CITTgroups AUSTRALIA
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Setting up a pest monitoring system in your orchard

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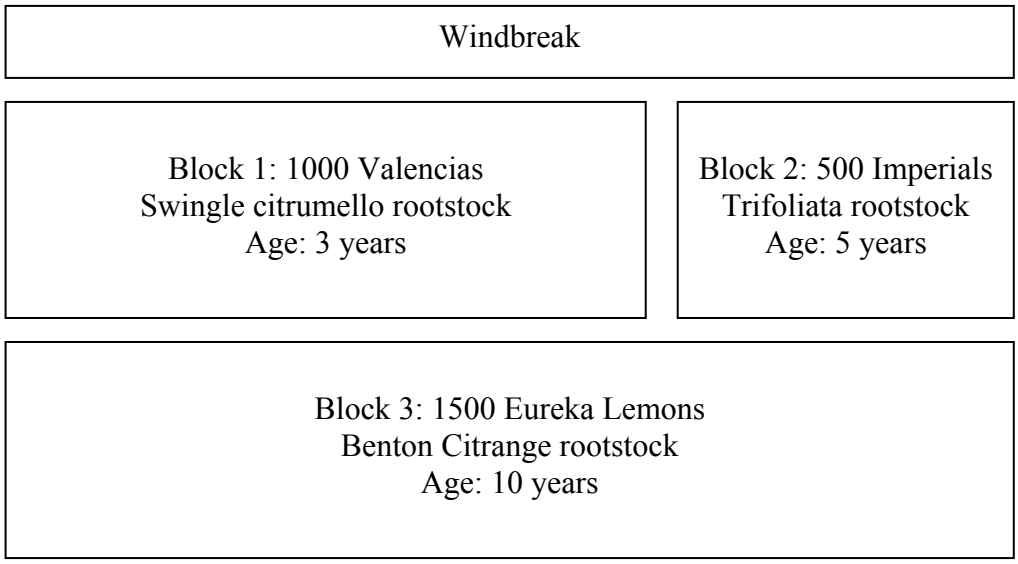
Most insect pests found in WA citrus orchards can be controlled using either natural enemies (parasites or predators) or by spraying with petroleum oils. By monitoring your orchard you can determine when and if you need to take action.

Where to Start

1. Make a map of your orchard: include details such as the number of trees, rootstock and planting date of each block. A block is usually composed of trees of the same variety, rootstock and age, on the same soil type, and is treated and sprayed as one unit.



2. Decide how many trees to sample per block: this will vary with the size of the block and the amount of time that you have to sample.

# trees per block	Area (Hectares)	# trees to sample
0 - 500	< 2	10
501 - 750	2 – 3	12
750 - 1000	3 – 4	15
1001 - 2000	4 – 8	20

When to monitor

Morning is the best time to monitor for insects as this is when they are least active and most likely to be seen. Be mindful however, of insects such as ants and weevils that will move into the tree as the day warms up.

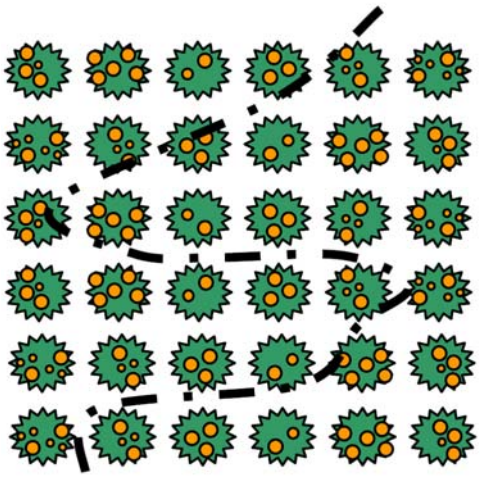
How often to monitor

How often you monitor will depend on the time of year and the level of pest activity. Pest activity is seasonal and insects are more active from spring to autumn. The stage of development of the crop will also influence insect activity. For example, citrus leaf-miner attack young leaf flush, particularly summer and autumn flushes.

- During high-risk periods e.g. flowering, fruit set, and as fruit is ripening, monitor every 3 to 7 days.
- As a minimum, sample at least every 14 days until you know what pests are present and when.

How to sample

Sampling must be random. Do not choose the same trees to sample every time, unless there is a good reason to do so. For example, if a particular area in the block has a history of being attacked by thrips. Even then, choose other trees to sample as well.



The easiest way to take a random sample is to walk through the block on a diagonal or in a zig-zag pattern.

Start from a new point each time you monitor.

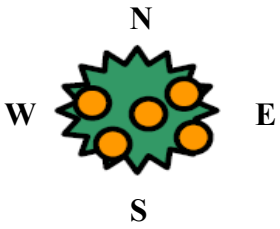
Avoid sampling small or unhealthy trees as these will give you a biased result.

Avoid sampling border (outside) rows as these will also give you a biased result.

Which parts of the tree to sample

Which component of the tree you sample (leaves, fruit, branches, flowers) depends on what pests are likely to be found at that time of year. For example, red scales are found on fruit as it matures, but the crawlers can be found on the leaves and branches.

For each tree selected, sample from each of the four quadrants (north, south, east and west) and from the middle of the tree.



Recording data

Record your sampling information in a way that you can calculate percentages of infestation. You need to know the percentage infestation on individual trees and for the block as a whole. Keep good records of your monitoring so you can develop a history for the block.

What to sample for

All trees

- Ants
- Sooty mould (indicator of other insects)
- Snails
- Thrips
- Whiteflies
- Mealybug
- Scale: Red scale, soft brown scale, hard wax scale (Chinese wax), white wax scale and black scale
- Beneficials (lacewings, ladybirds, mites, *Aphytis* on red scales)

Young trees

- Leafminer
- Scales (soft brown, black)
- Aphid

Take a hand lens or magnifying glass with you when you sample and collect samples of anything you can't identify (in a sealed plastic bag).

Be guided by the monitoring methods recommended in local Farmnotes and in the "Citrus Pests and their natural enemies" book.

Making a decision

The level of infestation or damage at which action must be taken to prevent an economic loss is referred to as the **action level**. Action levels for various pests are provided in "Citrus Pests and their natural enemies", by Smith *et al.* (1989) produced by QDPI. They are a guide only.

If the action threshold has been exceeded, then there are several options available. These include releasing beneficials and application of oils or chemicals. If you decide to use a chemical, choose one that is least likely to harm natural enemies.