

COMMUNICATION I

**Nutritional Requirements for Reproduction of *Micromus tasmaniae* Walker
(Neuroptera: Hemerobiidae)¹**

RINGKASAN

Satu percubaan di makmal telah di jalankan untuk mengetahui sama ada serangga betina atau jantan *Micromus tasmaniae* Walker memerlukan nutrien selain daripada gula untuk pengawanan dan pengalakan perkembangan telur-telur. Empat kategori diet telah di uji keatas serangga dewasa yang baharu menjelma. Perbezaan di antara rawatan-rawatan adalah berdasarkan sama ada serangga jantan atau betina atau kedua-dua jantina di sekat dari pada menerima mangsa yang hidup (*Myzus persicae*) sebelum mengawan. Kiraan bilangan telur setiap hari menunjukkan bahawa peneluran berlaku sekiranya serangga betina di beri makan kutu daun sebelum mengawan. Penyekatan serangga jantan daripada menerima kutu daun tidak mengubah kadar peneluran. Pemangsa dewasa adalah perlu di beri makan dengan kutu daun sebelum ia mula mengawan dalam pembelaan pemangsa di makmal.

SUMMARY

A laboratory experiment was conducted to determine whether it is males or females of *Micromus tasmaniae* Walker that require nutrients other than sugar to mate and promote egg development. Four categories of diets were tested on newly emerged adults. The treatments were differentiated based on whether or not male or female or both sexes were deprived of live prey (*Myzus persicae* Sulzer) before pairing. Egg counts indicated that oviposition occurred mainly when females had access to aphids prior to pairing. Depriving the males of aphids did not alter the incidence of oviposition. It is necessary to provide females with live aphids prior to mating to be able to rear them.

INTRODUCTION

Many species of insects feed on a mixed diet of plant and animal origins. With most insect parasitoids, the larva eats food of animal origin, but the adult, with a few exceptions, has no predatory habits. (House, 1977). The brown lacewings (Neuroptera: Hemerobiidae) are predaceous in both larval and adult stages (Tjeder, 1961; New, 1975; Syrett and Penman, 1981; Hussein, 1982). By contrast, adults of the green lacewings (Neuroptera: Chrysopidae) are not predaceous, but utilize yeasts and honeydew as a staple food (New, 1975). Hemerobiids are found in more diverse environments than chrysopids and are considered to be more important predators of some major insect pests of crop plants in Australia (Maelzer, 1977), in the United States (Neuenschwander *et al.*, 1975), in New Zealand (Syrett and Penman, 1981) and in Malaysia (Azhar, 1984).

In potato fields in South Australia, the brown lacewing *M. tasmaniae* is the most important insect predator of the green peach aphid, *M. persicae* (Hussein, 1982). A spray method

of mass releasing eggs of *M. tasmaniae* has been developed and tested in field plots (Hussein, 1983 and 1984). Mass culturing of *M. tasmaniae* was also developed; however, occasionally the insectary culture was hampered by poor oviposition. In order to understand more about the ovipositional behaviour of female *M. tasmaniae*, an experiment was conducted on nutritional requirements.

MATERIALS AND METHODS

M. tasmaniae collected from potato fields in Milang, South Australia, were cultured in an insectary at Waite Agric. Research Institute, South Australia. All of the developmental stages were reared at a constant temperature of $21 \pm 2^\circ\text{C}$ under LD 14:10 light:dark regime and $65 \pm 5\%$ relative humidity. After adult emergence each predator was placed in a clean ovipositional unit (Hussein, 1982), in which were two clean cotton rolls, one soaked in distilled water and the other in a 15% sucrose solution. The prey, *M. persicae*, reared on potato leaves, was supplied

¹Part of the author's Ph.D. thesis submitted to the University of Adelaide, South Australia.

daily to the predator in the combination of treatments given in Table 1.

All adult predators (three pairs representing 3 replicates) were fed on their respective diets for 5 days before pairing. Eight hours prior to pairing, aphids were removed thereby lessening the chance of sugar-fed adults receiving nutrients from the excrements or regurgitation of aphid-fed adults. Each pair was kept together for 5 days. During this time they had access to only sugar and water. On the sixth day and thereafter, a fresh supply of live aphids was supplied to all treatments. Eggs oviposited on the cloth of the oviposition units were counted daily. Egg counting was continued for eight days. Adult predators were transferred to a clean oviposition unit each day throughout the experiment.

RESULTS

Oviposition occurred mainly when females had access to aphids prior to pairing (Table 1). Each of these females oviposited within a few hours. Mating was observed in all replicates when females were fed on aphids previously but no mating was observed in the treatments where adults had no access to aphids prior to pairing.

However, depriving the males of prey did not alter the incidence of mating and oviposition as shown in treatment 2 (Table 1). Females in treatment 3 and 4 failed to oviposit any egg even when live prey were supplied to them from the sixth day onward.

DISCUSSION

The results are very close to those of Tauber and Tauber (1973) for *Chrysopa oculata* (Neuroptera:Chrysopidae) whereby oviposition only occurred if females were fed with live aphids as prey, prior to pairing with the males. Similarly, males instead of females of another chrysopid, *C. perla* require protein prior to mating (Phillipe, 1970 - as quoted by Tauber and Tauber (1973)). In this study, the difference in the total number of eggs laid by females of *M. tasmaniae* between treatment 1 and 2 was not significant (t test, $P > .05$). There seemed to be a decline in oviposition with time during the first 5 days after pairing, which was reversed when aphids were supplied. This would imply that additional nutrients were required for oviposition as well as for mating. Additions of aphids on the sixth day to treatments 2 and 3 did not stimulate mating in those treatments.

TABLE 1
Mean number of eggs per day per female of *M. tasmaniae*
when fed on four feeding regimes (treatments) from day 1 to 8
after pairing.

Treatment	Aphids given (+) or not given (-)	No. of pairs	Days after pairing								Total
			1	2	3	4	5	6	7	8	
1	♂ +	3	10.3	9.7	1.0	0	6.0	2.3	26.3	6.0	55.6
	♀ +										
2	♂ -	3	15.0	12.3	7.3	1.3	2.3	1.0	28.0	12.3	79.5
	♀ +										
3	♂ +	3	0	0.7	0.3	0	0	0	0	0	1.0
	♀ -										
4	♂ -	3	0	0.3	0	0	0	0	0	0	0.3
	♀ -										

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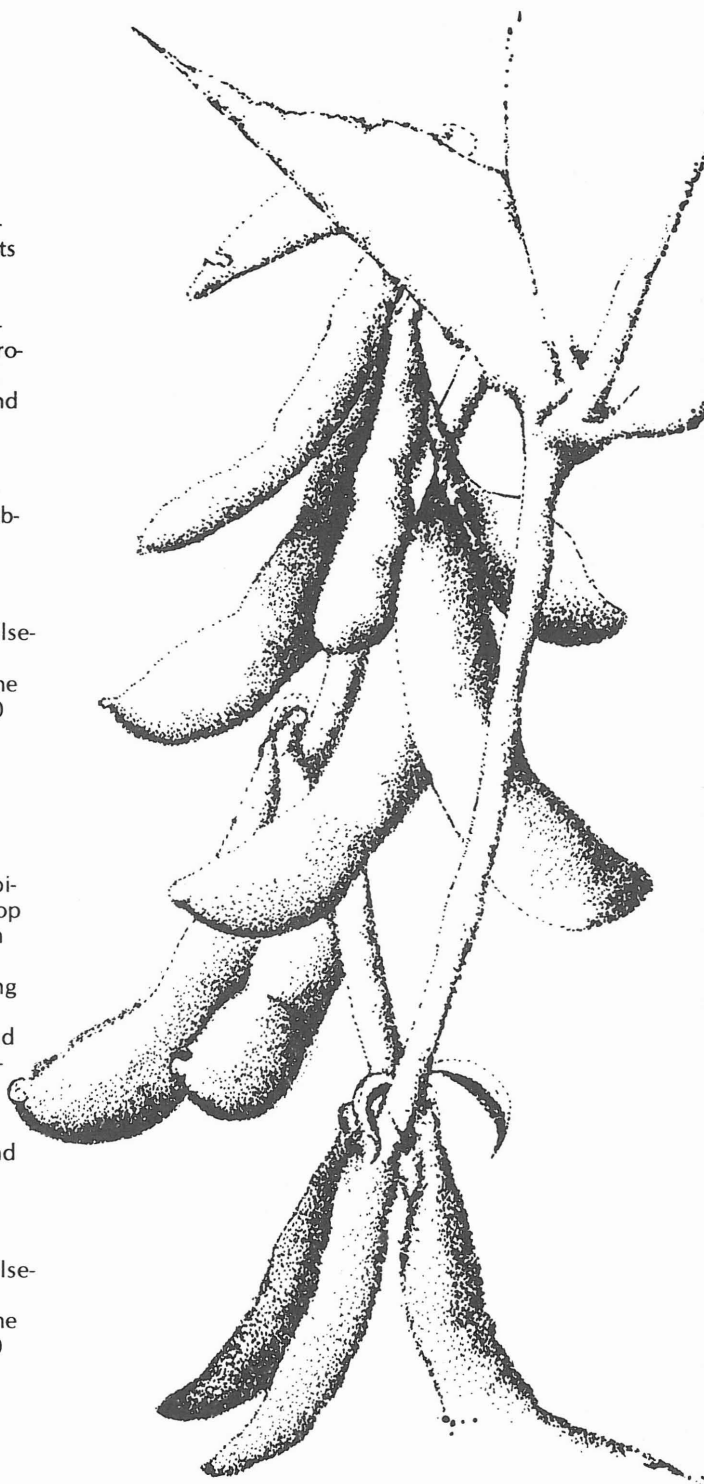
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It is concluded that *M. tasmaniae* females require protein from live aphid prey besides sugar to promote egg development. As such, in the mass rearing of *M. tasmaniae* and perhaps of other hemerobiids it should be ensured that live prey are supplied prior to mating.

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Mohd Yusof Hussein

*Plant Protection Department
Universiti Pertanian Malaysia
Serdang, Selangor, Malaysia.*

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