Australian Citrus Whitefly

Australian Citrus Whitefly (ACW), *Orchamoplatus citri*, was discovered in Auckland in October 2000 and quickly spread throughout the country. (It is now established as far south as Nelson). It can infest all varieties of citrus and causes sooty mould issues where it is allowed to take hold. Although called the Australian Citrus Whitefly, it is only a minor pest in Australia, as there are a number of beneficial insect species which keep it under control. In New Zealand, it is hoped that biological control will eventually control the pest, but until that point, it needs to be controlled by other means.

**Life Cycle and Habits**

ACW overwinters as immature nymphs that emerge as adults in the spring. In Gisborne, this hatch tends to be between Labour Weekend and mid-November, depending on the weather. From then, the adults lay eggs on young growth, crawlers emerge, and the whitefly goes through four nymphal instars before becoming an adult. Depending on the year, there can be a small release of adults in the autumn, although most of the late nymphal stages overwinter to the following spring and release as adults then. Only certain stages of the life cycle are susceptible to insecticide applications, and therefore the programme to control them must target these life stages.

Adults are the first life stage which can be targeted, young nymphs and crawlers are also susceptible.

**Damage**

Whitefly pierces leaves and ingests sap from the tree. When the whitefly are in their feeding stages e.g. adult and nymph, they also secrete honeydew. The piercing of leaves and ingestion of sap can weaken a tree, and allow secondary infection to occur. The secretion of honeydew however, is the major issue as sooty mould grows on this.

Sooty mould can cause significant problems when allowed to take hold. Severe cases can reduce the trees photosynthetic ability, therefore weakening it, and stunting growth rates. Sooty mould on fruit can cause delayed or uneven ripening, and the black mould is also difficult to remove through the packhouse system, so fruit gets downgraded.
In orchard where sooty mould is an issue, it can take several seasons to get back in control of the problem and clean the trees up.

**Cultural Control:**

Good pruning is very important when it comes to controlling ACW. An open canopy is imperative if control is going to be gained with insecticides, as ACW is often on the underside of the leaf, and therefore good spray coverage is essential.

An open canopy also allows for better air flow. Whitefly are small and lightweight so don’t respond well to being out in the open and can often be disrupted by wind and rain.

**Chemical Control**

Insecticides are still required for effective whitefly control as biological control alone is not sufficient to control populations. Some options are detailed below. There are no insecticides that have label recommendations for ACW; however, we know the products below are efficient in killing whitefly and some have label recommendations for whitefly control in other crops.

- **Mineral Oil** – a 1% mineral oil in mid to late October will assist in controlling juveniles as well as early scale crawlers and mites.

- **Diazinon (e.g. Dew 600)** applied once in November will assist with Whitefly, Thrips, Scale and Mealy Bug control. For best effect it should be applied with 0.5 - 1% spraying oil. The First Fresh spray program only recommends one application before the end of November to ensure fruit has no residue for market access purposes. We do still pickup Diazinon residues from applications made in November.

- **Movento** (Spirotetramat) applied twice (once in December and a second application before the end of January) will give good systemic control of Whitefly (during their feeding phases of life cycle), Scale, Thrips and suppresses Mealy Bug when used back to back. It is a systemic product that needs to be ingested (and not all stages of the Whitefly lifecycle feed) it takes time (approx. 7 days) to gain control but can last for 4 - 6 weeks. Movento only controls the crawler and early instar stages of the whitefly. Because of this, a knock-down application of oil, Diazinon or magnesium nitrate is recommended to control the adult population prior to the Movento application.

Movento is now registered for use on citrus for the control of Kelly’s Citrus Thrip and Armoured Scale. At the recommended label rates and timing, it will also control whitefly (crawlers and early instars). There is a 21 day withholding period, and a maximum of 3 applications during the season. However, there must be no more than 2 applications made within 90 days of harvest. Please check the 2014/2015 First Fresh Crop Protection Programme for export withholding periods, which are different to the NZ domestic market.

- **Buprofezin (Exault, Applaud, Mortar, Ovation, and Pilan)** is a growth regulator which hardens the shells of juvenile pests and prevents them from moulting into the subsequent instar. It is effective against Whitefly, Scale and Mealy Bug. It generally only attacks the young life stages and does not kill adults. It needs to be applied twice (generally two weeks apart) to ensure you break the lifecycle completely. It also has the advantage of being bee and beneficial friendly.
Magnesium Nitrate - The use of magnesium nitrate foliar applications for nutrition not only helps with nutrition, but the sticky nature of the formulation acts as a sticky trap for whitefly helping to control numbers of adults when it is applied between fruit set and Christmas.

Pymetrozine (Chess, Bravium) – this chemical has systemic and translaminar activity in the plant. It works by contact and ingestion, and within a few hours, whitefly will cease feeding, although it might take a few days for them to die. Pymetrozine is also very effective on aphids, so is a good option where Black Citrus Aphid is an issue. There are no MRL’s set for this product on citrus, so it shouldn’t be used after the 30th of November on winter harvested fruit (Navels, Satsumas, Grapefruit, and Tangelos). Avoid use on Encore, Valencia until the crop has been harvested. It should not be used on Lemons and Limes. NZCGI trials have shown that the chemical is affective, although residue work has not been completed.

Organsilicone (Penatra, Pulse Penetrant) – Again, NZCGI work has shown this to be effective on adult whitefly. Being a surfactant, it can also be added to some of the chemical options above, e.g. added to Biofezin, it will aid the penetration of the chemical into the whitefly, scale and Mealybug. Added to Chess, it will aid penetration into the whitefly, and the leaf for the translaminar and systemic activity. Penatra also has label registration for use with foliar nutrition products e.g. Magnesium Nitrate.

Wetcit – A new adjuvant for wetting and spreading. Based on cold pressed citrus oil, and biodegradable wetting agents this will enhance the efficacy of insecticides used against whitefly. It works in two ways to aid efficacy, being a highly effective spreader so getting into difficult to reach areas, and the ability to wet waxy insects therefore allowing better penetration of the chemical. Give me a call if you are interested in more information.

Resistance

Whitefly are tough little creatures and are renowned for their ability to quickly develop resistance to chemistry. With this in mind we need to follow a few rules to ensure resistance does not develop and cause us greater problems!

1. Never use lower rates than the label recommends. Although there are no label rates for whitefly, use the standard label rate for other pests, as you will also be targeting those at the same time. Using a lower rate to specifically target whitefly may have the counter effect of giving other pests a “sub-lethal” dose, leading to resistance development.

2. Mix up your chemistries. Don’t just use one product. The use of four or five different chemistries will give you better control, avoid resistance to a particular chemistry and avoid secondary infestations occurring. For example, mite populations exploding with continued use of Organophosphates (e.g. Dew) which kill their natural predators. The use of products such as mineral oil or magnesium nitrate helps reduce the reliance on traditional chemistry.

3. Monitor your block and assess pest numbers against industry set thresholds as well as numbers of beneficial insects before you decide to spray.

4. Wait until the 80% hatch for whitefly adults comes along. That way a greater amount of control is gained. There is little point spraying when the whitefly is still pupating, as no control will be gained.