

PHYTOSEIULUS PERSIMILIS (ACARINA: PHYTOSEIIDAE) FOR CONTROL OF TWO-SPOTTED MITES IN A COMMERCIAL GREENHOUSE¹

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ABSTRACT

Natural infestations of the twospotted spider mite were controlled on greenhouse cucumber by early releases of the predatory mite, *Phytoseiulus persimilis* Athias-Henriot. Later sporadic mite outbreaks severely damaged some plants and required frequent surveys and repeated predator releases in the greenhouse. However, no mite sprays were required and crop yield was satisfactory.

INTRODUCTION

Chemical control of the twospotted spider mite, *Tetranychus urticae* Koch, on greenhouse cucumbers is becoming increasingly difficult in British Columbia. A number of reports have been published on the use of the predaceous mite, *Phytoseiulus persimilis* Athias-Henriot, for control of spider mites on greenhouse cucumbers (Chant 1961; Gould 1970, 1971; Scopes and Parr 1971; Anonymous 1972). This paper reports the results of a preliminary trial in British Columbia using *P. persimilis* for control of the twospotted spider mite on cucumber in a commercial greenhouse.

METHODS

A commercial greenhouse containing 1300 parthenocarpic cucumber plants on 12,500 sq. ft. (0.12 hectare) was examined on March 24 for infestations of twospotted spider mites. Fifty-nine infested plants were tagged and 400 predator mites released among them. Predators were distributed by tapping 2 to 5 specimens from a glass vial onto a cucumber leaf on each infested plant. Five leaves, on each tagged, infested plant were then examined periodically for host and predator mites.

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Tagged plants received no further predators, but 2200 were distributed throughout the remainder of the planting on April 1, and 2400 on June 11. An additional 1600 predators were used to combat localized outbreaks of mites during April and May.

RESULTS AND DISCUSSION

Table 1 shows that twospotted spider mites on tagged, infested plants were eliminated by mid-May, about 55 days after predator mites were released. However, sporadic localized outbreaks of mites occurred in the planting during May and part of June. Some plants were severely damaged, but losses were not serious in relation to the total planting. Predators were abundant throughout the planting by June 21, and no further mite outbreaks occurred. Both host and predator mites had disappeared from all plants by mid-July. There was no recurrence of twospotted spider mites before the plants were removed in early August.

The introduction of red spider mites in a planting before releasing predators has been recommended in England to establish a predictable predator-prey interaction (Anonymous 1972). In our trials, predators were released in naturally occurring mite infestations. Plants with well-established infestations almost invariably suffered severe damage before the predators achieved control.

TABLE 1. Percentage of leaves with *T. urticae*, and *T. urticae* plus *P. persimilis*, following the release of predatory mites. A total of 295 leaves were examined on each sampling date.

Days after Predator Mite Release	% Leaves with <i>T. urticae</i>	% Leaves with <i>T. urticae</i> and <i>P. persimilis</i>
22	38	68
43	19	88
55	1	100
71	nil	nil

In addition, sporadic outbreaks of mites required frequent monitoring of the planting and repeated releases of predators. Nevertheless, we feel that the trial was successful. Economic control of mites was achieved when predators were released early in the development of mite infestations. No mite sprays were

required in the test planting, and cucumber yields were satisfactory throughout a normal cropping period. This contrasted with conditions in the same greenhouse during the previous season, when plant damage from mites and frequent acaricide applications shortened the cropping period by 3 to 4 weeks.

References

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A METHOD FOR REARING THE PREDACEOUS MITE, *PHYTOSEIULUS PERSIMILIS* (ACARINA: PHYTOSEIIDAE)

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ABSTRACT

The predaceous mite, *Phytoseiulus persimilis* Athias-Henriot, was reared successfully in a darkened growth chamber on blotting paper on a freezer carton lid floated on water in a plastic saucer. Predators were fed with twospotted spider mites collected from infested bean leaves with a mite brushing machine.

INTRODUCTION

During studies initiated on the biological control of the twospotted spider mite, *Tetranychus urticae* Koch on greenhouse cucumbers, we needed a simple method for rearing the predaceous mite, *Phytoseiulus persimilis* Athias-Henriot. Techniques for mass-rearing both host and predaceous mites have been published (McMurtry and Scriven 1965, Scopes 1968, Scriven and McMurtry 1971, Anonymous 1975). This report describes adaptations and innovations developed for our own conditions and facilities.

METHODS AND DISCUSSION

We reared twospotted spider mites on bush beans (*Phaseolus vulgaris* L. cv. Stringless Greenpod) grown in 3:2:1 soil-peat-sand mix,

planting 4 seeds in each 15 cm diameter plastic pot. When the plants are about 30 cm high, they are transferred to a growth chamber maintained at 25±1°C with 16 hours of light.

Predaceous mites are reared in darkness at 25±1°C. Each culture is started by transferring 30 predaceous mites to a 9 cm disc of blotting paper. This paper is placed on an inverted 12 cm diameter lid from a freezer carton (Plasti-Pak Containers, Toronto, Canada). Wandering by the mites is minimized by floating the lid on water in a plastic saucer 25 cm in diameter and 4.5 cm deep. The lid is centred in the saucer by attaching one small magnet to the bottom of the lid and a second magnet in the bottom of the saucer. Another 25 cm plastic saucer is inverted over the culture as a cover to maintain a high relative humidity within the container.

Each predaceous mite culture is fed with twospotted spider mites removed from infested bean leaves with a mite brushing machine (Henderson and McBurnie, 1943). We found

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