from 100.0 to 120.0 with an average of 83.0 eggs. The adult longevity was 3.0 to 12.0 days with a mean of 10 days. These results are in line with the earlier reports of Pant (1960) and Rao (1977).

KEY WORDS: *Eocanthecona furcellata*, biology, *Papilio demoleus*

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J. Biol. Control, 2 (1), 53—55, 1988

A Simple Method for Mass Rearing of an Exotic Predacious Phytoseiid Mite, *Phytoseiulus persimilis* A.H.

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Among the phytoseiid predators, *Phytoseiulus persimilis* A.H. was extensively and successfully used for suppression of tetranychids both under glasshouse and field conditions (Chant, 1961; Bravenboer and Dosse, 1962; Oatman *et al.*, 1977). Considering the potential and merits, the predator was imported for trials against red spider mites of horticultural crops under All India Coordinated Research Project on Biological Control of Crop Pests and Weeds. Bravenboer (1975) suggested that the most common method for rearing *P. persimilis* was on plants infested with tetranychids. Bakasova (1978) used cut leaves infested with tetranychids. The techniques developed by Scopes (1968) and Theaker and Tonks (1977) were too laborious. Even artificial diets developed by Shehata and Weismann (1972) and Kennett and Hamai (1980) resulted only in immature stages. In this paper, a method has been described for mass rearing both tetranychids and *P. persimilis* with minimal care. The stock culture of *P. persimilis* was received from the Glasshouse Crops Research Institute, Littlehampton, U.K. in 1984 and was maintained in the laboratory initially on cut leaves held over a wet cotton platform using *Tetranychus urticae* Koch as prey.

Contribution No, 290/87 of I, I. H. R., Bangalore

Mass Rearing of *T. urticae*

Potted plants of french beans (*Phaseolus vulgaris* L.) var. Arku Komal were raised once in three weeks as host plants for *T. urticae* At two tri-foliate leaf stage, the pots and plants were sprayed thoroughly with fenvalerate 0.01% to keep off indigenous phytoseiids and other predators. Three days after spraying, the plants were inoculated with *T. urticae* @ 20 adults/plant and held under glasshouse conditions. The spider mites multiplied rapidly in the absence of natural enemies and the insecticide residue appeared to be sufficient to keep off especially phytoseiids for more than 3-4 weeks. Spider mite-infested fourth trifoliate leaf from the bottom was used for mass rearing the predator. Adult spider mites

were collected from these pots for inoculation on another set of potted plants raised under glasshouse conditions.

Mass rearing of *P. persimilis*

A simple unit was developed with modifications on the method suggested by Fournier *et al.* (1985) and on the prinicples that the spider mite exhibits negative geotropism and shows an increased tendency to migrate upward when the plant gets dry, humidity decreases and food becomes scarce (Hussey and Parr, 1963) and *P. persimilis* follows this migration and remains at sites with higher prey density. The rearing unit consisted of four vertical plastic containers each measuring 14 x 11.5 cm, superposed one over the other (Fig. 1). The base of all containers was either perforated or wire gauzed for mites to move from bottom container to the top container, when the food became scarce. Closely woven mesh was used for ventilation from sides. One or two freshly cut bean leaves with spider mites (primarily adults and eggs) collected from the glasshouse were spread on each raised platform (Fig. 2A). Such platforms were used mainly to prevent the leaves from sticking together when fading, to facilitate movements of mites and air and to arrest moisture accumulation and fungal growth. These platforms were later stacked inside container 'A' and initially 10 mated females of *P. persimilis* were released. The mouth of the container was closed tightly with a lid having an exit glass tube (Fig. 1). The

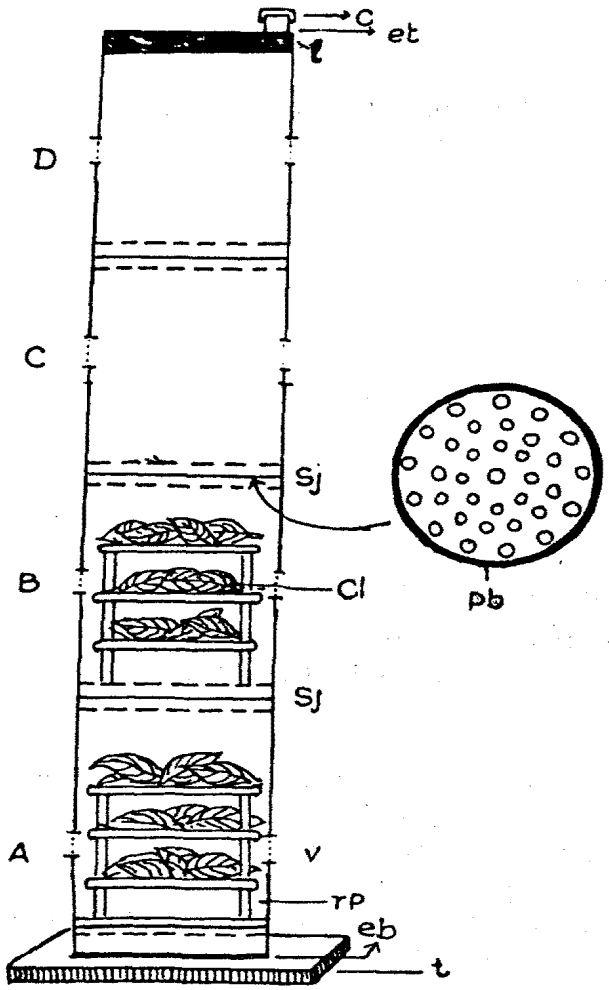

Fig. 1. Mass rearing unit for *P. persimilis*

A-D - plastic containers; c - cover, cl - cut leaves, eb - empty base; et - exit tube; l - lid; pb - perforated base; rp - raised platform; sj - sealed joints; t - trough; v - ventilation.

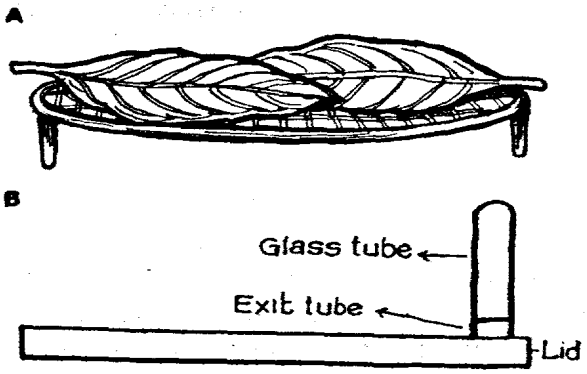

Fig. 2 A. Raised platform with cut leaves
B. Predator collecting unit

container was then held over a permanent empty base made of plastic which in turn was kept over a trough of water to prevent any possible escape of predator. The room temperature was maintained at 28 ± 1° C with 70-85% RH.

When predators were seen moving inside the exit glass tube, spider mite-infested cut leaves were stacked in container 'B' (as done in the case of A) and held over 'A' after replacing the lid over 'B'. All joints of the containers were sealed with an adhesive tape. This procedure was followed after every 2-3 days for C and D containers too. The predatory

mites actively preyed on the mites and laid eggs in container 'A'. When food became scarce, the predators moved to B, and when provided prey laid eggs. At one stage all the four containers had predatory mite populations. However, the last egg that was laid in container 'A' hatched and nymphs moved to upper containers in 5-6 days. Therefore the lower container was removed at 6 days interval as it did not contain any predator. When container 'A' was removed, container 'E' was added over 'D' so as to have four containers at a time.

When the predator populations were found in excess (observed through exit glass tube), certain populations were removed immediately as the food supplied in unit chamber may not be sufficient. Collection of predator was simplified by placing an inverted glass tube over the exit glass tube after removing the cover (Fig. 2B) a day prior to charging with new container. Adult mites that moved away from the plants, migrated into the tube. The tube was removed later and the predators utilized for field releases or for starting new units. Using this unit about 200 adults were collected during the first fortnight. However subsequent collections yielded more number of adults in shorter periods. In this method, the rearing area was reduced, it was less labour intensive requiring only a little technical skill and the environment could be controlled for better production.

KEY WORDS: *Phytoseiulus* mass production, *Tetranychus urticae*

ACKNOWLEDGEMENTS

The author is grateful to Mr. S. Hanumantharayappa, for the help rendered during the course of study. He is also thankful to the Director, IIHR, Bangalore for extending the facilities.

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