Integrated Pest Management in Western Australia©

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INTRODUCTION

Integrated Pest Management (IPM) is a method used to control insects and diseases in horticultural crops throughout the world.

Manchil IPM Services Pty Ltd (Manchil) is a Western Australian company that produces three types of beneficial bugs and mites that are distributed to growers around Australia. The use of beneficial insects is significantly increasing as pest insects are becoming more resistant to older chemistry and safety issues related to the use of toxic chemicals gain greater public awareness.

Manchil also runs a crop monitoring service checking grower's farms for pest insects.

Manchil is a member of the Australasian Biological Control Association (ABC), which seeks to encourage growers to gain accreditation that enables them to exhibit the IPM logo on their fruit and vegetable produce.

BENEFICIAL INSECTS (PREDATORS)

Orius armatus.

Orius armatus is a predator of various species of thrips (larvae and adults) especially Western flower thrips (WFT). In the absence of thrips *Orius armatus* can survive on aphids, spider mites, butterfly/moth eggs, and pollen. *Orius* is a native to Western Australia. Manchil has recently developed a technique for the mass rearing of the bug under laboratory conditions at its insectary facility at Muchea, Western Australian (WA).

Crops Suitable. Worldwide, *O. armatus* is used to specifically control thrips in capsicum crops. Strawberries, gerberas, and eggplant are also suitable. Crops that produce flowers with pollen and that are not immediately harvested are best suited for *O. armatus* use. Roses for example, whereby the heads open and are cut regularly, are not suitable for *O. armatus* use — with the exception of potted roses that are allowed to go to open bloom.

Description. *Orius armatus* has seven developmental stages. The female lays its eggs in the plant tissue of the stem, fruit, petiole, and major veins on the underside of the leaves. The development time from egg to adult is about 16–18 days at 25 °C and 12 days at 30 °C. At a temperature of 20 °C, *O. armatus* can kill about two thrips a day. When the pest population is high, it will kill more thrips than is required for its nutritional needs. Adult *Orius* have good flying capabilities and move quickly, which helps considerably in finding new prey and in dispersing within the habitat.

How to Use. *Orius armatus* is supplied to growers in units of 1,000 adults and nymphs, contained in a 500-ml plastic bottle of mixed vermiculite and buckwheat husks.

Monitoring. *Orius armatus* is light sensitive, therefore during the cooler darker periods of the day *Orius* will hide more in leaf tips and stems. They are more active in the middle of the day as indicated by the red staining that it secretes onto the white petals of capsicum flowers when feeding in the flower.

Once *O. armatus* has been released for 3–5 weeks, juvenile *O. armatus* will appear and will have a red dot on their backs during the early stages of their growth. After 3 months it should be found throughout the greenhouse.

Phytoseiulus persimilis.
Persimilis is a predator of all spider mites, in particular two-spotted mites (*Tetranychus urticae*) (TSM), also referred to as spider mites and bean spider mite (*T. ludeni*).

How to Use. Persimilis is now supplied in a pure form in 500-ml plastic bottles of mixed vermiculite. Previously, the mites were bred on bean leaves and transported with the leaves in paper bags together with the food source of TSM. This new method has the advantages of being free from any contaminants, more easily applied and cheaper to transport. The vermiculite is sprinkled at random over the plants and released at higher rates in spider mite hot-spots. Manchil can still produce persimilis in leaf form at a grower's request.

Neoseiulus cucumeris.
Cucumeris is a predator of thrips, particularly WFT (*Frankliniella occidentalis*), and broad mite (*Polyphagotarsonemus latus*).

Crops Suitable. Cucumeris does well in humidities above 65% and in crops with heavy foliage. It is used successfully in many protected crops, including tomatoes, capsicum, greenhouse vegetables, cut flowers, ornamentals, and strawberries. In capsicums *Orius* should be used in conjunction with cucumeris to gain total control of thrips.

Description. This predatory mite has been produced commercially for many years in Europe and for over 5 years in Australia. It feeds on the larval stages of thrips and some mites. It is part of a large group of predatory mites called phytoseids.

The adult predatory mite is cream colored, while the younger stages are clear. Both forms are pear-shaped and fast-moving. Predator eggs are clear and slightly oval and about 1.5 times the size of a two-spotted mite egg. Cucumeris feed on 1st and 2nd instar thrips larvae.

HANDY TIPS

For thrips, only the tiny, first-stage larvae are eaten, so it is important to release predators early, and to control adult thrips by trapping them with sticky traps and/or by screening vents and doorways to prevent swarms from entering the greenhouse. In cucumbers, different thrips species prefer different plant strata. Release mostly on lower leaves for onion thrips and upper to middle leaves for thrips. For broad mite, release in growing tips. Go for overkill of pests by releasing often. For thrips, use with Hypoaspis-S and nematodes applied at ground level.

MONITORING

Manchil provides an insect and disease monitoring service for most horticultural crops. Depending on their location, farms can be monitored on a weekly, fortnight-

ly, or monthly basis. Manchil technicians monitor crops by checking leaves, fruits, flowers, and stems for beneficial insects and pests. On the day of inspection the grower is handed a printed report showing details of pest and beneficial numbers present, along with comments and recommended control actions — which may include soft chemical selections or biological control options.

Manchil monitors a range of horticultural crops which include; strawberry crops with cultivars such as Camarosa, Gaviotta, Albion, Calmino Real, Selva, and Aromas. The monitoring season ranges from May to October in Perth and until December in southern regions of WA. Greenhouse strawberry crops are monitored throughout the year especially with growers using heating in winter. Cut flowers such as roses, gerberas, carnations and greenhouse vegetables such as cucumbers, capsicums, tomatoes, and egg fruit are also monitored throughout the year. Field crops such as sweet corn, tomatoes, lettuce, capsicums, and nursery roses are monitored mainly from September through to April.

AUSTRALASIAN BIOLOGICAL CONTROL ASSOCIATION

Manchil became a member of the Australasian Biological Control Association (ABC) during 2004. This organisation was established in 1992 for the purpose of facilitating co-operation and information exchange between professional horticulturists and the companies producing beneficial arthropods for horticultural use. There are currently eleven members from Australia and two from New Zealand.

IPM ACCREDITATION

The ABC is currently implementing an IPM accreditation scheme.

- Crop consultants are assessed by experienced members of the ABC and, if proven suitable, are then able to nominate selected growers for accreditation.
- A grower must meet a set of criteria that demonstrates that they are making a significant effort to incorporate biological methods and minimise disruptive chemical controls in their pest management programs.
- Accreditation by ABC enables the grower to use the IPM logo on their product. This logo is a measure of a high level of commitment to IPM and the need to reduce chemical inputs and minimise environmental and human health impacts.