Crop Guide KB Item 3429v8

Avocado

Sampling Notes

The nutritional status of avocado crops is monitored using soil tests and plant analysis. Annual monitoring is important to help sustain optimum levels and avoid nutritional disorders. If disorders do occur, leaf analysis is a valuable tool to assist with the diagnosis of the problem.

Sampling for nutrient monitoring should be done in April - May to coincide with cessation of the season's growth.

Leaf

Sampling Time: April to May, when the summer flush has ceased.

Plant Part Youngest mature leaf (blade plus petiole).

Collect From: Shoots that are not flushing nor fruiting. Select from the canopy of the trees at shoulder height, and exclude boundary trees.

Quantity per Sample: 4-8 leaves from each of 20 trees selected at random from throughout the sampling area.

Recommended Tests: Basic Plant (BP), Chloride (Cl).

Comments: Select trees that are sampled and identify them so that they can be sampled again the following year.

Ensure leaves from each tree are taken evenly from the sunny and shaded sides.

Do not mix cultivars or trees of different ages in the samples.

To help diagnose an obvious problem, leaves showing the first signs of the distinctive symptoms should be collected as soon as abnormalities appear. If sampling outside the normal sampling time it is useful to take a second sample of similar, healthy leaves from nearby unaffected trees for analysis as a comparative standard.

Soil

Sampling Time: Prior to crop establishment and annually at any time of the year, although autumn to early winter is recommended.

Core Depth 15cm.

Collect From: The drip zone of the trees.

Quantity per Sample: One core from each of 15 - 20 trees.

Recommended Tests: Basic Soil (BS), Mehlich 3 (M3), [Optional:Total Copper (tCu)].

Comments: Separate samples should be taken from blocks that differ in age, cultivar types, tree performance, soil types, topography and fertiliser history.

Where fertiliser has been broadcast, sample from the drip zone of the trees. Where fertiliser has been banded, samples should only be taken from areas under the drip zone which have previously received fertiliser.

When sampling prior to orchard establishment, a 15 - 30 cm depth sample should also be taken, primarily to check the sub-soil pH.

If trying to diagnose a problem with crop growth and yield, samples should be collected from the rooting zones of the worst affected plants. In these circumstances, a second sample taken for comparative purposes from the rooting zones of normal plants may be useful.

Comments

Avocado trees have a moderate nutrient demand and will tolerate a wide range of nutrients in the soil, provided there is good drainage. Avocado roots are extremely sensitive to low oxygen concentrations in the root zone.

The key elements that avocado trees require are; nitrogen, phosphorus, potassium, calcium, magnesium, sulphur, boron and trace elements. The nutrients identified as being difficult to manage in New Zealand are nitrogen, zinc and boron.

Nitrogen has one of the most significant effects on tree behaviour. The use of nitrogen fertiliser is a key management tool for growers. Spring applications of nitrogen are important for supporting vegetative flush, especially if flowering is heavy. Nitrogen applications must be used carefully as there is a narrow optimal range. Excess nitrogen, which is not common in New Zealand, contributes to excessive vegetative growth at the expense of flowering, fruit set and fruit quality.

Potassium is important for many key functions within the plant. This nutrient is removed in fruit at harvest at a higher proportion relative to other nutrients.

Calcium is important for disease management in avocados as a means to manage Phytophthora and fruit rots.

Magnesium is essential for chlorophyll, the driver of photosynthesis.

Sulphur is a key element in protein synthesis.

Boron is important for fruit development and fruit set. Sufficient boron levels are required for fruit set and boron is frequently applied as a foliar spray at the cauliflower stage of flowering to increase levels.

Trace elements are a range of other nutrients that are essential for normal plant growth and function. These include iron, manganese, zinc, copper and molybdenum.

For symptoms of nutrient element deficiencies and toxicity refer to the NZ Avocado Growers Manual on the NZ Avocado Industry website.

Phytophthora is a common root rot pathogen that if not managed well, can severely impact root systems. Damaged root systems will be less effective at delivering nutrients and water to the tree.

The soil pH has a direct impact on the availability of the nutrients to the plant and can influence Phytophthora root rot development. Avocado trees grow on a wide range of soil pH and have been shown to grow well on soil pH ranging between 5.0 and 7.0. This does not mean that if the pH is outside this range avocados trees will not grow, however it may limit their ability to extract certain minerals from the soil, restricting tree functions and productivity. Al and Mn toxicity may become problematic at lower pH's if soils have higher levels of these minerals. Iron deficiency may develop at higher pH values. Phytophthora is a significant root rot pathogen of avocado and a pH value near 6.5 has been shown to reduce the effect of this pathogen.

Fruit rot prevention requires consistent copper fungicide applications year on year to protect the fruit and tree from infection. If growers are concerned about total copper level accumulation rates in soil, a total copper soil test is recommended.

Normal Range nutrient levels as shown in the histogram reports apply to the Hass variety. Other varieties may have different normal ranges.

References

Fertiliser recommendation for horticultural crops. HortResearch HortNET, 1997.

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Cutting, J. 1997. Guidelines for drawing leaf analysis samples. Pers. Comm.

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Disclaimer

Normal Range levels shown as histograms in test reports relate specifically to the sampling procedure provided in this crop guide. The Normal Range levels in test reports and Comments provided in this Crop Guide are the most up to date available, but may be altered without notification. Such alterations are implemented immediately in the laboratory histogram reports. It is recommended that a consultant or crop specialist be involved with interpretations and recommendations.