The Role of the Predaceous Mite *Typhlodromus athiasae* Porath and Swirski in the Control of the Carmine Mite *Tetranychus cinnabarinus* (Bois.) (Tetranychidae: Acarina) Infesting Lemon Seedlings

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ABSTRACT

The role of the predatory mite *Typhlodromus athiasae* Porath and Swirski in the control of the carmine mite *Tetranychus cinnabarinus* (Boisduval) was tested in the greenhouse. *Citrus limon* (L.) Burm. f. cultivar seedlings one and half years old were used. The average daily temperature ranged from 15°C to 26°C and the relative humidity from 45–85%. The predatory mite was able to suppress the carmine mite population and consequently prevented the high percentage of the leaf drop to occur.

INTRODUCTION

The efficiency of the phytoseiid mites as predators of phytophagous mites had been proved through many experimental studies in the greenhouse or under natural conditions in the field. The value of many species from the genus *Typhlodromus* as important predators of the tetranychid mites had been summarized by McMurtry *et al.* (11). Because there are no population studies for the predatory mite *T. athiasae* in literature, the discussion in this study is correlated with the reports for some other species from the genus *Typhlodromus*. The importance of the predatory mite *T. pyri* Scheuten as a controlling agent against the tetranychid mites on apple in the greenhouse was reported by Collyer (1,2), Herbert (3), and van de Vrie and Kropczynska (14). The predatory mite *T. occidentalis* Nesbitt was considered also an important controlling agent against species of spider mites on different host plants in the greenhouses (6,7,9,10).

In Tripoli, the predatory mite *Typhlodromus athiasae* Porath and Swirski was found in association with the carmine mite *Tetranychus cinnabarinus* (Boisduval) on citrus (4).

In the present study the role of this predatory mite in the control of the carmine mite was tested on *Citrus limon* seedlings under controlled greenhouse conditions.

MATERIALS AND METHODS

Healthy seedlings of *Citrus limon* (L.) Burm. f. cultivar Eureka, one and half years old were used. These uniform and healthy seedlings were obtained and grown under

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complete nutritional condition by employing the same technique reported by Hessein *et al.* (5).

The carmine mite *T. cinnabarinus* (Bois.) and the predatory mite *T. athiasae* Porath and Swirski were both cultured in the same way as explained by Hessein (4).

Before infestation with the carmine mite, only 9 leaves were left on each seedling. One week later, each plant was infested with eighteen adult females of the spider mite, by introducing two mites on each leaf. To prevent the dispersal of the phytophagous mite, each seedling was kept under a cylinder made from a fine wire screen. The spider mites were left on the seedlings for thirty days to build one generation or more before the introduction of the predatory mite. Half the number of plants were left without predators while the other plants received the predators at the rate of two adult females per leaf. The experiment included five replicates for each treatment.

Active immature stages and adult females of the spider mite were counted on the upper and lower surfaces of leaves almost every week by the use of a 10× lens. Counts were carried on March 19, March 29, April 5, and April 12. After that date high percentage of the leaf drop had occured in case of the plants without predators which prevented further counting.

The dispersal of the predatory mite on the different parts of the plants made the counting impossible. However, its action was evidenced by observing it on the plant parts and the presence of the consumed individuals of the spider mite. At the end of the experiment, the technique described by Krantz (8) was applied. The different parts of the seedlings were cut and placed in the Tullgren apparatus where the active immatures and both the adult females and the adult males of the predatory mite were collected in alcohol.

RESULTS AND DISCUSSION

It had been reported before in previous work that the leaf drop was the most obvious and serious symptom on the citrus seedlings when infested with the carmine mite, *Tetranychus cinnabarinus* (Bois.), especially when the latter reaches high numbers (5).

The absence of the predatory mite (Table 1) allowed a gradual increase in spider mite populations and reached at the end of the experiment 497 individual per leaf of those seedlings without predator. This case of high infestation had caused a very high percentage of leaf drop which reached 89% on April 19 (Table 1). This percentage increased to 100% one week later.

Table 1 Average number of the carmine mite *Tetranychus cinnabarinus* (Bois.) per leaf, and the average percentage of leaf drop of *Citrus limon* seedlings in the absence and presence of the predatory mite *Typhlodromus athiasae* Porath and Swirski.

Average no. of carmine mite per leaf					Average % leaf drop				
	March 19	March 23	April 5	April 12	March 19	March 29	April 5	April 12	April 19
Without predator	20.7	59.9	134.6	497.0	0	11	37	67	89
With predator	13.8	12.5	13.2	14.8	0	0	0	0	2.8

The other treatment, where the predatory mite was present, the phytophagous mite was only 14.8 individuals per leaf, and caused only 2.8% leaf drop on April 19 (Table 1). This percentage remained the same even one week later.

These results may indicate the role of the predatory mite in suppressing the number of phytophagous mites and its importance in preventing the damge to the seedlings. It had been also noticed that the leaves which carry the predator were more green and healthy, while those without the predator were yellowish in colour. The chlorophyll had disappeared from the areas where the carmine mite had established its colonies.

Although phytoseiids usually spend much of their time on the undersurface of the leaves (11), yet some species such as *Typhlodromus caudiglans* Schuster (12), *T. bakeri* (Garman), and *T. massei* (Nesbitt) (13) seem to be entirely bark-inhabiting.

Similarly this predatory mite was noticed on the different plant parts, however, higher numbers were found on stems. This type of distribution had not prevented it from attacking the carmine mite on the leaves. The consumed different stages including the eggs of the spider mite were noticed particularly on the lower surface of the leaves.

In conclusion it could be said that the predatory mite *T. athiasae* Porath and Swirski was able to keep the phytophagous mite *Tetranychus cinnabarinus* (Bois.), at lower density and consequently prevented its damage. This might suggest the possibility of using this predatory mite as a biological agent for the control of carmine mites. More studies are needed to confirm the conclusion on different host plants in the greenhouse and in the field.

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دور الحلم المفترس تفلود رومس اثيبسى فى مقاومة الحلم الاحمر

تترانيكس سينابارنيس الذى يصيب شتلات الليمـــــون

نـــوال احمـــد حسين

المستخلـــــص

تم اختبار دور الحلم المفترس تفلود رومس اثيبسى فى مقاومة الحلم الاحمر تترانيكس سينابارنيس فى الصوبة الزجاجية ٠

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