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EFFECT OF PREY SPECIES AND STAGES ON PREDATORY EFFICIENCY AND DEVELOPMENT OF THE STIGMAEID MITE, 
AGISTEMUS EXSERTUS

BY S. M. HAFEZ ¹, Aly H. RASMY ² and S. A. ELSAWY ³

ABSTRACT : The effect of the different stages of two tetranychid prey species on the predatory efficiency and biology of the stigmaeid mite, Agistemus exsertus Gonzalez was studied. It was found that feeding the predatory immatures on eggs of Tetranychus urticae (Koch) favoured faster development compared to feeding on eggs of T. cucurbitacearum (Sayed) although the eggs of the latter prey were more attractive to the predator. Also rearing the predatory mite on eggs of either tetranychid prey promoted faster development and a higher rate of oviposition than rearing on larvae or nymphs.

INTRODUCTION

Predacious mites of the family Stigmaeidae have a significant role in the biological control of phytophagous mites and scale insect in Egypt (ZAHER & ELBADRY, 1961; RASMY, 1975). It was reported by ELBADRY et al. (1969) that Agistemus exsertus Gonzalez was effective in destroying eggs and postembryonic stages of Tetranychus cinnabarinus (Bois.) and Eutetranychus orientalis (Klein).

The aim of the present work was to study the effect of prey stages and species, i.e. Tetranychus urticae (Koch) and T. cucurbitacearum (Sayed), on the biological activities of the stigmaeid mite, A. exsertus.

MATERIAL AND METHODS

Five groups, of 20 A. exsertus larvae each, were reared singly on five different foods: eggs, larvae or nymphs on T. urticae or on eggs or nymphs of T. cucurbitacearum. Larvae of the latter prey were not offered because rearing A. exsertus on

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larvae or nymphs of *T. urticae* produced no substantial differences in developmental periods or in ultimate egg production between predator groups (Table I). Prey-infested leaf discs of sweet potato, about four square centimeters in area, were used as a rearing platform for the predator. The discs were placed dorsal-side down on water saturated cotton in Petri dishes. The leaf discs were replaced daily with fresh ones having surplus of the prey stage investigated.

The development of predatory larvae to adulthood was observed daily and the consumed prey were determined. Virgin females of *A. exsertus* were coupled with unmated males within 24 hours after the last moult. Eggs oviposited during the 10 days following the preoviposition period were recorded.

**RESULTS AND DISCUSSION**

**EFFECT OF PREY STAGES**

Rearing *A. exsertus* on eggs of either tetranychid prey promoted significantly faster development, a higher oviposition rate and a shorter preoviposition than did rearing on prey larvae or nymphs (*P* < 0.05 F-test). Predators fed on larvae showed no differences in development or oviposition rate from those predators fed on nymphs, and the duration of sexes was similar in both groups (Table I).

**EFFECT OF PREY SPECIES**

Predatory adult and immature stages consumed a higher number of *T. cucurbitacearum* eggs than *T. urticae* eggs (Table II) and the differences were significant (*P* < 0.5). Although the eggs of *T. cucurbitacearum* were more attractive to the predator than eggs of *T. urticae*, the latter promoted faster development. Feeding the predator on eggs of either prey resulted in similar rate of oviposition (Table I).

<table>
<thead>
<tr>
<th>Average duration in days</th>
<th>No. eggs in 10 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larva</td>
<td>Proto- nym</td>
</tr>
<tr>
<td><em>T. urticae</em> eggs</td>
<td></td>
</tr>
<tr>
<td>♀ 2.2±0.1</td>
<td>2.1±0.1</td>
</tr>
<tr>
<td>♂ 2.1±0.1</td>
<td>2.1±0.1</td>
</tr>
<tr>
<td><em>T. urticae</em> larvae</td>
<td></td>
</tr>
<tr>
<td>♀ 4.0±0.3</td>
<td>2.4±0.1</td>
</tr>
<tr>
<td>♂ 3.4±0.3</td>
<td>2.6±0.2</td>
</tr>
<tr>
<td><em>T. urticae</em> nymphs</td>
<td></td>
</tr>
<tr>
<td>♀ 3.7±0.1</td>
<td>3.3±0.4</td>
</tr>
<tr>
<td>♂ 3.6±0.3</td>
<td>2.7±0.2</td>
</tr>
<tr>
<td><em>T. cucurbitacearum</em> eggs</td>
<td></td>
</tr>
<tr>
<td>♀ 2.6±0.1</td>
<td>1.9±0.1</td>
</tr>
<tr>
<td>♂ 2.7±0.2</td>
<td>2.7±0.8</td>
</tr>
<tr>
<td><em>T. cucurbitacearum</em> nymphs</td>
<td></td>
</tr>
<tr>
<td>♀ 2.6±0.2</td>
<td>3.4±0.3</td>
</tr>
<tr>
<td>♂ 2.6±0.1</td>
<td>2.4±0.4</td>
</tr>
</tbody>
</table>

**PREDATORY CONSUMPTION**

The nymphs of *A. exsertus* consumed higher numbers of larvae and nymphs of *T. urticae* than did predatory larvae. The rate of predation of either sex of the predator nymphs reared on eggs or nymphs of *T. cucurbitacearum* was higher than that of predatory larvae. Also, the rate of predation of the adults when fed on *T. cucurbitacearum* eggs was higher than that of the predatory nymphs or larvae (Table II).

However, developmental times of the predator were influenced by prey stages as well as by prey species. *A. exsertus* had a shorter developmental time, a shorter preoviposition period, and a higher rate of egg production when fed on prey eggs than when fed on prey larvae or nymphs.

The males of *A. exsertus* were found to develop into adults more quickly than the females when fed on prey larvae or nymphs, while feeding on prey eggs induced similar developmental periods for both sexes. A shorter developmental time for male *A. exsertus* also had been reported by ELBADRY et al. (1969) when the predator was reared on the postembryonic stages of *E. orientalis* and *T. cinnabarinus*. 
Feeding the predator on eggs of *T. urticae* favoured faster development than feeding on eggs of *T. cucurbitacearum*. However, feeding *A. exsertus* on nymphs of the latter prey promoted a shorter developmental time for the predator when compared with rearing on nymphs of *T. urticae*. A similar response was reported for the phytoseiid mites *Amblyseius gossypi* Elbadry and *Typhlodromus magniferus* sp. n. when fed on *T. urticae* and *T. cucurbitacearum* by Rasmy et al. (1982).

REFERENCES


*Paru en octobre 1983.*