FEEDING HABITS AND PREDATORY BEHAVIOR IN SOME SPECIES OF PHYTOSEIID MITES USED IN BIOLOGICAL CONTROL (ACARI: PHYTOSEIIDAE)

By

ISLAM MOHAMMAD SOLIMAN ZIDAN

B.Sc. Agric. Sci. (Agricultral Pests), Fac. Agric., Cairo Univ., 2007

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APPROVAL SHEET

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APPROVAL COMMITTEE

Dr. HUSSEIN ABDALLA REZK ….……
Professor of Acarology, Fac. Agric., Alexandria University

Dr. MOHAMED ABD EL-AZIZ ZAHER ….……
Emeritus Professor of Acarology, Fac. Agric., Cairo University

Dr. MOHAMED SAMY NAWAR ….……
Emeritus Professor of Acarology, Fac. Agric., Cairo University

Dr. MORAD FAHMY HASSAN ….……
Emeritus Professor of Acarology, Fac. Agric., Cairo University

Date: / /2014

SUPERVISION SHEET

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Dr. MORAD FAHMY HASSAN
Emeritus Professor of Acarology, Fac. Agric., Cairo University

Dr. MOHAMMED SAMY NAWAR
Emeritus Professor of Acarology, Fac. Agric., Cairo University

Dr. FATEN MAMDOUH MOMEN
Emeritus Researcher Professor of Acarology, NRC, Giza

Name of Candidate: Islam Mohammad Soliman Zidan **Degree:** M.Sc.

Title of Thesis: Feeding Habits and Predatory Behavior in Some Species of Phytoseiid Mites Used in Biological Control (Acari: Phytoseiidae)

Supervisors: Dr. Morad Fahmy Hassan
Dr. Mohammed Samy Nawar
Dr. Faten Mamdouh Momen

Department: Agricultural Zoology and Nematology

Branch: Acarology **Approval:** / /2014

ABSTRACT

This study was carried out in two parts; 1) study the feeding habits and 2) the predatory behavior in indigenous species of phytoseiid mites to evaluate their role in biological control.

Part I: Feeding habits of predatory phytoseiid mites used in biological control; three phytoseiid mites were selected for our study which have not been studied before; *Euseius finlandicus* (Oudemans), *Typhlodromus balanites* El- Badry and *Typhlodromus rhenanus* (Oudemans) in addition to recognize their feeding on various kinds of pests selected for the current study.

Euseius finlandicus, was able to develop and reproduce the best when fed on active stages of eriophyid mite species *Aceria olivi*, *Aceria dioscoridis* and *Cisaberaptus kenyae*. Pollen grains, *T. urticae* and *P. ziziphus* eggs were also considered as supplementary food. 100% mortality was recorded when the predator fed on *E. orientalis, C. pulcher, T. tabaci, B. tabaci* and *E. ficus.* Total egg production was highest when the predator fed on *A. olivi* and *A. dioscoridis*.

No mortality was recorded on immature stages of the predatory mite, *T. balanites* when fed active stages of tested eriophyid mite species compared to 100% mortality when fed on tetranychid, tenuipalpid mites, pollen grains, thrips, whitefly and scale insects. The eriophyid mite *A. dioscoridis*, recorded the highest reproductive rate (r_m = 0.212) compared with feeding on other tested eriophyid species.

The predacious mite, *T. rhenanus* was able to develop successfully on the tested eriophyid mites *A. dioscoridis, A. olivi* and *C. kenya*, as well as pollen grains of castor bean *R. communis* and date palm *P. dactylifera* and also eggs of the scale insect *P. ziziphus*. The eriophyid mite *A. olive* gave the highest reproductive rate (r_m = 0.224).

Part II: Predatory behavior in phytoseiid mite species used in biological control.

Three phenomena associated with the selected phytoseiid mite species were studied, ex: Feeding larval behavior resulted as; only *E. finlandicus* is (OFL). *Neoseiulus barkeri* Hughes, *Typhlodromips swirskii* (Athias-Henriot), *Neoseiulus californicus* (McGregor), *Cydnoseius negevi* Swirski and Amitai, *Typhlodromus mangiferus* Zaher and El-Borolossy, and *Euseius scutalis* (Athias-Henriot) are (NFL). *Amblyseius deleoni* (Muma and Denmark) is (FFL).

Cannibalism and intraguild predation was also studied in *E. finlandicus, N. barkeri, T. mangiferus* and *A. deleoni.* Immature's development, survival and predation rates when selected species fed either con- or heterospecific and natural prey resulted in: *E. finlandicus* and *T. mangiferus* failed to develop on phytoseiid prey, while *N. barkeri* and *A. deleoni* were developed into adult stage as well as fed a high amounts of phytoseiid preys.

Aggressiveness of adult females in cannibalism and intraguild resulted in: *N. barkeri* has the most aggressive behavior among the studied species in both cases of cannibalism. While aggressiveness in intraguild resulted as *N. barkeri* and *T. swirskii* proved to be the most aggressive species in attacking heterospecific prey, while *N. californicus* was the worst.

Predation preference in tested phytoseiid species when offered two kinds of larvae were also studied, the percentage of predation preference of heterospecific larvae: IG $prey_2$ in each species tested were: *C. negevi* 80:20%, *N. californicus* 82:18%, *A. deleoni* 7:93%, *N. barkeri* 60:40%, *T. swirskii* have shown 100% preference to heterospecific larvae and *E. scutalis* failed to attack both larvae.

Key words: Phytoseiidae, Feeding habits, *Euseius finlandicus*, *Typhlodromus balanites*, *Typhlodromus rhenanus*, life table parameters, Predatory behavior, Cannibalism, Intraguild predation (IGP), Aggressivness.

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DEDICATION

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