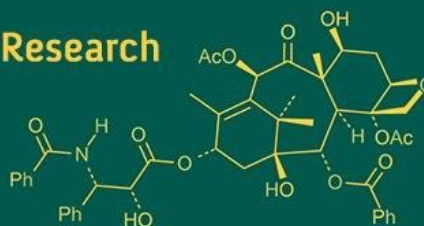


International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
ISSN Online: 2617-4707
IJABR 2024; SP-8(11): 171-172
www.biochemjournal.com
Received: 16-08-2024
Accepted: 23-09-2024

Nag Ambika
Msc Final Year, Department of
Entomology, College of
Agriculture, I.G.K.V, Raipur,
Chhattisgarh, India

Dev Narayan
Ph.D. Final Year, Department
of Agronomy, College of
Agriculture, I.G.K.V, Raipur,
Chhattisgarh, India

Beerendra
Ph.D. Final Year, Department
of Entomology, College of
Agriculture, I.G.K.V, Raipur,
Chhattisgarh, India

Ganguli Jaya Laxmi
Professor, Department of
Entomology, College of
Agriculture, I.G.K.V, Raipur,
Chhattisgarh, India

Feeding capacity of *Menochilus sexmaculata* (Fabricius) (Coleoptera: Coccinellidae) on guava aphid, *A. punicae* Passerini

Nag Ambika, Dev Narayan, Beerendra and Ganguli Jaya Laxmi

DOI: <https://doi.org/10.33545/26174693.2024.v8.i11Sc.2856>

Abstract

The present laboratory experiment was conducted to estimate the feeding capacity of the coccinellid, *M. sexmaculata* on guava aphid, *Aphis punicae* under laboratory conditions. Results revealed that the feeding capacity increased consequently from 1st, 2nd, 3rd and 4th instars by consuming an average number of 13.13, 25.00, 42.25, 58.38 *A. punicae* respectively and maximum number of aphid consumption was by adult female 90.69 aphids. Thus, Adult female beetles showed better predation than grub and devoured maximum number of *A. punicae*.

Keywords: *Menochilus sexmaculatus*, feeding capacity, *Aphis punicae*

Introduction

Aphid are small, minute soft bodied sucking pests and approximately 4000 species of aphids have been observed so far feeding over 250 agricultural and horticultural crops. Aphids cause damage directly by sucking plant juices and secrete honey dew on the leaves and shoots, and indirectly as vector of plant viruses (Raboudi *et al.*, 2002) [1]. Predatory coccinellids play a very important role for control sucking pests. They are sap-sucking insects with piercing-sucking mouthparts, having a needle-like stylet that allows the aphid to access and feed on the contents of plant cells causing significant loss of plant's phloem sap, which is essential for plant growth (Dixon, 1998) [2].

Among the predatory Coccinellidae, *Menochilus sexmaculata* (Fabricius), is one of the potential predators of aphids and is widely distributed in India, Iran, Australia and other parts of the Oriental region (Agarwala and Bardhanroy, 1997) [3]. The lady bird beetle *M. sexmaculata* is one of the most common predators of sucking and soft bodied insects. All stages of *M. sexmaculata* eat soft bodied insects such as aphids and mealybugs. The prey are mostly from the order Hemiptera and are predominantly aphids on low growing vegetation. The important features of *M. sexmaculata* includes its wide geographic distribution and host range, broad habitats, tolerance to certain pesticides, enhanced searching ability, voracious larval feeding capacity and easy rearing in laboratory (Venkatesan *et al.*) [4], and has been used in the biological control of insect pest on crops. They are of great economic importance as predators both in their larval and adult stages on various important crop pests such as aphids, coccids and other soft bodied insects (Hippa *et al.*, 1978; Kring *et al.*, 1985) [5]. The present study was undertaken to determine the predatory efficiency in terms of feeding capacity of grubs and adults of *M. sexmaculata* on host guava aphid, *Aphis punicae*

Materials and Methods

For testing the feeding capacity of *M. sexmaculata* at different larval stages, adult male and female beetles and guava aphids, were collected from the field and brought into the Biocontrol laboratory, collage of Agriculture, IGKV, Raipur, (C.G).

Newly hatched (neonate) grubs of *M. sexmaculata* was separated and kept in different petridishes and provided with fresh guava aphids, *A. punicae* separately daily. Initially ten aphids was provided to each larval instar (grub) ie; 1st, 2nd, 3rd, and 4th, separately replicated four times and the number of aphids provided as food was increased accordingly. Daily record on the number of aphids consumed was maintained separately till the survival of the

Corresponding Author:
Nag Ambika
Msc Final Year, Department of
Entomology, College of
Agriculture, I.G.K.V, Raipur,
Chhattisgarh, India

adult male and female beetles and then computed for the total number of aphids consumed throughout its larval period. The change in larval instar was confirmed by checking the shed head capsule. The number of aphids fed at each instar was recorded daily and the experiment was continued until death of the beetle.

Results and Discussion

The predatory capacity in terms of feeding capacity of the grub was determined by counting total number of aphids consumed by each larval instar. The data presented in the Table 1 depicts that the rate of consumption increased gradually from the first to fourth instar. Consumption of first instar 13.13 ± 3.76 aphids/day, while predation in 2nd instar grub was of 25.00 ± 5.09 aphids. Third instar grub showed better predatory activity than first two instars and the fourth and final instar grubs were very active until pupal transformation. They required more food than the previous instar due to bigger size, growth, longer duration and to

accumulate nutrient for pupal period. In the 3rd instar, the mean consumption was estimated to be 42.25 ± 6.57 aphids/day. During 4th instar, they devoured a maximum number of 58.38 ± 7.71 aphids/day. The result obtained is also in accordance with they also recorded the feeding potential of *Lipaphis erysimi* as 26.82 ± 0.59 and 47.13 ± 1.75 aphids/days in grub and adult. Duration of all the four instars were found to be of one day in the present studies. Thus the studies conducted on the feeding potential of Coccinellid predator, *M. sexmaculatus* on guava aphid, *A. punicae* revealed that the mean maximum number of aphids consumed increased from 1st to 4th instar with maximum number of aphids were consumed by adult female i.e., 90.69 ± 9.58 /day. Feeding potential of *M. sexmaculatus* grubs increased consequently from 1st, 2nd, 3rd and 4th instar by consuming an average number of 13.13 ± 3.76 , 25.00 ± 5.09 , 42.25 ± 6.57 and 58.38 ± 7.71 aphids/day respectively.

Table 1: Feeding capacity of *M. sexmaculatus* on guava aphid (*Aphis punicae*)

S. No	Host	Mean number of host consumed by different life stages of <i>M. sexmaculatus</i> grubs and adult on aphid species					
		1 st instar	2 nd instar	3 rd instar	4 th instar	Male	Female
	<i>Aphis punicae</i>	13.13 (3.76)	25.00 (5.09)	42.25 (6.57)	58.38 (7.71)	54.67 (7.46)	90.69 (9.58)

*Figures in parentheses are square root transformation values.

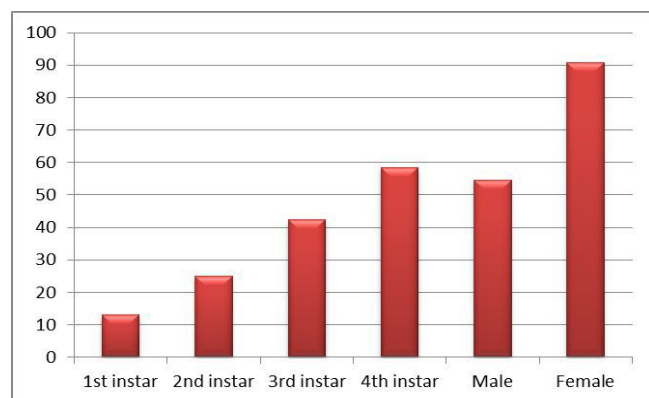


Fig 1: Graph showing feeding efficiency of *M. sexmaculatus* on *A. punicae*

Conclusion

The study on the predatory capacity of *Menochilus sexmaculatus* grubs on *Aphis punicae* revealed a significant increase in feeding potential across the four larval instars. The results showed that as the larvae progressed from the first to fourth instar, their aphid consumption rose substantially due to their increasing size and energy requirements. The first instar consumed 13.13 aphids/day, while the fourth instar devoured 58.38 aphids/day. Adult females displayed the highest predatory capacity, consuming 90.69 aphids/day. These findings underscore the importance of *M. sexmaculatus* as an effective biological control agent against aphids.

Acknowledgement

The authors are thankful to Dr. Sunil Joshi, scientist, NBAIR, Bangalore. For identifying the guava aphid as *Aphis punicae*.

References

1. Agarwala BK, Bardhanroy P. Oviposition behaviour and reproduction efficiency in ladybird beetles (Coccinellidae: Coleoptera): A case study of *Menochilus sexmaculatus* (Fabricius). Journal of Aphidology. 1997;11:49-59.
2. Dixon AFG. Aphid ecology: An optimization approach. London: Chapman & Hall; 1998.
3. Hippa H, Koponen S, Laine T. Feeding biology of *Coccinella hieroglyphica* L. (Coleoptera: Coccinellidae). Reports from the Kevo Subarctic Research Station. 1978;14:18-20.
4. Raboudi F, Ben Moussa A, Makni H, Marrakchi M, Makni M. Serological detection of plant viruses in their aphid vectors and host plants in Tunisia. EPPO Bulletin. 2002;32(3):495-498.
5. Venkatesan T, Jalali SK, Murthy KS, Bhaskaran T. Rearing of *Cheilomenes sexmaculata* (Fabricius) on artificial diet and its predatory efficiency against *Aphis craccivora* Koch. Annals of Plant Protection Sciences. 2006;14(2):277-279.