail:* nkbajpai69@gmail.com

ABSTRACT: Investigations on parasitization of different host ages (5 to 20 days old) of *Chilo partellus* larvae by *Cotesia flavipes* were carried in the laboratory conditions at 27±2°C and 75±5 per cent relative humidity. Higher parasitization and cocoon formation was recorded on the 17 and 20 day old larvae of *C. partellus* with 82.61 and 82.46 per cent parasitization and 43.09 and 42.70 cocoon formation, respectively while no parasitization and cocoon was recorded in 5 day old larvae. The 11 and 14 day old larvae were highly preferred recording significantly more female progeny and on par with 17 and 20 days old larvae.

KEY WORDS: *Cotesia flavipes*, host age, *Chilo partellus*, parasitism, cocoon formation, sex ratio

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Cotesia flavipes Cameron (Hymenoptera: Braconidae) is an important gregarious endo larval parasitoid of graminaceous stemborers. It is found in nature during *kharif* season throughout the country and proven as a dominant larval parasitoid of *Chilo partellus* by reducing the population up to 32-55 per cent (Divyal *et al.,* 2009; Padmaja and Prabhakar, 2004). It prefers the larvae of specific age for parasitization resulting in more offspring. Various researchers have reported the effect of host age larvae on parasitism, but, no systematic study has been conducted. Therefore, it was planned to investigate the effect of larval age of *C. partellus* on parasitism, cocoon formation and sex ratio of *C. flavipes*.

For the present investigation, the nucleus culture of *C. flavipes* was collected from parasitized larvae of *C. partellus* from maize fields. These larvae were reared on split maize stem till the formation of cocoon of *C. flavipes* (Overholt *et al*., 1994). The cocoons were collected and kept in test tube for adult emergence. The culture was maintained in controlled condition at 27±2°C temperature and 75±5 per cent relative humidity. Five larvae of *C. partellus* of different age i.e. 5, 8, 11, 14, 17 and 20 days were isolated and kept inside the glass tube 15 × 25 cm and one mated female *C. flavipes* was released inside the glass tube for 24 hrs along with 20 per cent sugar solution. Thus, for each larval age group eighty larvae were exposed to the females of *C. flavipes*. After 24 hrs of exposure larvae were collected back and reared on split maize stem inside the BOD maintained at 27±2°C and 75±5 per cent RH for further multiplication. The observations on per cent parasitization, number of cocoons formed per larvae and sex ratio (female to male) were counted and analyzed through completely randomized design.

The data observed on per cent parasitization (Table 1) showed that preference of 17 and 20 days old larvae of *C. partellus* was maximum with highest parasitization, 82.61 and 82.46 per cent respectively, followed by 72.82, 45.41 and 34.79 per cent in 14, 11 and 8 days old larvae respectively. It is also evident from the Table 1 that no parasitization was observed in 5 days old larvae of *C. partellus*. The parasitization increased from 34.79 to 82.61 per cent with the increase in the age of larvae. Most of the treatments differ significantly to each other while T_5 (17 days old larvae) and T_6 (20 days old larvae) were found statistically at par. Our investigation corroborates with the report of many workers among them Shi *et al.* (2002) observed that *C. plutellae* could parasitize larvae of all four instars of *Plutella xylostella*, but preferred 2nd and 3rd instars. Similarly, Shekharappa and Kulkarni (2003) observed that third instar larvae of *C. partellus* were most suitable for parasitization by *C. flavipes*.

The data recorded on number of cocoons (Table 1) showed that 17 days old larvae of *C. partellus* yielded maximum number of cocoons (43.09 per larva), followed

Table 1. Preference of larval age by *Cotesia flavipes*

Age of the larvae (days)	Per cent parasitization	Number of cocoons per larvae	Female emerged (%)
5	0.00 (0.64)**	0.00 (0.71)*	0.00 (0.00)**
8	34.79 (35.76)**	12.50 (3.54)*	86.00 (68.02)**
11	45.41 (42.42)**	16.19 4.02)*	88.00 (69.73)**
14	72.82 (59.38)**	27.33 (5.22)*	88.00 (69.73)**
17	82.61 (66.56)**	43.09 (6.56)*	82.00** (64.89)
20	82.46 (65.33)**	42.70 (6.53)*	83.00 (65.65)**
SEm±	1.00	0.13	1.03
CD $P \leq 0.05$	2.10	0.27	2.07
CV %	3.17	4.01	2.33

* Figures in parentheses represent retransformed square root values

**Values in parentheses represent angular retransformed values.

by (20, 14, 11 and 8 days old larvae (42.70, 27.33, 16.19 and 12.5 cocoons per larvae respectively). It is also evident from the Table 1 that no cocoons were formed in 5 days old larvae of *C. partellus*. Most of the treatments differed significantly to each other while, T_5 (17 days old larvae) and T_6 (20 days old larvae) were found statistically at par. The increase in the number of cocoons after increased larval age would be due to the capacity of larvae to favour development of parasitoid. Various workers have reported the similar views. Campos Farinha and Chaud Netto (2000) observed that number of offspring of *C. flavipes* was greater when heavier larvae of *Diatraea saccharalis* Fab. were exposed. Jalali and Singh (2002) also found similar results and reported that 2nd to 6th instar of *C. partellus* were most preferred for parasitism by *C. flavipes.* Jiang *et al.* (2004) reported significantly more number of *C. flavipes* cocoon emerging from 4th instar larvae than 3rd instar larvae.

The data observed on per cent of females emerged from different aged larvae showed that all the treatments recorded maximum female emergence with 11 and 14 days old larvae yielded significantly more females (88%) and were at par with 8 days old larvae. It is also apparent from the table 1 that 17 and 20 days old larvae were at par yielding 82% and 83% females respectively. The effect of different size and age of host larvae on the sex ratio of emerged adult parasitoid have been reported by several researchers. They indicated that host age might be a primary factor in determining effectiveness of a parasitoid. In an investigation made by Campos Farinha and Chaud Netto (2000) the third to fifth instar *D. saccharalis* larvae individually exposed to *C. flavipes* influenced sex ratio which was biased towards females in all three instars. While Jalali and Singh (2002) reported positive relationship between age of larvae of *C. partellus* and per cent female progeny of *C. flavipes.* In contrast, Jiang *et al.* (2004) reported that there was no effect of host stage, *C. partellus*, on progeny sex ratio of *C. flavipes* but, might be a primary factor in determining effectiveness of a parasitoid.

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