IOBC-WPRS

Working Group "Integrated Control of Plant-Feeding Mites"

OILB-SROP

Groupe de Travail "Lutte Intégrée Contre les Acariens Phytophages"

Proceedings of the Third Working Group Meeting

at

Český Krumlov, Czech Republic

13 - 16 September, 2011

Editors:

Eric Palevsky, James Ridsdill-Smith, Phyllis Weintraub, Uri Gerson,
Sauro Simoni, James McMurtry, Rostislav Zemek

IOBC-WPRS Bulletin
Bulletin OILB-SROP Vol. 93, 2013

The content of the contributions is in the responsibility of the authors.

The IOBC-WPRS Bulletin is published by the International Organization for Biological and Integrated Control of Noxious Animals and Plants, West Palearctic Regional Section (IOBC-WPRS).

Le Bulletin OILB-SROP est publié par l'Organisation Internationale de Lutte Biologique et Intégrée contre les Animaux et les Plantes Nuisibles, section Regionale Ouest Paléarctique (OILB-SROP).

The Publication Commission of the IOBC-WPRS:

Dr. Ute Koch
Schillerstrasse 13
D-69509 Moerlenbach (Germany)
Tel +49-6209-1079, Fax +49-6209-4849
e-mail: u.koch_moerlenbach@t-online.de

Dr. Annette Herz
Julius Kühn-Institute (JKI)
Federal Research Center for Cultivated Plants
Institute for Biological Control
Heinrichstr. 243
D-64287 Darmstadt (Germany)
Tel +49 6151 407-236, Fax +49 6151 407-290
e-mail: Annette.Herz@jki.bund.de

Address General Secretariat:

Dr. Philippe C. Nicot
INRA - Unitè de Pathologie Vègètale
Domaine St. Maurice – B.P. 94
F-84143 Montfavet Cedex
France

ISBN 978-92-9067-272-2

Web: http://www.iobc-wprs.org

Darmstadt, 2013

Integrated Control of Plant-Feeding Mites
IOBC-WPRS Bulletin Vol. 93, 2013
pp. 129-132

Predation of *Typhlodromus longilaterus* Athias-Henriot (Parasitiformes, Phytoseiidae) females on eggs and juveniles of the tetranychid mites *Tetranychus urticae* (Koch) and *Panonychus citri* (McGregor) (Acariformes, Tetranychidae)

Haralabos Tsolakis, Milko Sinacori, Salvatore Ragusa
Department DEMETRA, Laboratory of Applied Acarology "Eliahu Swirski" - University of Palermo, Viale delle Scienze 13, 90128 Palermo, Italy
e-mail: haralabos.tsolakis@unipa.it

Abstract: *Typhlodromus longilaterus* is a generalist phytoseiid mite described by Athias-Henriot in 1957 and commonly found in Israel on spontaneous herbaceous plants. As very little is known about this species, the present study reports preliminary results on the predation capacity of phytoseiid females on eggs and juveniles of two tetranychid mites very common in the Mediterranean area, *Tetranychus urticae* and *Panonychus citri*. After 24 hours the phytoseiid females preyed on 15% of offered eggs of both tetranychids, while the prey ratio was higher on *T. urticae* eggs after this period (33.4% and 33.5% vs 20.8% and 16.2% after 2 and 3 days for *T. urticae* and *P. citri* respectively). The phytoseiid showed its preference also for nymphs of *T. urticae* preying on 44-50% of nymphs offered, while the predation range was lower on nymphs of *P. citri* (from 30.3 to 36.3%).

Key words: *Typhlodromus longilaterus, Tetranychus urticae, Panonychus citri,* predation

Introduction

Typhlodromus longilaterus Athias-Henriot was described from material collected on *Cynodon dactylon* (L.) in Algeria in 1957 (Athias-Henriot, 1957) and afterwards found only in Israel on spontaneous herbaceous plants (Swirski & Amitai, 1997; Lotan, 2011).

As only few data are available to date on the biology of this species (Lotan, 2011), we decided to carry out some biological observations to check the predation capacity of the phytoseiid on the two most common and dangerous tetranychids of the Mediterranean area: *Tetranychus urticae* Koch and *Panonychus citri* (McGregor).

Material and methods

Amblyseius longilaterus (genus name in Swirski & Amitai, 1997) came from a laboratory colony of the Agricultural Research Organization (ARO) Volcani Center, Israel and it was bred in the laboratory on plexiglas arenas as described by Swirski *et al*. (1970) using pollen of *Oxalis corniculata* L. as food. *Tetranychus urticae* and *P. citri*, collected in a citrus orchard, were kept in laboratory cultures on bean plants (*Phaseolus vulgaris* L.) and on lemon fruit, respectively.

Tests on prey consumption were carried out on the eggs and nymphs of the two preys. Each experimental unit (EU) consisted of a bean or lemon leaf disc (∅ 2.5cm) for *T. urticae* and *P. citri* respectively, placed on wet cotton in a plastic Petri dish. To obtain prey eggs about 10-15 females of *T. urticae* and *P. citri* were isolated in an EU for 24 hours and then

removed. About 20 eggs of prey were left on each EU. In the tests on juveniles, 20 prey nymphs were transferred daily from cultures using a fine brush.

Young females of *A. longilaterus* were obtained by transferring approx. 50 eggs of the predator onto a plexiglas arena with abundant food until juveniles attained adulthood. To ensure the fertilization of females, the emerged adults were transferred into a new arena with abundant food for 2-3 days. Afterwards, one female of the phytoseiid was transferred with a fine brush onto an EU. Each test consisted of 20 replicates and observations were continued for 3 days. All the tests were carried out in a conditioned room at 25 ± 1 °C and at 70 ± 5% of R.H.

Data were statistically analyzed by ANOVA followed by Tukey's test using the software "Statistica" (StatSoft Inc., 2003).

Results and discussion

The predation rate of *A. longilaterus* females on eggs was low in both preys after 24 hours (3.05 ± 0.35 and 3.0 ± 0.83 eggs/female for *T. urticae* and *P. citri*, respectively), while this rate increased significantly especially on *T. urticae* eggs after this period ($F_{11,\ 105}$ = 4.33, $p < 0.01$) (Figure 1). In contrast the phytoseiid females maintained a low rate of predation on eggs of *P. citri* during the whole observation period.

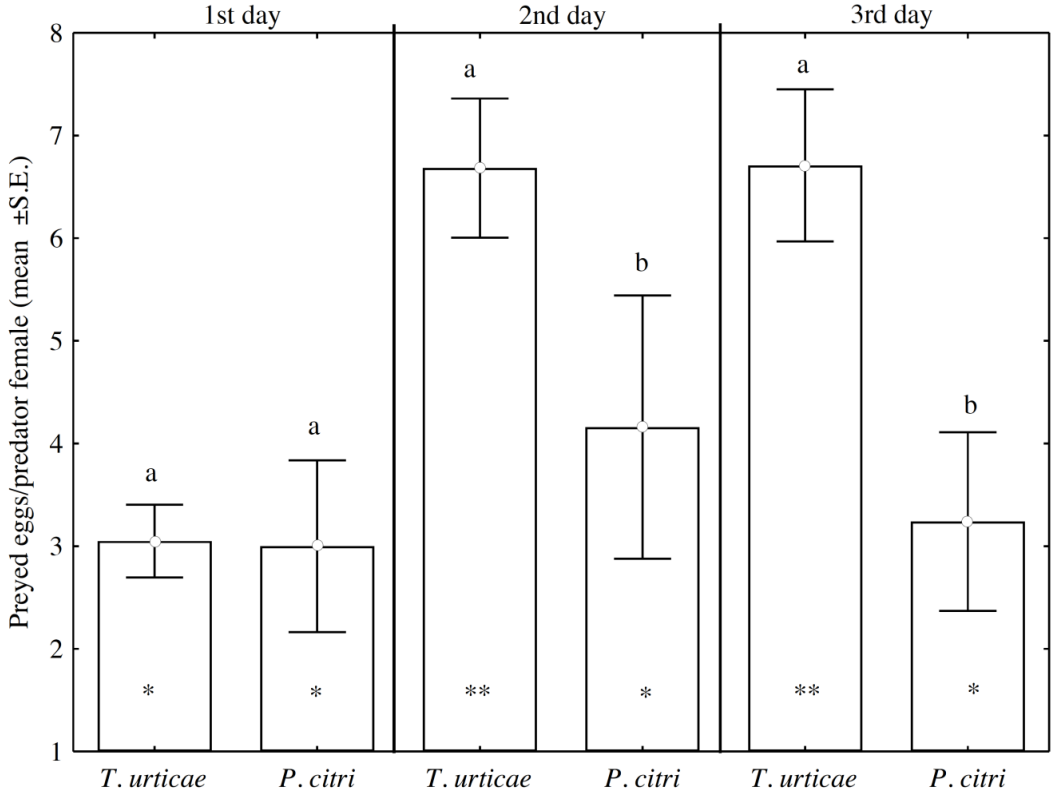

Figure 1. Predation of young females of *Amblyseius longilaterus* on *Tetranychus urticae* and *Panonychus citri* eggs. Different letters denote significant differences between prey mites for the same day. The different number of asterisks denotes significant differences in time for the same prey. ANOVA followed by Tukey's HSD test was performed on the data.

The low predation rate of *A. longilaterus* on *T. urticae* eggs in the first day, as also observed for other phytoseiid species (Castagnoli & Simoni, 1999), could have been due to the change of diet, as mites were reared on the pollen of *O. corniculata*. On the other hand, these data showed a clear preference of the predator *vs*. *T. urticae* eggs even if the predation rate was lower in comparison to other phytoseiid species preying upon *T. urticae* eggs (Ragusa *et al*., 2000). The shape of *P. citri* eggs and the oviposition behaviour of the mite could have explained the difficulty of *A. longilaterus* to prey upon this tetranychid, more than the organoleptic differences between the two prey eggs. As a matter of fact, the phytoseiid showed no statistical preference when nymphs of the two preys were supplied as food, even if the predation rate on *T. urticae* nymphs was about 15% higher (Figure 2).

As far as the oviposition rate is concerned, less than one egg every two days was laid on both eggs and juveniles of the two tetranychids. This value is very low if compared to other phytoseiid species fed on tetranychids and confirms both the absence of preference for one of them and the low predation capacity of the phytoseiid on tetranychid mites.

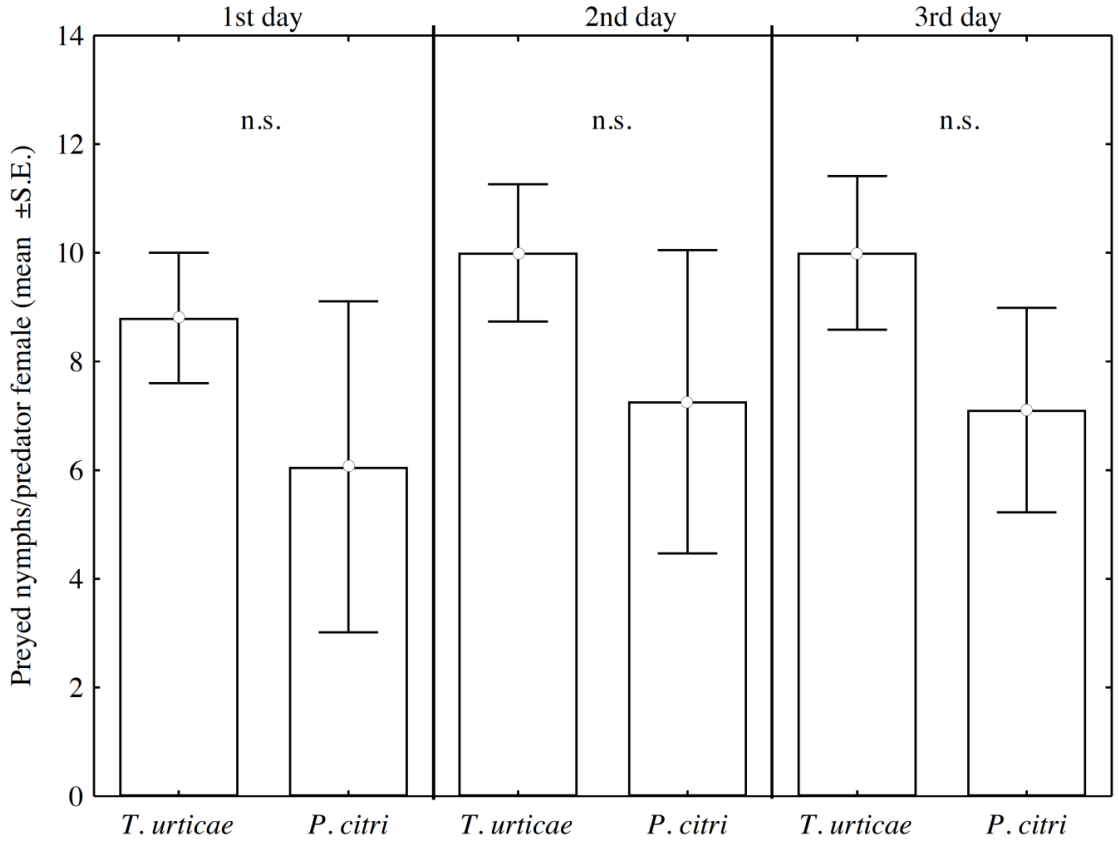

Figure 2. Predation of young females of *Amblyseius longilaterus* on *Tetranychus urticae* and *Panonychus citri* nymphs. n.s. = no statistical differences between the observation periods and preys. ANOVA followed by Tukey's HSD test was performed on the data.

Acknowledgements

Authors wish to thank Dr. E. Palevsky and Dr. A. Lotan for providing the *A. longilaterus* strain and literature information on this species.

References

Athias-Henriot, C. 1957: *Typhlodromus ornatus* n.sp. et *Typhlodromus longilaterus* n.sp. (Acarina, Phytoseiidae) mesostigmates predateurs d'Algerie. Rev. Path. Veg. et Ent. Agric. France 36(4): 215-222.

Castagnoli, M. & Simoni, S. 1999: Effect of long-term feeding history on functional and numerical response of *Neoseiulus californicus* (Acari: Phytoseiidae). Exp. Appl. Acarol. 23: 217-234.

Lotan, A. 2011: Developing an integrated pest management program for the old world date mite *Oligonychus afrasiaticus* in the southern Arava valley. Ph.D Thesis, University of Haifa, 1-104.

Ragusa, S., Vargas, R., Tsolakis, H. & Ashbach, R. 2000: Laboratory studies on the influence of various food substances on some biological and life-table parameters of *Cydnodromus picanus* Ragusa (Parasitiformes, Phytoseiidae) associated with Citrus trees in the Chilean Desert. Phytophaga 10: 11-23.

StatSoft Inc. 2003: Statistica, Users Manual. Stat Soft Inc., Tusla, OK.

Swirski, E. & Amitai, S. 1997: Notes on phytoseiid mites (Mesostigmata: Phytoseiidae) of Mt. Carmel (Israel), with descriptions of two new species. Israel J. Entomol. 31: 1-20.