



Newsletter - June 2014

Welcome to the first newsletter of our new company—we hope that you find it informative. Read the first article about the combination of 2 of the most innovative biocontrol companies in Australia into one new entity. The new logo reflects some of the key organisms reared by Manchil IPM - *Orius* for thrips and *Persimilis* for spider mites as well as key organisms reared by Biological Services - *Aphytis* for red scale and *Encarsia* for greenhouse whitefly.



Manchil IPM and Biological Services Join Forces

Inside this issue:

<i>Breaking news—Biocontrol companies consolidate</i>	1
<i>Successful use of Orius in strawberries grown under covers</i>	1
<i>Adelaide Plains update</i>	2
<i>Diadegma to help control diamond back moth</i>	2
<i>Nesidiocoris—new greenhouse whitefly control available</i>	3
<i>Aphid control in outdoor crops—initial trials promising</i>	3
<i>Meet the whole team</i>	4

After several years of working very closely together Biological Services and Manchil IPM Services have decided to consolidate and operate as one business. Biological Services commenced in 1971 breeding *Aphytis melinus* for red scale control in the southern citrus districts of Australia with Mediterranean conditions. Whilst *Aphytis* is still widely used, and remains a key product for the citrus industry, we have over time diversified into other horticultural crops that required biocontrol agents for their key pests. Manchil IPM Services started in 2002 focusing initially on rearing *Phytoseiulus persimilis* for two spotted mite control in the Western Australian strawberry industry, but since then have also increased their range of organisms. More recently both businesses have jointly been developing programs for horticultural growers Australia wide. Combined we now produce 16 biocontrol agents for pests such as whiteflies, thrips, mites, aphids, fungus gnats, red scale and cabbage moth. Whilst the busi-

ness will still be called Biological Services, both insectary sites will be retained, and all staff and consultant contacts will stay the same. Both Lachlan, James and staff are strongly committed to producing and supplying quality biocontrol organisms, advice and consultation to growers to reduce the reliance on broad-spectrum chemical use.



Directors of the new Biological Services
James Altmann (left) and Lachlan Chilman (right)

The successful use of Orius in strawberry crops grown under covers

For many years strawberry growers have struggled to control western flower thrips (WFT) with chemicals largely due to the high level of chemical resistance to most commonly used insecticides. In outdoor strawberry IPM systems, the key thrips predator has been the predatory mite *Neoseiulus cucumeris*. This mite feeds on the juvenile stages of WFT and growers normally only need 3 introductions per season for effective control. Newly fumigated ground is also inoculated with two *Hypoaspis* species to aid in control of thrips pupae that drop to the soil. In combination this program has proved highly successful over the last 4 years of implementation. However, strawberries grown under covers tend to suffer from much higher thrips pressure due to the higher temperatures and drier conditions under the covers. In these situations an additional predator is required—*Orius*. *Orius* controls not only juvenile thrips but feeds on adults as well. *Orius* will take 4-6 weeks to establish evenly in good numbers throughout the crop. As *Orius* will also feed on pollen it is critical that good numbers of flowers are present in the crop to help build *Orius* populations quickly. Protected strawberry growers in WA have been using *Orius* in conjunction with *Cucumeris* successfully for a number of seasons now with excellent results. Trials in Victoria in covered houses have produced similar results and there is increased interest from more growers to use *Orius* this year.



Adult Orius feeding on thrips larvae

Another Successful year for IPM growers on the Adelaide Plains

Biological Services is nearing completion of a second year of successful IPM programs in capsicums, cucumbers, eggplants and tomatoes in the Adelaide Plains district. In this area, all farms experience high pest pressure, high levels of pesticide resistance from overuse of sprays, and high incidence of virus/disease. In some cases complete greenhouses of capsicums can be ruined by tomato spotted wilt virus before any fruit are picked. Greenhouse structures are typically low tech, with poor hygiene, lack of weed control, and no exclusion practices such as insect meshing. The growers using IPM have changed their approach. Their pest control is now based primarily on the use of beneficial organisms and improved weed control and pest exclusion. If needed, selective insecticides are still utilized as a backup instead of the regular use of broad-spectrum insecticides.

The IPM system has seen the major pests well controlled—these include western flower thrips (*Frankliniella occidentalis*), two spotted mite (*Tetranychus urticae*), aphids (mostly *Myzus persicae* and *Aphis gossypii*) and greenhouse whitefly (*Trialeurodes vaporariorum*). Key beneficials used are *Orius tantillus* and *Neoseiulus cucumeris* for thrips, *Phytoseiulus persimilis* and *Neoseiulus californicus* for two spotted mites, *Encarsia formosa*, *Eretmocerus narrae* and *Nesidiocoris tenuis* for whitefly, and *Aphidius spp.* for aphids. Some secondary pests that were traditionally controlled with broad-spectrum sprays still cause some problems. These include mirids, broad mite and green vegetable bug. These pests are often associated with poor hygiene practices and can be improved by better weed control and screening. Other key issues faced by IPM growers this season have been:

- ◆ spray drift from other properties, (especially those in close proximity to neighbours)
- ◆ improper decontamination of spray tanks leading to accidental cross contamination of chemicals into IPM greenhouses.

Precise chemical residue tests have detected several contamination issues and have been important in understanding issues for the IPM system.

The key to successful IPM programs has been the regular crop monitoring and close consultation with growers. Two full time consultants Steve Coventry and Jake Byrne, and casual scout Toni Casey work as closely as possible with growers to educate them in

Watch out diamond back moths—*Diadegma* is here!

Brassica growers know the battle to protect crops against diamondback or cabbage moth (*Plutella xylostella*) is never ending. Diamondback moths can cause significant damage in brassica crops including cauliflowers, broccoli and canola, especially in drier seasons. Resistance has developed to many of the commonly used insecticides making chemical control difficult. The new group 28 insecticides which includes *Belt* have proven to be very effective in controlling cabbage moth but if they are overused, resistance will also occur to them (and in fact resistance to this group has already occurred in parts of Asia). To help reduce resistance pressure there is a new ally for growers in the form of the parasitic wasp *Diadegma semiclausum*.

Trials were developed by Paul Horne and Jessica Page of IPM Technologies several years ago. They combined the use of *Diadegma* wasps with chemicals safe to beneficials in Victoria (Werribee) and Tasmania. Biological Services in conjunction with IPM Technologies, Bayer Crop Science, Sumitomo Chemicals and EE Muir & Sons have now developed a commercial IPM program for broccoli and cauliflower. Parasites are now available in limited numbers for sale to growers.

Wasps are released into crops as pupae on paper cards and are placed in containers through the crop. Two releases are recommended per planting approximately 2 and 4 weeks after planting.

Both wasps and distribution containers can be ordered through Biological Services or your nearest EE Muir & Sons supply store. Please contact your local office for more information.

IPM practices.

Some of the key improvements that IPM programs have delivered are:

- ◆ reduced pesticide use (up to 80% reduction)
- ◆ reduction in virus infection (especially with growers in their second season of IPM)
- ◆ less time spent spraying, leading to more time allocation for other farm duties
- ◆ increased plant health with the reduced pesticide application
- ◆ increased longevity of the crop
- ◆ increased yield

This season the best results were achieved where whole farms and adjacent neighbours applied IPM programs. It is highly recommended that where growers have neighbors with crops in close proximity, that both properties utilize the IPM program. Several instances have occurred where beneficial organisms have been killed by spray drift from neighboring properties.

New developments for 2014/15

- * *Nesidiocoris tenuis*, a predatory bug is now being used in combination with *Encarsia* and *Eretmocerus* in commercial tomato and eggplant crops for control of whitefly. The new predator has so far proven very successful, particularly when introduced at the seedling stage.
- * *Neoseiulus californicus* was successfully reared off plant this season and used to aid in control of two spotted mite in crops alongside *Phytoseiulus persimilis*. They will be introduced earlier and in larger numbers this season especially for hot/dry environments.
- * A cool room was set up at CRT on the corner of Gawler Rd and Mays Rd. Deliveries of beneficials were held in cool storage to extend beneficial quality and ease of access for growers. This was very successful and we will now build our own for the coming season.

We are very grateful for the assistance from CRT. We would also like to thank the Hortex group and Tony Burfield for their support.



Diadegma semiclausum adult female



Diadegma release point



Adult *Nesidiocoris* feeding on whitefly scale



Nesidiocoris nymph

"*Nesidiocoris* is a voracious general predator and a major natural enemy of pests such as whitefly, moth eggs and caterpillars"

New beneficial to combat greenhouse whitefly

Greenhouse whitefly has been the bane of many indoor tomato growers lives for decades, but finally there may be light on the horizon. The latest tool for Australian growers in the war against whitefly is the predatory mirid *Nesidiocoris tenuis*. *Nesidiocoris* is found extensively in Mediterranean climates and is found naturally in all mainland states of Australia. Adults are bright green, are 5-6 mm long with several black specks on their clear hind wings and can fly. Nymphs are 1-4mm in length and are yellow to bright green with red eyes, but cannot fly. *Nesidiocoris* is a voracious general predator and a major natural enemy of pests such as whiteflies, moth eggs and grubs. It also feeds on other pests such as thrips, two spotted mite and some aphids. *Nesidiocoris* is recommended for use on tomato and eggplant (aubergine) crops for controlling both greenhouse whitefly and silver leaf whitefly. *Nesidiocoris* are supplied in bottles containing adults and late instar juveniles in inert vermiculite allowing them to be easily applied to crops by sprinkling onto the heads of plants. Ideally they should be applied in the nursery prior to planting out. In production houses *Nesidiocoris* should be applied once or twice at planting, the rate depending on pest numbers present. To optimize whitefly control, *Nesidiocoris* should be used in conjunction with *Encarsia* and *Eretmocerus* for best results. This is especially important where pest levels are moderate to high.

Nesidiocoris will feed on plant tissues, especially in the absence of sufficient pest prey. Symp-

tomts due to plant feeding are common but rarely economic. These symptoms tend to increase in the following situations:

- ◆ If little or no prey is available
- ◆ If high numbers of predatory bugs are present in the growing points of plants
- ◆ In hot conditions more sap feeding occurs to maintain their body moisture
- ◆ Some small fruiting tomato varieties such as cherry tomatoes may be more sensitive to mirid feeding and lower numbers are recommended in these situations

Eggplants are less sensitive to *Nesidiocoris* feeding than tomato.

Symptoms of feeding may include:

- ◆ Necrotic feeding rings on soft plant stems and flower petioles
- ◆ Spotting and holes in new leaves or flowers
- ◆ Flower drop
- ◆ Uneven setting
- ◆ Feeding spots on fruit

Where *Nesidiocoris* populations need lowering, several controls are available to reduce the predators as required, before any commercial damage occurs. Control can be achieved without eliminating *Nesidiocoris*, so they remain in the crop and keep whitefly numbers low.

For more information and to find out if *Nesidiocoris* might be an option for you, contact your Biological Services IPM consultant.

Aphidius trialled in outdoor crops

Over the last 2 years Biological Services has been carrying out a number of trials with Melon growers in the Northern Territory, WA, Queensland and NSW. The trials have been mainly focusing on controlling the cotton or melon aphid, *Aphis gossypii* and two spotted mites. The aphid pressure in some of these districts is extremely high and plants can be suffocated by aphids. On top of the aphid pressure, insecticide resistance is widespread, and the aphids often transmit viruses. Growing crops without aphid damage can be difficult. Biological Services has supplied *Aphidius colemani* to these growers, and although it is too early to say that the program has been completely successful, a very high level of control has been achieved when using *Aphidius*. The most successful procedure is to release *Aphidius* when aphids are low or before they are detected, once the first crop of melons start to run. Releases continue on a weekly basis for at least 3 weeks thereafter, and occurs over each planting thereafter.

The use of banker plants early in the season to generate larger *Aphidius* field colonies is being trialled this season. Like most

IPM programs, the use of pesticides needs to be adjusted to have less effect on beneficials in their critical periods. The predatory mites *Persimilis* and *Californicus*, are also being introduced to help control two-spotted mites. Due to the size of plantings, only the perimeters of blocks and known hotspots are being treated. Last year significant reductions in the need for miticide applications were also achieved.



Photos showing *Aphis gossypii* and parasitised aphid mummies on water melon leaf (left) and (right) adult wasps and 100% parasitised mummies on water melon fruit Mataranka NT 2013



The Manchil team in WA.
 From left rear: Darryl, Parag, Cezar, Caitlin, Chevaun,
 Middle row: Amy, Roxy, Barker
 Front Lachlan Chilman and daughter Jasmine



Biological Services team in SA.
 Back from left : Rob, Kylie, Lewis, Ben, Trevor, James Altmann,
 Middle row: Terril, Sue, Simone Altmann.
 Front row: Lisa, Trish, Caroline, Mark



Adelaide Plains staff: Jake, Steve and Toni



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Biocontrol Products available:

Pest	Control	Pest	Control
Aphid	<i>Aphidius colemani</i> <i>Aphidius ervi</i> <i>Aphelinus abdominalis</i> Aphid parasite mix (3 species mix)	Red Scale	<i>Aphytis melinus</i>
Diamond back moth	<i>Diadegma semiclausum</i> <i>Diadegma</i> release containers	Thrips	<i>Neoseiulus cucumeris</i> <i>Orius tantillus spp)</i>
Fungus Gnat/Thrips/Shorefly	<i>Hypoaspis miles</i> <i>Hypoaspis aculeifer</i> <i>Hypoaspis</i> mix (2 species) <i>Dalotia coriaria</i>	Two spotted mite	<i>Phytoseiulus persimilis</i> <i>Typhlodromus occidentalis</i> (on leaf) <i>Neoseiulus californicus</i>
		Whitefly	<i>Encarsia formosa</i> <i>Eretmocerus narrae</i> <i>Nesidiocoris tenuis</i> <i>Nesidiocoris</i> food (<i>Ephestia</i> eggs)

Other IPM Tools Include:

Hand Lens (10x)	
Pheromone Traps	Codling moth (<i>Cydia pomonella</i>), light brown apple moth (<i>Epiphyas postvittana</i>), oriental fruit moth (<i>Grapholitha molesta</i>), stored product moth (<i>Plodia spp</i> , <i>Ephestia spp</i>)
Yellow Sticky Traps	100mm x 150mm (cardboard) 100mm x 250mm (plastic)