

Effect of Substrata and Age of *Menochilus sexmaculata* (Fabr.) (Coleoptera : Coccinellidae) on its Oviposition

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ABSTRACT

Adults of *Menochilus sexmaculata* (Fabr.) reared on the striped mealybug, *Ferrisia virgata* (Cockerell) showed no particular preference to different substrata viz., jar surface, tissue paper or potato as indicated by the percentage of egg-laying which was 36.51, 36.23 and 29.10, respectively. However, when fed on aphids [*Lipaphis erysimi* (Kalt.) and *Aphis gossypii* Glover] it preferred to lay maximum eggs (71.75%) on cotton twigs. Rearing of *M. sexmaculata* either on mealybug using tissue paper or aphids with cotton twigs as substrata upto 4th week (Productive age) may be adopted as 73.44-81.47% eggs with 91.35-100.00% hatching are obtained in this period. Thereafter, adults may be discarded in order to save laboratory host.

Key Words : *Menochilus sexmaculata*, *Ferrisia virgata*, substrata, age effect on oviposition, multiplication

The value of the coccinellid predator, *Menochilus sexmaculata* (Fabr.) in the biological control of aphids is enhanced by the fact that both adults and grubs possess predaceous habits. In order to obtain more number of fertile eggs of the predator during its productive age as well as saving its laboratory host from voracious feeding at unproductive / under productive stage, studies on effect of substrata and age of *M. sexmaculata* on its oviposition were carried out.

MATERIALS AND METHODS

The culture of the striped mealy bug, *F. virgata* was maintained on sprouted potatoes (*Solanum tuberosum* L.) as described by Gautam and Kataria (1986). The aphid, *Aphis craccivora* Koch was multiplied on sprouts of cowpea [*Vigna unguiculata* (L.)] in the laboratory. Cowpea seeds were cleaned and washed in water before soaking. After 24 h, seeds (100) showing initiation of sprouts were gently spread over the soaked cotton (absorbant), placed inside a paired petri dish (9 cm dia.). Twenty five ml of water was used to submerge 2 g of cotton wool and hundred healthy and full grown adults of *A. craccivora*

were inoculated on the sprouts kept inside the petri dish. The lid was removed on the 3rd day and the petri plates having the germinated cowpea alongwith developing aphid colony were shifted to glass jars (20 x 15 cm). The jars were covered with moist muslin cloth in order to avoid escape of aphids and minimize interference of light. As many as 3100-6580 aphids per petri dish were obtained on the 7th day in a chamber with 4 tubelights (40 watt) maintained at $25 \pm 2^\circ \text{C}$ and $50 \pm 10\%$ RH. *Aphis gossypii* Glover, *Lipaphis erysimi* (Kalt.) and *Rhopalosiphum maidis* (Fitch) were collected from the fields of cotton (*Gossypium* species), mustard [*Brassica juncea* (L.)] and sorghum (*Sorghum bicolor* M.) respectively during October 1987-April, 1988. *M. sexmaculata* were reared on aphids and the adults were used for experimentation at $27 \pm 1.5^\circ \text{C}$ and $60 \pm 5\%$ R.H.

Oviposition preference of *M. sexmaculata* in relation to different substrata was studied by providing the mealybugs as well as aphids as prey in separate sets. In the first set, potato tubers infested with *F. virgata*, multifolded tissue paper, jar surface and markin cloth were considered as substrata for oviposition.

Medium sized potatoes (500 g) well infested with *F. virgata* @ 10 per jar (20 x 15 cm) were provided as prey for five pairs of newly emerged *M. sexmaculata*. Eggs laid on different substrata including inner surface of jar were separately counted daily starting from 3rd day onwards consecutively for 10 days. Similarly, in another set, five pairs of *M. sexmaculata* were released in a jar containing 2 g of aphids (*A. gossypii*, *L. erysimi*) along with mustard and cotton twigs, and tissue paper as egg-laying substrata. The experiment had 10 replications in each of the above two sets. The data were subjected to analysis of variance after suitable transformation.

With a view to studying the effect of age of *M. sexmaculata* on its oviposition, a newly emerged (0-24 h) pair of the predator was caged in individual plastic container (8.5 x 4.5 cm) having two treatments viz, *F. virgata* and aphids (*A. gossypii*, *A. craccivora*, *L. erysimi* and *R. maidis*) as prey. The beetles were also provided with glucose (10%) as food supplement. Besides, tissue paper and cotton twig were placed in the jar as egg-laying substrata for beetles caged on mealybugs and aphids, respectively. The experiment had 3

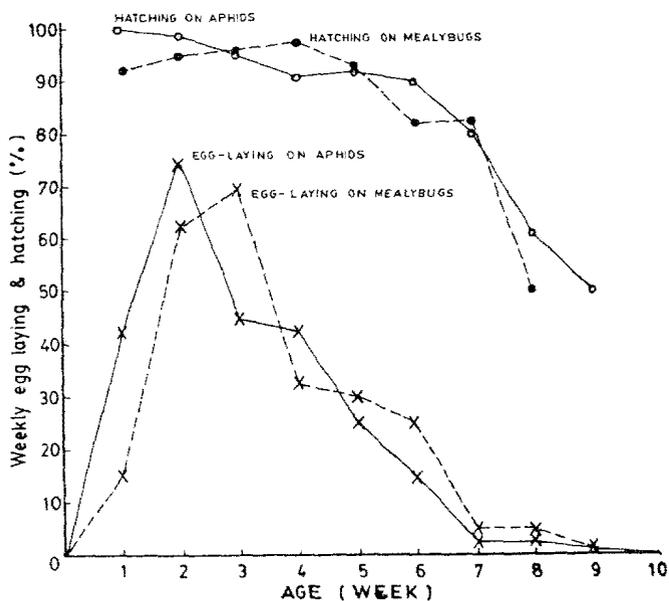


Fig. 1. Influence of age of *M. sexmaculata* on its oviposition

Table 1. Ovipositional preference of *M. sexmaculata* on different substrata

Substrata	Mealybug		Aphids	
	Oviposition preference (%)	Substrata	Oviposition preference (%)	Substrata
Potato tuber	29.10 ^b	Mustard twig	2.64 ^c	
Tissue paper	36.23 ^a	Cotton twig	71.75 ^a	
Jar surface	36.51 ^{ab}	Tissue paper	1.44 ^b	
Markin cloth	3.27 ^c	Jar surface	24.17 ^b	
		Markin Cloth	0.50 ^c	

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

replications. Size of egg mass (number of eggs/mass), egg-laying (%) and hatching (%) were recorded daily till the females survived. Weekly data on egg-laying as well as hatching were averaged and used for graphical representation.

RESULTS AND DISCUSSION

There was no significant differences in the ovipositional preference of *M. sexmaculata* on different substrata viz., potato, tissue paper and glass jar. The egg-laying ranged between 29.10- 36.51 per cent in these substrata as against 3.27 per cent on markin cloth. Beetles reared on aphids and provided with different substrata preferred to lay maximum eggs (71.75%) on cotton twigs as against scanty egg laying (0.50%) on markin cloth (Table 1).

Peak egg-laying of *M. sexmaculata* reared on *F. virgata* was observed in the second week and as much as 73.44 per cent eggs were laid by 4th week (productive age) as against 81.47 per cent on aphids. Beetles stopped laying eggs during the last week of their life on both the prey. Adults survived upto 9 and 10 weeks on mealybug and aphids, respectively. A regular decline in fecundity was observed irrespective of aphid and non-aphid prey (mealy bug) which

was also reported by Saha (1987). Percentage of egg-hatching ranged between 91.35-100.0 during the productive age of the predator irrespective of hosts and thereafter it declined to 50.0 per cent during the last week of oviposition (Fig.1). Successful laying and hatching of the eggs of *M. sexmaculata* reared on *F. virgata* has been reported earlier by Gautam (1988).

It is suggested that the coccinellid predators reared on *F. virgata* may be provided with a tissue paper having multifold while those reared on aphids with cotton twigs as substrata for oviposition. The beetles may be discarded after the 4th week as they become unproductive beyond this period.

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