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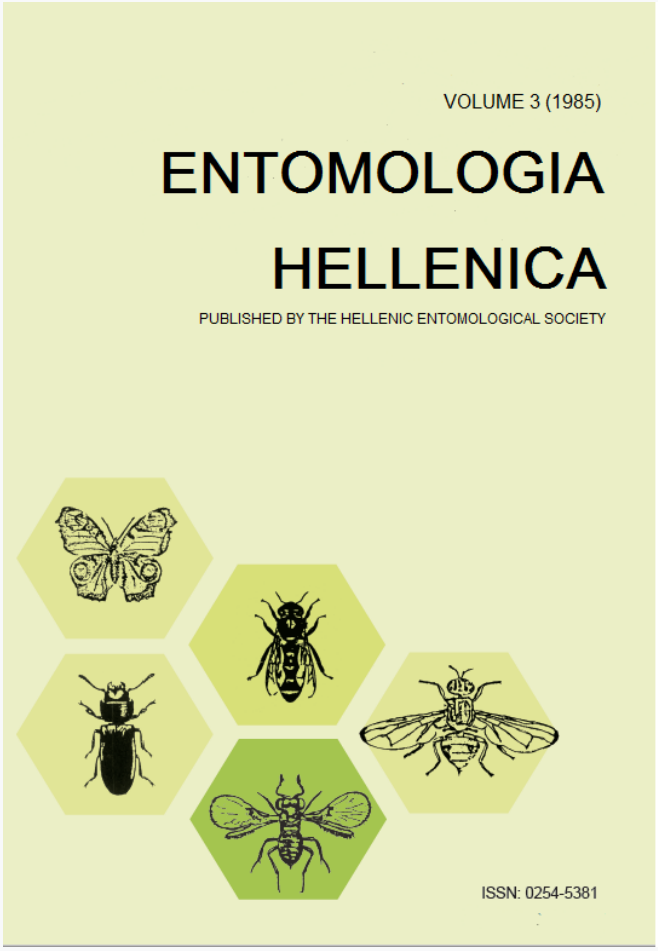

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Preliminary Information on Parasitization Rates and Larval Survival of *Metaphycus helvolus* Comp. and *Metaphycus lounsburyi* How., Parasites of *Saissetia oleae* Olivier, under Laboratory Conditions[1]

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ABSTRACT

Parasitization rates and larval mortality of *M. helvolus* and *M. lounsburyi* parasites of *S. oleae* were studied under laboratory conditions. Mean life duration of *M. helvolus*, under temperature 23° ± 1°C and relative humidity 65-70%, was found to be 8.4 days. Only a relatively small proportion of the individuals of *S. oleae* was parasitized, but the greater proportion of the larvae of the parasite was successfully developed to the adult stage. Mean life duration of *M. lounsburyi*, under temperature 19° ± 1°C and relative humidity 65-70%, was found to be 10.2 days. Oviposition of *M. lounsburyi* occurred at a much higher rate but the fact that several eggs were usually laid per *S. oleae* individual greatly reduced the proportion of the parasitic larvae which developed to the adult stage.

Introduction

The complex of natural enemies of *Saissetia oleae* Oliv. (Homoptera-Coccidae) comprises several species of endoparasites (*Coccophagus lycimnia* Walke, *Metaphycus helvolus* Comp., *Metaphycus flavus* How., *Metaphycus lounsburyi* How.) and predators (*Scutelista cyanea* Motsch., *Moranila californica* How., *Eublemma scitula* Ramb., *Chilocorus bipustulatus* L., *Exochomus quadripustulatus* L., *Exochomus flavipes* Thbng., *Chrysoperla carnea* Stephens) (Viggiani et al. 1975, Argyriou and Katsoyannos 1976, Tzoras et al. 1979). Biological control of *S. oleae* has received a lot of emphasis and much effort has been given to investigate various aspects of *S. oleae* parasites (Viggiani 1978, Stratopoulou and Kapatos 1984). Before mass rearing and release in the field, parasites should be investigated thoroughly both under field and laboratory conditions. Within this approach, the development and survival of larvae of *M.helvolus* Comp. (Hymenoptera: Encyrtidae) and *M.lounsburyi* How. (Hymenoptera: Encyrtidae) developing on *S.oleae* individuals reared on potato sprouts, were studied in the laboratory.

Materials and Methods

The conditions in the laboratory were 65-70% RH, 12 hours light and constant temperature of 23° ± 1°C for *M.helvolus* and 19° ± 1°C for *M.lounsburyi*. Fourty pairs from each species of parasites were used in the study and each pair of individuals (male and female) was placed in an adequately modified plastic cage (25×25×26 cm) permitting sufficient ventilation. Each cage was provided with potato sprouts having 30-40 individuals of *S.oleae* of suitable stage for each parasite (third stage for *M.helvolus* and fourth stage for *M. lounsburyi*).

At intervals of two days, the potato sprouts were renewed and the individuals of *S.oleae* were treated in the following way: half of the scales were kept for some days and examined under the binocular microscope for larvae of parasites. The others were kept

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in suitable containers until the adult parasites emerged. The results, i.e. number of larvae and adults of parasites produced, were expressed on the total number of *S.oleae* individuals available for parasitism. At the same intervals mortality of parasites in the cages was recorded.

Results and Discussion

The mean life duration of each parasite species, the total number of *S. oleae* individuals available to the parasites for parasitism, and the total number of larvae and adults of *M. helvolus* and *M. lounsburyi* are given in tables 1 and 2, respectively.

The mean life duration of *M. helvolus* at these conditions (i.e. 23° ± 1°C, 65-70% RH) was found to be 8.4 days. Only a small proportion of the scales provided to the parasite for parasitism contained a larva of *M. helvolus* (277 larvae of the parasite out of 1363 scales offered), but the great majority of these larvae developed to the adult stage successfully. Usually, one parasitic larva was found in each parasitized scale. It is possible, however, that oviposition of *M. helvolus* took place at a higher rate but high egg-mortality occurred. Usually, *Metaphycus helvolus* is reared on *S.*

TABLE 1. Mean life duration, number of larvae and adults of *M.helvolus* produced, and number of individuals of *S.oleae* available for parasitism.

No. parasite females	Mean life duration (days)	*S.oleae* individuals	Parasites produced Larvae	Adults
40	8.4 ± 0.48	1363	277	251

oleae developing on *Nerium oleander*. Rearing of *M. helvolus* on *S. oleae* developing on potato sprouts was reported by Blumberg and Swirski (1977), but data on the proportion of *S. oleae* individuals parasitized were not given. Potato sprouts as a substrate of *S. oleae* presents certain advantages because of the possibility for mass rearing the coccid all the year around, and also because of the fast development of *S. oleae* on this medium (Blumberg and Swirski 1977).

The mean life duration of *M. lounsburyi*, at temperature 19° ± 1°C and relative humidity 65-70% was found to be 10.2 days. A relatively high number of larvae of *M. lounsburyi* was produced (1961), but these were found in only 303 parasitized scales (a mean of 6.5 larvae of parasite per parasitized larva of *S. oleae)* and the greater proportion of the available scales were left unparasitized. Because of this, only a relatively small proportion of the larvae of the parasite survived to the adult stage (306 adults of *M. lounsburyi* out of 1961 larvae) suggesting very high larval mortality due to intraspecific competition. This behaviour has been observed

TABLE 2. Mean life duration, number of larvae and adults of *M.lounsburyi* produced, and number of individuals of *S.oleae* available for parasitism.

No. parasite females	Mean life duration (days)	*S.oleae* individuals	Parasites produced Larvae	Adults
40	10.2 ± 0.63	3895	1961	306

in the field (Paraskakis et al. 1980) and it can be characterized as a limiting factor for the role that this parasite could play as a biological agent against *Saissetia oleae*.

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References

Argyriou, L.C. and P. Katsoyannos. 1976. Establishment and spreading of *Metaphycus helvolus* Compere, parasite of *Saissetia oleae* (Olivier) in Corfu. In Greek, Ann. Phytopath. Inst. Benaki 11: 215-224.

Blumberg, D. and E. Swirski. 1977. Mass breading of two species of *Saissetia* (Hom. Coccidae) for propagation of their parasitoids. Entomophaga 22(2): 147-150.

Paraskakis, M., P. Neuenschwader and S. Michelakis. 1980. *Saissetia oleae* (Oliv.) (Hom., Coccidae) and its parasites on olive trees in Crete, Greece. Z. ang. Ent. 90: 450-464.

Stratopoulou, E.T. and E.T. Kapatos. 1984. Preliminary results for the evaluation of the action of *Saissetia oleae* parasites in Corfu. Entomologia Hellenica 2: 3-9.

Tzoras, A.,S. Pappas and G. Viggiani. 1979. Osservazioni fenologiche comparate relative a *Saissetia oleae* (Oliv.) e i suoi nemici naturali su *Oleae europaea* L. e *Carduus*

pycnocephalus L. nell' isola di Corfu. Boll. Lab. Ent. Agr. "F. Silvestri" 36: 3-12.
Viggiani, G. 1978. Current state of biological control of olive scales. Boll. Lab. Ent. Agr. "F. Silvestri" 35: 30-38.
Viggiani, G., S. Pappas and A. Tzoras. 1975. Osservazioni su *Saissetia oleae* (Oliv.) e i suoi entomofagi nell'isola di Corfu. Boll. Lab. Ent. Agr. "F. Silvestri" 32: 156-167.

KEY WORDS: *Metaphycus helvolus*, *Metaphycus helvolus* rearing, *Metaphycus lounsburyi*, *Metaphycus lounsburyi* rearing, *Saissetia oleae*, *Saissetia oleae* parasitization

Προκαταρκτικές Πληροφορίες για τον Παρασιτισμό και την Θνησιμότητα των Προνυμφών του *Metaphycus helvolus* Comp. και *Metaphycus lounsburyi* How., Παρασίτων του *Saissetia oleae* Olivier, σε Συνθήκες Εργαστηρίου

Μ.Β. ΜΑΚΡΟΠΟΔΗ

Ινστιτούτο Ελιάς Κέρκυρας

ΠΕΡΙΛΗΨΗ

Ο παρασιτισμός και η θνησιμότητα των προνυμφών *M. helvolus* και *M. lounsburyi* παρασίτων του λεκανίου μελετήθηκε κάτω από συνθήκες εργαστηρίου. Η μέση διάρκεια ζωής των ακμαίων του *M. helvolus* στο εργαστήριο σε θερμοκρασία 23° ± 1°C και σχετική υγρασία 65-70% βρέθηκε 8.4 ημέρες. Ένα μικρό ποσοστό των ατόμων λεκανίου 3ου σταδίου παρασιτίστηκε απ' το παράσιτο, αλλά ένα μεγάλο ποσοστό των προνυμφών του παρασίτου εξελίχθηκαν σε ακμαία.

Για το *M. lounsburyi* σε συνθήκες 19° ± 1°C θερμοκρασία και 65-70% σχετική υγρασία, η μέση διάρκεια ζωής ήταν 10.2 ημέρες. Η ωοτοκία του παρασίτου αυτού ήταν πολύ μεγαλύτερη από ότι του *M. helvolus*, αλλά η πολλαπλή ωοτοκία σε ίδια άτομα του ξενιστή και η μεγάλη θνησιμότητα των προνυμφών, περιόρισαν σημαντικά τον αριθμό των προνυμφών του *M. lounsburyi* που εξελίχθηκαν σε ακμαία.