

## Biology of *Snellenius maculipennis* (Szepligeti) (Hymenoptera: Braconidae), a Larval Parasitoid of Castor Semilooper *Achaea janata* (Linnaeus) on Different Genotypes of Castor with Different Blooms

M. Eswar Naik\*, K.V. Hari Prasad, S.R. Koteswara Rao, V. Umamahesh and O. Anusha

Department of Entomology, S.V. Agricultural College, Tirupati-517502, Andhra Pradesh, India

\*Corresponding Author E-mail: m.esunaik@gmail.com

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### ABSTRACT

*Biology of Snellenius maculipennis* (Szepligete), a solitary endolarval parasitoid of castor semilooper *Achaea janata* (Linnaeus) were studied under the laboratory conditions at  $28 \pm 2^\circ\text{C}$  temperature and 75-80 per cent RH during kharif, 2017. Biology of *S. maculipennis* were studied on six varieties of castor with different blooms i.e., DPC-9 (Green zero), DCH-177 (Red single), PCH-111 (Green double), 48-1 (Red double), DCH-519 (Green triple), GCH-4 (Red triple). In our investigation, biological parameters of *S. maculipennis* such as egg+ larval, cocoon and adult duration ranged from 5.25 to 5.75, 4.50 to 4.75, 3.50 to 3.75, respectively, when reared on castor varieties with different blooms. The total life cycle duration of *S. maculipennis* was higher when reared on variety, GCH-4 ( $13.7 \pm 0.95$  days) and lowest durations of total life cycle were observed when reared on DPC-9 ( $13.2 \pm 0.50$  days).

**Keywords:** Biology, Castor semilooper, *Achaea janata*, Endolarval parasitoid, *Snellenius maculipennis*.

### INTRODUCTION

Castor semilooper, *Achaea janata* (Noctuidae: Lepidoptera) is one of the major defoliator of castor in India. It is the key pest of castor in the rainfed castor belts of India and is also known to occur regularly throughout the country wherever the crop is being grown. The yield reduction of castor crop due to semilooper attack is about 20 per cent (Gaikwad and Bilapate, 1992). It feeds on

tender capsules and causes yield loss ranging from 5 to 90 per cent depending upon larval density and crop stage (Prabhaker and Prasad, 2005).

In nature, it is regulated by larval parasitoid *Snellenius maculipennis* (= *Microplitis maculipennis* (Szépligeti) (Khan, 1946; Gaikwad and Bilapate, 1989; Somasekhar *et al.*, 1992).

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This paper presents detailed information on the biology of *Snellenius maculipennis* and its compatibility with castor varieties of different blooms with reference to its host, *A. janata*.

## MATERIALS AND METHODS

The nucleus culture of *S. maculipennis* was maintained in laboratory, at Insectary, Department of Entomology, S.V. Agricultural College, Tirupati. Initially the cocoons of parasitoids from infested larvae are collected from the crop cafeteria of dryland farm, RARS, Tirupati. These pupae were kept in petri plates of 9 cm. the parasitoids were reared in a rearing tray and culture was maintained throughout the experiment. 1<sup>st</sup> and 2<sup>nd</sup> instar larvae of semilooper were provided continuously to maintain the populations of parasitoid.

In addition to field collection of parasitoid cocoons, weekly samples of 1<sup>st</sup> and 2<sup>nd</sup> instar semilooper larvae were collected from plants and were reared in the laboratory to record parasitization due to *S. maculipennis*. Cocoons were separated from the host body and placed in glass tubes for emergence. Adult parasitoids were transferred to glass tubes. Fifty per cent honey solution was streaked on the inner walls of the tube as adult food. For three consecutive days, 10 semilooper larvae (1<sup>st</sup> and 2<sup>nd</sup> instar) were introduced into the tube for exposure to *S. maculipennis* adults for four to five days. Host larvae were then reared on fresh castor leaves till their death. Simultaneously healthy semilooper larvae of similar age but unexposed for parasitization were reared for comparison.

Biology of *S. maculipennis* were studied under laboratory conditions at 28 ± 2°C temperature and 75-80 per cent RH. The 1<sup>st</sup> and 2<sup>nd</sup> instar larvae of *A. janata* larvae will be provided in each respective variety. A total of four replications of each castor variety with different blooms were maintained. Adults of parasitoid (both male and female) were released in each respective variety and allowed

to parasitization. Fifty per cent honey solution will be provided as food for parasitoid adults. After parasitization the larvae of *A. janata* were collected and biology of *S. maculipennis* on *A. janata* in terms of egg+larvae, cocoon, adult and total life cycle durations were studied.

## RESULTS AND DISCUSSIONS

### Biology

#### Duration of egg+larva of *S. maculipennis*

No significant differences were found with respect to egg and larval duration of *S. maculipennis* on *A. janata* larvae. Larval durations of parasitoid on *A. janata*, which is different varieties of castor are, DPC-9 (5.25±0.50 h), DCH-177 (5.25±0.50 h), PCH-111 (5.75±0.50 h), 48-1 (5.5±0.57 h), DCH-519 (5.25±0.50 h) and GCH-4 (5.5±0.57 h).

#### Duration of cocoon of *S. maculipennis*

No significant differences were observed in cocoon durations of *S. maculipennis* on *A. janata* larvae. The cocoon duration of parasitoid is, DPC-9 (4.50±0.57 h), DCH-177 (4.50±0.57 h), PCH-111 (4.50±0.57 h), 48-1 (4.50±0.57 h), DCH-519 (4.75±0.57 h) and GCH-4 (4.50±0.57 h).

#### Duration of adult parasitoid, *S. maculipennis*

No significant differences were observed in adult longevity of parasitoid. Highest durations were observed in varieties DCH-177, DCH-519 and GCH-4 is 3.75±0.50 h. Lowest durations were observed in varieties DPCC-9, PCH-111 and 48-1 is 3.50±0.50 h.

#### Duration of total life cycle of parasitoid, *S. maculipennis*

No significant differences were found with respect to total life cycle of parasitoid, *S. maculipennis*. The highest durations were found on varieties, PCH-111 (13.75±0.50 h), DCH-519 (13.75±0.50 h) and GCH-4 (13.75±0.95 h). lowest durations were found on DPC-9 (13.25±0.50 h) followed by DCH-177 (13.50±1.00 h) and 48-1 (13.50±1.00 h).

**Talbe 1: Developmental periods of *Snellenius macculipennis* on *Achaea janata* which is reared on castor varieties with different blooms**

Genotypes ± SD	percent parasitization± SD	duration of egg+larva ± SD	duration of cocoon± SD	duration of adult± SD	total life cycle duration ± SD
<b>DPC-9</b>	50.71± 15.325	5.25± 0.500	4.50 ± 0.577	3.50± 0.577	13.25± 0.500
<b>DCH-177</b>	63.33± 31.972	5.25± 0.500	4.50 ± 0.577	3.75± 0.500	13.50± 1.00
<b>PCH-111</b>	67.56± 7.738	5.75± 0.500	4.50 ± 0.577	3.50± 0.577	13.75± 0.500
<b>48-1</b>	61.25± 10.308	5.5± 0.577	4.50 ± 0.577	3.50± 0.577	13.50± 1.00
<b>DCH-519</b>	61.25± 10.308	5.25± 0.500	4.75 ± 0.500	3.75± 0.500	13.75± 0.500
<b>GCH-4</b>	60.42± 12.500	5.5± 0.577	4.50 ± 0.577	3.75± 0.500	13.75± 0.957

- Values followed by same letter are not significantly different at 0.05 level as per LSD
- Values in the parenthesis are angular transformed value

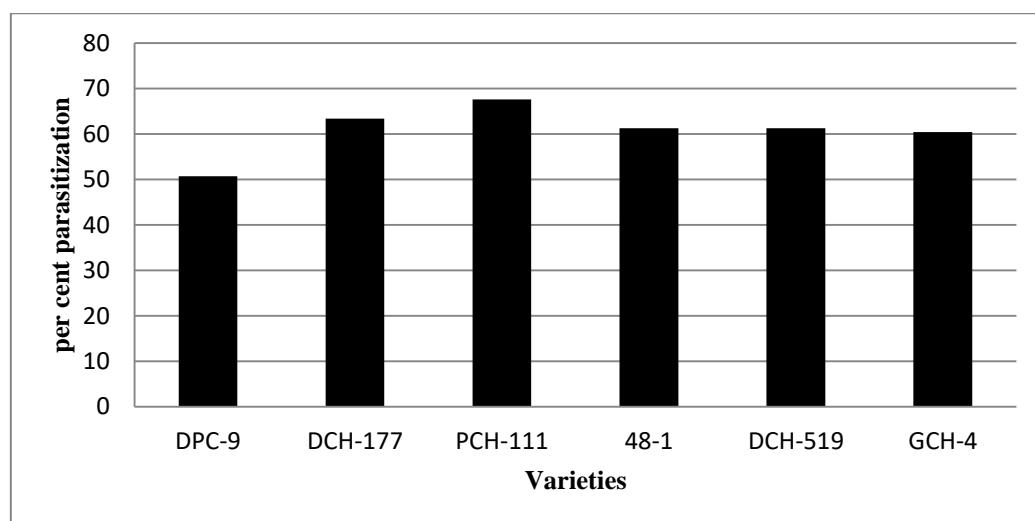
### Percent parasitization of *S. macculipennis* on *A. janata* larvae

No significant differences were observed in Percent parasitization of *S. macculipennis* on *A. janata* larvae which is reared on castor varieties with different blooms. Highest values of percent parasitization were recorded on PCH-111 (67.56±7.73 %) followed by DCH-177 (63.33±31.97), 48-1 (61.25±10.38), DCH-519 (61.25±10.30) and GCH-4(60.42±12.50). Lowest values were recorded on DPC-9 (50.71±15.32).

In our investigation biology of *S. macculipennis* ranged from 13.25 to 13.75 days, when reared on castor varieties with different blooms. Our results supported by Prabhakar and prasad (2005), who reported the egg+ larval, cocoon, adult and total life cycle duration as 6.25±0.96, 5.08±0.90, 3.5±1.2 and

14.83±2.88 days, respectively. Khan (1946) reported that the life cycle of *M. macculipennis* lasted 7 days, while Husain (1972) observed that it was 12-16 days.

In our investigation percent parasitization of *A. janata* larvae by *Snellenius macculipennis* on different castor varieties with different blooms ranging from 50.67 to 67.56 per cent. No significant differences were observed in percent parasitization. Our results supported by Satyanarayana (2004), who reported the parasitization of *Helocoverpa armigera* egg by *Trichogramma* species. His results revealed that highest per cent parasitization of 55.40 and 52.10 observed on cultivar of *Gossypium herbaceum* (Jayadhar) and *G. barbadense* (B-82-17), respectively by *T. chilonis*, which were having relatively lowest pubescence on plant surface.



**Figure 1. Per cent parasitization of *Snellenius macculipennis***

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