Issue No.38 VEGIE BITES March 2010

National Vegetable Industry Centre Newsletter

Silverleaf Whitefly

Tony Napier and Sandra McDougall, I&I NSW, Yanco

Whitefly are small sucking pests similar to aphids or leafhoppers with three distinct biotypes found in Australia. These include the Australian native whitefly or cotton whitefly, Silverleaf whitefly – biotype B and Silverleaf whitefly – biotype Q. The Australian native whitefly is commonly found in Australia and generally causes no problems in agricultural crops.

Silverleaf whitefly (both B & Q biotypes) can cause problems and is a serious pest of many vegetable crops including cucurbits, tomatoes, brassicas, beans and lettuce. Silverleaf whitefly biotype B (SLW) was first discovered in Australia in 1994 and within 10 years, many Queensland growers were experiencing significant crop damage. In January 2009 biotype B was found in the Riverina on melons in the Griffith area. It was hoped that the pest would not be able to over-winter due to our cold winter climate and few host plants. Unfortunately SLW has been found again on the same property and causing further problems this season. It is now likely to spread across the Riverina over the next few years and infest more susceptible crops. One of the biggest problems with SLW is its ability to quickly gain resistance to insecticides, especially pyrethroids and organophosphates. Some resistance or tolerance has been observed with SLW on all new insecticides.

While feeding, SLW can cause damage to vegetable crops in many ways. When the pest population is high, direct feeding from adults and nymphs can cause poor growth, stunting, reduced yields and some plant deaths. SLW also excrete honeydew which encourages the growth of sooty moulds. This reduces appearance and marketability of the fruit and can also affect plant growth by reducing plant photosynthesis. While feeding, SLW inject saliva into the plant which can cause physiological changes in crop tissue with SLW biotype B. In squash, zucchini and pumpkins it causes a characteristic 'silver-leaf' symptom and fruit discolouration. In tomatoes it causes uneven ripening of fruit. SLW adults can also be a vector for spreading viruses from infected plants to healthy plants. Virus transmission is an issue for tomato growers with two Gemini viruses found in Australia.

Silverleaf whitefly – biotype B infesting a melon crop in the Riverina

Silverleaf whitefly – biotype B

A number of generalist predators and specialist parasitoids will feed on SLW. In 2004 a parasitoid wasp, *Eretmocerus hayati* was introduced from Pakistan and released in Queensland. This wasp is now established and helps reduce SLW populations in the region. When parasitism reaches 70-80% melon growers in the Burdekin district do not need to spray for Silverleaf Whitefly.

Regular monitoring is required in deciding how and when to make control measures. SLW adults are large enough to be seen with the naked eye but the nymphs are very small and a 10 x lens is useful if you are trying to count them. Sampling is best done early in the morning by focussing on the underside of leaves. Parasitised nymphs change colour relative to unparasitised nymphs and need to be checked for. Cultural control is imperative, with quick cleaning up of crop residues and eliminating alternative hosts a priority.

Note that the first 1-2 years after the arrival of a new pest is usually the worst years for extreme populations. In the long term an area-wide approach with emphasis on supporting SLW natural enemies will be needed to manage SLW.

Chemical options are limited with Silverleaf whitefy with excellent application required and care taken to rotate chemicals groups. The options below are a guide only. Read the permit and/or product label before intended use for specific information.

- Confidor Guard® (imidacloprid) – For subsurface soil application at planting and is effective on nymphs and adults but has no effect on eggs.
- Admiral® (pyriproxyfen) and Movento® (spirotetramat) – These insecticides control the egg and nymph stages but are not effective against adults.
- Chess® (pymetrozine) – Controls the adults but not effective on the egg and nymph stages.
- Talstar® (bifenthrin) – Effective on all life stages although SLW has developed resistance to pyrethroids. Using the synergist PBO improves efficacy, particularly when applied prior to a bifenthrin spray on resistant populations.

For further information, contact the District Horticulturist at Yanco Agricultural Institute on (02) 6951 2611. Also a detailed Primefact on "Silverleaf whitefly in vegetables" can be found on our website at: http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0019/312805/Silverleaf-whitefly-in-vegetables.pdf

Using Soil Solution Extraction Tubes

David Troldahl I&I NSW, Yanco

Extracting water from the soil using ceramic suction devices has been used in Australia for over 30 years. Soil Solution Extraction Tubes (SSETs) are active lysimeters, which draw water out of the soil through negative air pressure (suction) exerted within the ceramic cup and tube of the SETT.

Soil solution extraction is steadily increasing in popularity as a tool to assist growers in salinity and nutrition management, rather than only a research tool. The traditional management strategy for soil nutrition and salinity has been a soil test prior to the crop being sown. From these tests the growers can plan their fertiliser applications for the season, but have no idea during the season if the nutrients have been leeched from the root zone or remain within the root zone where they are available to the plants. For growers not carrying out sap testing, the first indication that there is a nutrient deficiency or toxicity is when it becomes apparent from the plant, by this time there may have been enormous yield losses or the crop may even be past help.

The advantages of the SSET's are that they are easy to install and only disturb a small area of soil, reliable sampling can occur after a couple weeks of irrigation cycles and they can be placed at any depth. The disadvantages of the SSET's are that they need to be primed (suction applied) a day or so before the sample is extracted, they will not operate if the ceramic tip loses contact with the soil or leaks air and the ceramic tips are easily broken and can clog up in clay or loamy soils.

SETTs installed at 3 different depths in a lettuce crop

Analysing soil solution extracted from the SSET's provides a quick easy and economical way to measure salt and nutrient levels in the soil throughout the growing season. This allows for the early detection of any problems and corrective action can occur before damage to the crops yield potential is incurred.

Soil solution extraction tubes are widely used in orchards and long season crops, but it is still to be determined how useful they are in shorter season vegetable crops. For further information, contact the District Horticulturist at Yanco Agricultural Institute on (02) 6951 2611.

Biological Control of Onion Thrips on Stored Red Onions

Greg Baker and Kevin Powis, SARDI

Despite frequent insecticide sprays in the field, onion thrips still infest onion bulbs after post-harvest. In storage the thrips continue to feed upon and damage the onion bulbs, particularly the high-value red salad varieties, often reducing the packout of premium value bulbs by 35% or more. To address the problem, a study was undertaken in South Australia to assess the potential of commercially-reared predatory mites to control onion thrips and limit their damage to stored onions.

Two species of predatory thrips (*Neoseiulus cucumeris* and a *Hypoaspis* sp) were evaluated in a 2007 trial. Both species of mites were introduced at three different densities (0.25, 1.0, and 4.0 L mites in vermiculite) into 600 kg storage bins as these were filled with red onions in a storage shed at a grower's property in Mypolonga, SA. The onions were harvested on 1 February 2007, and the mite treatments where introduced at three layers (bottom, mid and top) as the treatment bins were filled on 14 February 2007. The effect of the *Hypoaspis* sp. introductions was statistically insignificant. By contrast, thrips densities and resultant feeding damage were significantly reduced by *N. cucumeris* at all three seeding densities.

The bins treated with the predatory mite of *N. cucumeris* had very promising results. More than 35 % of the onions subjected to *N. cucumeris* were upgraded to premium quality when compared to the control bins were no predatory mites were introduced. A commercial bin holds approximately 600 kg onion bulbs. This represents a savings of $147 per bin at the 2007 price differential between premium and lower grade onions. The cost of treating a bin with the intermediate 1.0L dose of *N. cucumeris* was estimated to be $15.

Fig. 1. Red onions downgraded with thrips blemish

Fig. 2 Premium grade onions devoid of thrips scarring.

The predatory mites, if present at detectably high densities on onions at the time of sale and consumption, could conceivably be a concern to consumers. However these mites, due to both their small size and the decline in their density around 4-6 weeks after introduction, would not appear to present a contamination threat to consumers.

Further studies on the most suitable rates (density of mites) and the best method for ensuring good distribution of the mites and hence effective thrips control throughout each bin are continuing. For further information contact Greg Baker or Kevin Powis at the South Australian Research and Development Institute on (08) 830 39544.

New Weapon Against Onion Thrips

T Napier & J Mo, I&I NSW, Yanco

Bayer Crop Sciences has recently registered Movento® (spirotetramat) for the control of onion thrips in onion for Australian growers. Movento® controls sucking pests in a range of vegetable crops and already has registration for use in cucurbits and lettuce. This insecticide will be very compatible with IPM systems as it is "soft" on most beneficial species. Growers will find that Movento® is not a quick knockdown chemical as it takes 7 to 10 day before peak activity is reached. Movento® is a systemic insecticide that controls the juvenile stages of thrips.

It is timely for a new insecticide to become available for onion growers. Many growers around Australia have complained that the chemicals they use to control onion thrips are not working as well as they once did. Unfortunately, this is due to high levels of resistance in many of the current insecticides used on onion thrips. This includes Karate® (λ-cyhalothrin) which is the most widely used onion insecticide in the Riverina.

Effective resistance management needs to be considered which will mean rotation of registered insecticides and limiting the number of application for each insecticide. It is recommended to rotate to a different insecticide after two consecutive sprays of each insecticide. Currently Karate® is best left for later in the season and applied when there is a rapid increase in thrips population. According to studies conducted here at Yanco, onset of rapid thrips population increases usually occurs after thrips density has reached two adults per plant and the plants are at the 5-6 leaf stage. Movento® doesn't seem to work well at high thrips densities and is better used early in the season when the numbers are below five adults per plant. For best rotation plans of Karate®, Movento®, and other registered insecticides in a single onion season, it is recommended that Movento® be used early in the season and leave Karate® for later in the season while other registered insecticides can be used at any time during the season.

Insecticide efficacy and thrips population studies being conducted at Yanco

It is worth remembering that combined application of Karate and Movento® will not enhance the control by either chemical and therefore should be discouraged. For further information, contact the District Horticulturist at Yanco Agricultural Institute on (02) 6951 2611.

Freshcare Food Safety & Quality – Training For Updated 3rd Edition Code

Gerard Kelly, I&I NSW, Dareton

Freshcare has now upgraded their Code of Practice and produced the Food Safety and Quality 3rd Edition Code. As a result, all growers currently accredited to Freshcare 2nd edition and new growers to Freshcare need to attend a training workshop about the new requirements. Growers' audits for Freshcare Certification after 1st March 2011 will be for the new 3rd Edition Code.

The 3rd edition code has several changes and additional requirements for food safety and quality practices on farm. Methods of risk assessment, hazard analysis critical control point (HACCP) and good agricultural practice (GAP) are used to identify and manage food safety and quality risks on farm. Some changes include assessment of water that is used for irrigation and post harvest washing, developing a list of approved suppliers for the farm business and documenting a simple flow chart of the main farm operations. The new code also provides innovative tools to guide growers through a risk based on-farm assurance process and practical forms and guidelines for growers to keep records.

I&I NSW have registered Freshcare trainers who can organise training worshops for interested growers. Freshcare training courses are registered with the Australian Government's FarmReady program (check course details at http://www.farmready.gov.au/ or phone 1800 087 670) and growers are able to register for the training and apply for a reimbursement grant which covers the course fees. For more information, contact registered Freshcare trainer Gerard Kelly, I&I NSW on 03 5019 8406 or 0411 139 657 to discuss attending a training course.

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