

Orchard Mapping and Sampling

To ensure that monitoring is carried out in a consistent fashion, an orchard map must be obtained or drawn, and a sampling plan must be established for every block to be monitored before monitoring is due to start.

Orchard Mapping

Operators must have a documented system that includes an orchard map and sample plans for all properties being monitored.

Prior to beginning monitoring obtain or draw a map of the orchard that clearly illustrates each block and other significant landmarks. Record on the map the following:

- Name of orchard owner or manager
- Contact phone/fax number
- Orchard address, including number, road, and P-PIN
- Boundaries of blocks and orchards
- Buildings and other physical landmarks
- The number of trees per block
- Other block plantings e.g. kiwifruit

Sample Blocks

A sample "block" is defined as a group of trees on an orchard of the same age that are generally consistent in both tree size and management.

- Sample blocks are the areas that are to be monitored. Large blocks may be subdivided for sampling purposes.

- The number of blocks to be sampled should be agreed on between the Operator and the grower, and be consistent with these specifications. Factors to be considered in determining this are:

- o Historical pest levels (specify - take more or less if pest levels are high)
- o Sources of pest invasion e.g. shelter type, adjacent vegetation including unsprayed or neglected orchards
- o Presence and location of shelter belts
- o The need to obtain a representative sample of the orchard
- o Cost

- Sample blocks must be representative of the entire orchard, and scattered throughout the orchard.

All orchard blocks and the AvoGreen® sample blocks should be noted on the map with a number allocated to each of these blocks. The grower should be provided with a copy of the orchard map.

Sample Size

The programme is based on regular monitoring of a minimum of 10 leaf sites and 5 fruit sites on each selected tree, and must occur according to the minimum Monitoring Schedule ("Hyperlink to Monitoring Schedule").

The number of trees to be monitored will be based on orchard size.

For both the Marked Tree method and the Repeated Random Sampling method select the following number of trees for monitoring:

- If the block is less than 50 trees then select 5 trees;
- If the block is less than 3 hectares then select 10 trees;
- If the block is less than 10 hectares then select 30 trees;
- If the block is greater than 10 hectares then select 50 trees

Sample Plan

Once the sample blocks have been defined, a sampling plan for each block should be developed.

Sampling can be done by EITHER repeatedly visiting marked trees selected initially at random, OR by repeatedly taking a random sample from the block.

With either technique it is important that the resulting sample be representative of the sample block.

- Avoid selection of corner trees due to atypical influences
- Ensure representation reflects any sources of pest invasion e.g. shelter type, adjacent vegetation etc.
- If necessary subdivide the sample area to ensure representation.

Marked Trees

Within each block identify the appropriate number of trees spread across the block and mark these using a readily identifiable permanent marker e.g. coloured tape or paint. Monitoring is carried out on these trees only. Indicate the marked trees on the sample plan. When selecting trees to be marked, the grower or orchard manager should accompany the monitor. Re-select the set of marked trees every second season.

Repeated Random Sampling

True random sampling each round can be time consuming. Selection using a zigzag or W path through the sample block is an acceptable compromise. Start the zig-zag on each visit at a different location. On each visit trees would be sampled without regard as to whether or not they had been sampled on previous visits.

Sites to Monitor

Sites to monitor should be taken from around the circumference of the tree and at a range of heights within reach from the ground:

- A leaf site is the terminal growth on a branch and should include either new or mature leaves depending on the time of the growing season. The last 15 cm of growth should be examined.
 - A fruit site is a bunch of fruit i.e. touching fruit surfaces. Fruit monitoring should commence in February or earlier once adjacent fruit are touching. If fruit are not in bunches, fruit that have touching leaves may be used. If all fruit are hanging freely, sample 3 nearby fruit as a "cluster".
- If a tree does not have an appropriate number of fruit or leaf sampling sites, move to a neighbouring tree to obtain the required number. Do not reduce the number of sites inspected within a sampling season.