

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.

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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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<sup>2</sup>J. W. Gates, personal communication

that many mites were injured when leaves were passed between both brushes of the machine, so we removed one brush. The leaf can be then pressed and moved gently against the remaining brush with the hand until all the mites are removed. Apparently the same effect can be achieved on some machines by reversing the belt drive so that the brushes rotate outwards<sup>1</sup>. The mites are collected on a 12 cm blotting paper disc and tapped off or brushed from the paper onto the predator culture.

Cultures develop satisfactorily if fed three times a week. Rate of increase varies among cultures, but we have obtained 400 to 1000 predators from single cultures after 3 to 4 weeks. One culture will remain productive for

many weeks, but after about 6 weeks debris accumulation interferes with collecting. Collections are made with a small suction aspirator. One person can collect at least 1000 mites an hour from vigorous cultures. Although predators survive only a few hours when they are collected in vials without any host mites, they survive about 7 days in vials containing mite-infested bean leaf sections.

Our relatively small demand for predaceous mites required the services of one person for about 3 hours per week. This includes planting about 20 pots of beans per week, maintaining established plants and feeding 6 to 10 cultures. The whole rearing procedure can be readily expanded or reduced according to demand.

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## THE FIRST RECORD OF *CULISETA SILVESTRIS MINNESOTAE* BARR IN BRITISH COLUMBIA (DIPTERA: CULICIDAE).

Curtis (1967) speculated that *Culiseta silvestris minnesotae* likely occurred in British Columbia since it has been taken near the southern boundaries of the province. During a routine light-trap survey in the municipality of Port Coquitlam, a suburb of Vancouver, British Columbia, two *C.s. minnesotae* females were collected on July 12 and August 14, 1974. The larvae of this species have not yet been found in British Columbia.

Originally described by Barr (1957) as

*Culiseta minnesotae*. Stone (1967) assigned it as a subspecies of *Culiseta silvestris* Shengarev.

This finding brings the total number of mosquito species recorded in British Columbia to 41, and extends the known Canadian range of this species from Ontario to the West Coast.

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