

## Influence of Different Hosts on the Adults of *Menochilus sexmaculatus* (Fabr.) (Coleoptera : Coccinellidae)

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### ABSTRACT

Adults of *Menochilus sexmaculatus* (F.) were fed on several hosts and their effect on the longevity, fecundity and egg size of the predator was studied. Longevity of adult *M. sexmaculatus* fed on mealy bugs ranged from 22.71 to 40.14 days in males and from 26.14 to 42.71 days in females. In case of those fed on *S. litura* and *C. cephalonica*, the period ranged from 2.57 to 3.86 days in both sexes. On an average, 85.71, 22.85, 9.85 and 725.14 eggs were laid by a female when they were fed on *Ferrisia virgata*, *F. virgata* + *Planococcus pacificus*, *P. pacificus* and control (aphids), respectively. Little influence was found on egg size due to feeding on different hosts. Also percentage of egg hatching ranged from 84.22 to 93.65 as against 100 in control.

KEY WORDS : *Menochilus sexmaculatus*, host influence, *Ferrisia virgata*, *Planococcus pacificus*, multiplication

The coccinellid, *Menochilus sexmaculatus* (F.) is a common and widely distributed aphid-predator in India. It is known to prey on about 39 arthropod species viz., 24 aphids and 15 non-aphid preys comprising an aleurodid, a crambid, a delphacid, a fulgorid, a pyralid, a noctuid, 3 psyllids, 3 pseudococids, 2 mites and one unidentified spider. The predator has not been utilised extensively in release programmes against the aphids, probably due to lack of techniques of mass-multiplication on non-aphid preys. Rearing of aphids is laborious and difficult. In the light of earlier reports of successful oviposition of *M. sexmaculatus* on *Ferrisia virgata* (Cock.) (Gautam, 1988), studies were made on the effect of different non-aphid preys (hosts) in the laboratory.

### MATERIALS AND METHODS

Adults of *M. sexmaculatus* collected from the field were reared on *F. virgata* and *Planococcus pacificus* Cox which were mass-multiplied on sprouted potatoes placed in jars (20 x 15 cm) following the method developed by Gautam and Kataria (1986). Larvae of the predator were reared in individual glass tubes (10 x 2.5 cm) on the aphid, *Rhopalosiphum maidis* (Fitch), collected from the sorghum fields. Seven pairs of newly emerged adults of *M. sexmaculatus* were provided with non aphid preys *F. virgata*, *P. pacificus*, *F. virgata* + *P. pacificus* (1:1), eggs and neonate larvae of *Spodoptera litura* (Fabr.) and *Corcyra cephalonica* Stainton as food placed in separate jars. A sufficient food density (10 well infested potatoes with mealy bugs, 10-15 egg masses of *S. litura* and two ml eggs of *C. cephalonica*) was maintained ac-

ordingly in each treatment and compared with control in which 2-3 g of mixed population of *Aphis gossypii* (Glover), *A. craccivora* Koch, *Lipaphis erysimi* (Kalt.), *Myzus persicae* Sulz. and *R. maidis*, were provided on the basis of their availability in nature. A cotton ball soaked with glucose (10%) was hung inside each jar except in control and was changed once in two days. In experiments comprising *S. litura* and *C. cephalonica* papers folded lengthwise were also kept in order to provide habitat to the predator for hiding, resting and oviposition. Observations on longevity, fecundity, size of eggs and hatching were recorded. The number of eggs laid on different substrates like potato, plant leaves, cotton and jar surface were counted daily throughout the life of each female. Egg masses laid on potato during the first week of oviposition were peeled off with the help of a sharp blade and kept for further development in 6 replications. Percentage of hatching was computed on the basis of number of eggs hatched from each egg masses. The experiment was conducted at  $27 \pm 1.5^{\circ}\text{C}$  and  $60 \pm 5$  per cent relative humidity. For measurements, 20 eggs in each treatment were taken and the length and width were measured with the help of an ocular micrometer fitted in the stereoscopic binocular microscope.

### RESULTS AND DISCUSSION

Adults of *M. sexmaculatus* voraciously preyed on *F. virgata* which conforms to the findings of Rawat and Modi (1969), Lapis (1970) and Gautam (1988). The mealy bug *P. pacificus* was also preyed well by the predator in captivity. This predator was earlier known to prey occasionally on other mealy

Table 1. Influence of different hosts on *M. sexmaculatus*

Host	Adult longevity (days)		Fecundity (eggs/female)	Size of egg (mm)		Hatching (%)
	Male	Female		Length	Breadth	
<i>F. virgata</i>	40.14 <sup>b</sup>	42.71 <sup>b</sup>	85.71 <sup>b</sup>	1.03	0.57 <sup>a</sup>	90.12
<i>P. pacificus</i>	22.71 <sup>b</sup>	26.14 <sup>bc</sup>	9.85 <sup>c</sup>	1.05	0.54 <sup>b</sup>	84.22
<i>F. virgata</i> + <i>P. pacificus</i>	25.14 <sup>b</sup>	41.86 <sup>b</sup>	22.85 <sup>c</sup>	1.06	0.55 <sup>b</sup>	93.65
<i>C. cephalonica</i>	2.57 <sup>b</sup>	2.57 <sup>c</sup>	0.00 <sup>c</sup>	-	-	-
<i>S. litura</i>	2.71 <sup>b</sup>	3.86 <sup>c</sup>	0.00 <sup>c</sup>	-	-	-
Aphids	67.57 <sup>a</sup>	74.86 <sup>a</sup>	725.14 <sup>a</sup>	1.18	0.68 <sup>a</sup>	100.00

In vertical columns, means followed by similar letters are not different statistically ( $p=0.05$ ) by L.S.D.

bugs viz., *Pseudococcus* spp. and *Pulvinaria* spp. (Puttarudriah and Channabasavanna, 1953). Occasional feeding on the noctuid *S. litura* and pyralid, *C. cephalonica* in captivity was also noticed. Bhatnagar and Davies (1978) also made similar observations and reported further that *M. sexmaculatus* also preyed on *Heliothis armigera* (Hb.). Thus *P. pacificus*, and *C. cephalonica* are reported as new hosts of *M. sexmaculatus*.

Longevity of males fed on *F. virgata*, *P. pacificus* and *F. virgata* + *P. pacificus* was found to be on par and ranged between 22.71 to 40.14 days. Similar trend was observed in females. In general, females survived longer (2.57 - 74.86 days) on different hosts including aphids (control) than males (2.57 - 67.57 days) (Table 1). This is in agreement with the earlier report of Saharia (1980). Lower range of longevity in both sexes was noticed on *C. cephalonica* and during this period there was no egg laying. Fecundity was very low when fed on mealy bugs ranging from 9.85 - 85.71 as against 725.14 eggs per female in control (mixed population of aphids). A wide variation in fecundity of *M. sexmaculatus* due to feeding on different hosts was reported by various workers : 96 eggs/female on *A. nerri* from India (Chaudhary *et al.*, 1983), 344.4 eggs/female on *M. persicae* from Bangladesh (Haque and Islam, 1982), 779.8 eggs/female on *Schizaphis graminum* from United States of America (Campbell *et al.*, 1980) and 1962.8 eggs/female on *Melanaspis sacchari* from Taiwan (Chu and Hsueh, 1976).

Length of the eggs was not changed due to feeding on different hosts while breadth differed statistically, though it was on par in experiments with *F.*

*virgata* and aphids. The size of the eggs varied between 1.03 - 1.18 mm in length and 0.54 - 0.68 mm in breadth due to feeding on different hosts. Similarly, egg-hatching was also not much influenced due to the effect of food and was found to be statistically non-significant. When fed on mealy bugs, it ranged from 84.22 - 93.65 per cent as against 100 per cent on aphids (Table 1). Overall hatching was better in the present studies than that of by Haque and Islam (1982) from Bangladesh in which feeding of *M. sexmaculatus* on *A. craccivora*, *A. gossypii* and *M. persicae*, resulted in 65.27 - 80.85 per cent hatching. These differences may probably be due to differences in the age of the predator and rearing conditions. The above results suggest that mass-multiplication of *M. sexmaculatus* on *F. virgata* (or any other non-aphid host) may be possible.

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#### REFERENCES

- BHATNAGAR, V.S. and DAVIES, J.C. 1978. Factors affecting the population of gram pod borer, *Heliothis armigera* (Hubner) (Lepidoptera, Noctuidae) in the period 1974-77 at Patancheru (Andhra Pradesh). Paper presented at the Oriental Entomology Workshop on Population Ecology in Relation to insects of Economic Importance, 18-20 Jan, 1978, Bangalore.
- CAMPBELL, R.K., FARRIS, T.N., PERRING, T.M., LEONARD, M.E. Cartwright, B.O. and Eikenbary, R.D. 1980. Biological observations on *Melanaspis sexmaculatus*, reared on *Schizaphis graminum*. *Ann. Ent. Soc. Am.*, 73, 153-157.

- CHAUDHARY, D., DAVID, B.A. and SINGH, D.R. 1983. Studies on the host preference of *Chilomenes sexmaculatus* (Fabr.) (Coleoptera : Coccinellidae) on the different aphid hosts. *Comp. Physiol. Ecol.*, **8**, 289-290.
- CHU, Y.I. and HSUEH, T.F. 1976. The rearing of two aphidophagous Coccinellid beetles, *Lemnia swinhoei* (Crotch) and *Menochilus sexmaculatus* (Fabricius) on substituted diets. *Pl. Prot. Bull. Taiwan*, **18**, 58-74.
- GAUTAM, R.D. 1988. Possible utilization of predators in biocontrol of the white tailed mealybugs, *Ferrisia virgata* (Cockerell) (Pseudococcidae : Homoptera). *Proc. National Symposium on Integrated Pest Control - Progress and perspectives*, 15-17 October, 1987, Trivandrum. pp. 196-199.
- GAUTAM, R.D. and KATARIA, B.S. 1986. Feasibility of mass-multiplication of white tailed mealy bug, *Ferrisia virgata* (Cockerell) (Pseudococcidae: Homoptera), and its parasitoid-predator complex together with bibliography. *J. Ent. Res.*, **10**, 1-18.
- HAQUE, M.E. and ISLAM, M.A. 1982. Effects of three species of aphids as food on the fecundity of lady bird beetle. *Bangladesh J. Agric.*, **3**, 373-376.
- LAPIS, E.B. 1970. The biology of the grey mealy bug, *Ferrisia virgata* (Cockerell) (Pseudococcidae, Homoptera). *Phillipp. Entomologist*, **1**, 397-405.
- PUTTARUDRIAH, M. and CHANNABASAVANNA, G.P. 1953. Beneficial coccinellids of Mysore-I. *Indian J. Ent.*, **15**, 87-96.
- RAWAT, R.R. and MODI, B.N. 1968. A report of natural enemies of *Ferrisia virgata* Ckll. in Madhya Pradesh (India). *Mysore J. Agric. Sci.*, **2**, 51-53.
- SAHARIA, D. 1980. Some aspects of biology of Coccinellid predators associated with *Aphis craccivora* Koch. on cowpea. *J. Res. Assam Agric. Univ.*, **1**, 82-89.