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Research Note

Biology and feeding potential of *Sphaerophoria javana* Wied. (Diptera: Syrphidae) on the bean aphid, *Aphis craccivora* Koch

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ABSTRACT: **The biology and feeding potential of *Sphaerophoria javana* Wied. were studied in the laboratory at 27.9± 1.1° C and 85.7± 5.2 percent relative humidity, on *Aphis craccivora* Koch, a common pest of *Dolichos lablab* L. The egg, larval and pupal stages occupied 1.96± 0.07, 6.30±0.22 and 5.38±0.04 days, respectively. The total life cycle was completed in 14.02±0.2 days. The per day consumption of first, second and third instar larvae was 12.7±2.2, 69.4±7.4 and 112.2±7.7 aphids, respectively.**

KEY WORDS: *Aphis craccivora*, biology, feeding potential, *Sphaerophoria javana*

Sphaerophoria spp. larvae feed on a wide variety of aphid species, namely *Acyrthosiphon pisum* (Harris), *Aphis craccivora* Koch, *A. gossypii* Glover, *Brachycaudus helichrysi* (Kaltenbach), *Brevicoryne brassicae* (Linnaeus), *Liosomaphis himalayensis* Basu, *Lipaphis erysimi* (Kaltenbach), *Macrosiphum miscanthi* (Takahashi), *M. rosae* (Linnaeus), *M. rosaeiformis* Das, *Melanaphis sacchari* (Zehntner), *Mollitrichosiphum nandii* Basu, *Myzus persicae* (Sulzer) and *Uroleucon compositae* (Theobald) (Agarwala *et al.*, 1979, 1984; Ghorpade, 1981; Ghosh *et al.*, 1985; Jalali *et al.*, 2000). During a study on the population dynamics of *A. craccivora* on *Dolichos lablab* L., the larvae of *S. javana* Wied. were commonly found to occur among the aphid colonies. No information is available on the biology and feeding potential of this predator of *A. craccivora* in Orissa. Therefore, its biology and feeding potential were studied.

The biology of the syrphid was studied (n=10) at 27.9±1.1°C and 85.7±5.2 percent relative humidity. Freshly laid eggs were placed in Petri-dishes with dolichos leaves and the incubation period was recorded. After hatching, the larvae were reared individually on *A. craccivora* provided *ad libitum*. Moulting and successive developmental period of each instar of the larva and pupal period were noted. For studying the feeding potential, the newly hatched larvae (n=10) were fed with known number of aphids. Observations were made at 24h interval and the unfed aphids were removed. Fresh batch of aphids were offered to the larvae everyday until population. The data obtained were analysed satistically as per Snedecor and Cochran (1967).

The freshly laid eggs were white, elongate oval and without any processes on the sides. Average length and breadth of the eggs were 0.96

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Table 1. Size and duration of developmental stages and feeding potential of *S. Javana* on *A. craccicora*

Stages of *S. javana*	Length (mm)	Breadth (mm)	Developmental period (days)	No. of aphids consumed (Mean± SD)	No. of aphids consumed per day
Egg	0.96±0.05	0.27±0.02	1.96±0.07	–	–
Larva					
I instar	2.49±0.29	0.45±0.04	2.07±0.11	12.7±2.20	6.1±0.80
II instar	7.23±0.60	2.03±0.11	2.06±0.15	69.4±7.40	33.7±2.10
III instar	11.50±1.13	3.56±0.36	2.18±0.10	112.2±7.70	51.2±4.30
Total	–	–	6.30±0.22	193.3±10.30	30.7±1.80
Pupa	7.64±0.69	3.00±0.10	5.38±0.04	–	–
Total	–	–	14.02±0.20	–	–
Adult	11.05±0.33	13.63±0.46 *(Expanded wings)	–	–	–

± 0.05 and 0.27 ± 0.02mm, respectively. The egg assumed darker hue with a purplish tinge at the time of hatching. The average incubation period was 1.96 ± 0.07 days. There were three larval instars and each instar lasted for 2.07 ± 0.11, 2.06 ± 0.15 and 2.18 ± 0.1 days, respectively. The mean larval period was 6.3 ± 0.22 (6.0-6.33) days. Bhatia and Shaffi (1932) reported the larval period as 10-15 days during November-December, when the ambient temperature was 10°C. The size of the larva increased at successive instar. The pupa was 7.64± 0.69 mm long and 3±0.1mm broad. The average pupal period was 5.38± 0.04 days. According to Bhatia and Shaffi (1932) the size and duration of pupa were 5.1x2.1mm and 8-10 days, respectively. The mean duration of development was 14.02± 0.2 days. The adult was a long fly with a mean length of 11.05±0.33mm and breadth of 13.63±0.46mm when wings were fully expanded (Table 1).

The newly hatched larvae were legless, pale yellow with a slight greenish tinge equally broad in the posterior half and gradually taper towards the anterior end. The second instar larva became more yellow, the middle portion was bottle green with a reddish tinge in the fourth and fifth segments of its body. A pair of green median broad lines were observed, which enclosed the reddish coloured mid-dorsal blood vessel. The body shape of the third instar larva was uniformly broad posteriorly and narrowed very gradually towards the anterior end. Its colour was pea green. The pupa was fusiform in outline, being broad and round anteriorly and gradually tapering towards the posterior end. The male and female pupae were distinguished from their respective colouration (Bhatia and Shaffi, 1932). The description of the male and female adults exactly tallied with the description given by Brunetti. (1923).

During the development, first, second and third instar larvae consumed 9-16(12.7+2.2), 58-82(69.4±7.4) and 100-126 (112.2±7.7) aphids, respectively. The mean consumption was 193.3±10.3 (178-213) aphids per larva. The mean daily consumption at successive larval instars was 6.1± 0.8, 33.7 ± 2.1 and 51.2±4.3 aphids. On the day of emergence, the larva was observed to consume minimum aphids (3-5), whereas, maximum consumption occurred on 5th day (73-94 aphids).

Agarwala *et al.* (1979) observed that the *S. scripta* larva on its first day of emergence consumed 3-6 aphids (*Macrosiphum* spp.), while seven-day-old larva fed on a maximum of 54-56 aphids. They further reported that, a larva consumed about 321-419 aphids during its entire larval period. The difference in the feeding rate may be due to the difference in the predator and prey species and the climatic conditions.

The high voracity of syrphid larvae observed in the laboratory may not be achieved in the field (Chambers,1988). Therefore, further investigations are needed, particularly in this field, in order to measure the efficiency of syrphids as predator.

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