NSW GOVERNMENT Department of Primary Industries

primefact

Citrus Leaf Nutrient Analysis: methods

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Leaf analysis is a tool to indicate the nutritional status of your orchard. Leaf analysis is the chemical testing of leaves to provide nutrient composition of the sample. It provides a general indication of the nutrient levels in the plant, reflecting what the plant was able to extract and store during the current season. Leaf analysis is based on the fact that the amount of each nutrient present in leaf tissue is related to the supply, uptake and use of that element during the season. The concentration of most nutrients in plant tissue is restricted to quite a narrow range.

Although leaf analysis is good nutrient monitoring tool, it should not be solely relied upon to make dramatic changes to a nutrition program and should be used in conjunction with other nutrient monitoring information including tree and fruit observations.

Purpose of sampling

Leaf analysis is normally used for two main purposes:

Diagnosis: as a tool to determine the cause of a specific problem. Samples for this purpose are collected from trees displaying leaf symptoms, poor growth or suspected of having a nutritional problem. When undertaking diagnostic sampling it is useful to also collect a sample from a block of healthy trees of the same age, variety and rootstock for comparison.

Monitoring: as a tool to assess the current nutritional status of a crop or to assess the suitability of your fertiliser program. Samples for this purpose should be collected from a fairly uniform block of trees of the same age, variety and rootstock.

Interpretation

Leaf analysis interpretation charts were developed in USA throughout the 1960's to 80's. The interpretation chart was developed sampling numerous orchards of known health and cropping performance. Results from the higher productive orchards were used to develop the optimum leaf nutrient standards currently used in leaf analysis interpretation charts. A guide on interpreting leaf analysis results is presented in the "Citrus Leaf Analysis: Interpretation Guide" primefact available from the NSW DPI website

Sampling time & leaf type

Interpretation standards (Australia and USA) require the sampling of 4 to 7 month old fully expanded leaves from **non-fruiting** terminals. These leaves are picked late summer/early autumn or from about late February to late March in Australia. The leaves from the middle part of the flush are selected and for simplification these are often described as the 3rd and 4th leaf of the spring flush shoot.

A pictorial guide on the correct leaves to pick is presented in the "Citrus Leaf Nutrient Analysis: leaf sampling guide" primefact and video available from the NSW DPI website.

Preparing to take a Sample

Shop around for analysis laboratories. It can be cheaper if you are only provided with the results and not an interpretation of the results. It can also be cheaper if you take the samples yourself and post it directly to the laboratory rather than an agronomist collecting the samples for you. Collecting your own samples provides an opportunity to closely inspect the orchard. Information gathered during the orchard inspection will significantly improve the interpretation of results. Some analyses do not include molybdenum and boron. These can be included at extra cost, or can be excluded for a

cheaper cost. Check if postage is included in the price.

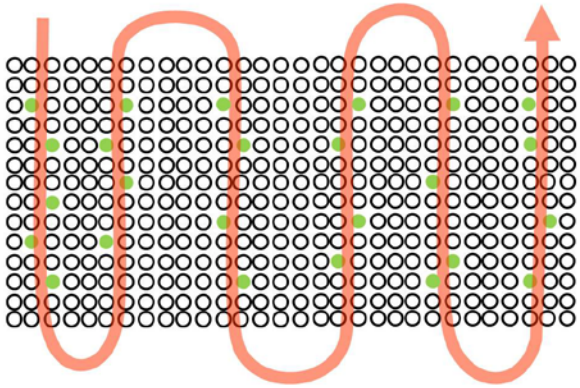
Once you have found a suitable laboratory it is recommended to continue with the same laboratory over numerous season for consistency. A NATA accredited laboratory is independently assured to have technical competence and industry best practice.

- Use the paper bags provided for samples (**no plastic bags**)
- Ensure your hands are clean (washed) or use fresh disposable gloves
- Correctly identify samples and blocks and clearly label each sample bag
- A block should be the same age, variety, rootstock and soil type
- Do not selectively sample from unrepresentative poor looking trees or headland trees

Sampling method

- Sample within a uniform block (i.e. same variety, rootstock, tree age, soil type, irrigation system etc.)
- Soil type can have a dramatic influence on the nutrient status of trees. If the block soil and/or topography changes in the block, it is best to take two samples (i.e. sandy and loam soil or top of hill and bottom of hill).
- Take 3-4 leaves from each of 20 to 40 representative trees, scattered throughout the block
- Sample leaves in the cool of the morning from 4-7 month old non-fruiting shoots (see “Leaf Sampling Guide” primefact or video)
- Sample at about shoulder height
- Sample all sides of the trees
- Sample healthy leaves – avoid leaves contaminated by disease, dust or chemicals
- Do not pick leaves from boundary rows
- Collect about 100-120 leaves for each sample
- Clearly write on the sample bag the block from where the leaves were taken and the date of sampling
- Sample leaves from representative trees throughout the whole block.

Figure 1: In mature hedge-row orchard walk up and down rows to collect leaves from representative trees throughout the whole orchard



Optional leaf washing procedure

Most laboratories do not wash leaves prior to analysis. If any contaminants are on the leaves (e.g. recent micronutrient sprays), this will cause excessive levels of certain nutrient to result. Iron is often shown to be excessive in leaf analysis results due to contamination of soil dust residue on leaves. Contamination has become more of an issue as growers have converted from overhead irrigation to under tree irrigation. Contamination can also occur from recently applied foliar nutrient sprays.

Most growers do not wash their leaves and accept that their iron and perhaps other micronutrient results will not be reliable. However washing leaves prior to posting is an option if the accuracy of iron is important or leaves were recently sprayed with foliar nutrients. Washing must be undertaken in a way to avoid further leaf contamination. Leaves can be washed by using the following method:

- Immerse the leaves in a basin of rain or deionised/demineralised water with 4ml of Agral® (a non-ionic detergent) or a few drops of non-phosphate laundry detergent. Do not use detergents that contain phosphates or other salts.
- Deionised/demineralised water is often used for car battery maintenance and can be purchased from a car accessories shop or supermarket.
- Rub each side or the leaf with soft sponge and then place it in a wire strainer (i.e. 20cm kitchen strainer). A quick method to wipe the leaves is to fold the sponge in your hand and place the

leaf in between the sponge. Pull the leaf through to clean both sides.

- When the strainer is full, put the leaves into a second basin of rain or deionised water. Do not put the strainer into the second basin of water to reduce cross contamination of the second basin. Gently rinse the leaves in second basin to remove the detergent.
- Unroll a one metre double layer length of paper towel on a clean table. Remove the leaves from the basin with a strainer (not the same one used in the first basin, it is advisable to number the strainers with a permanent marker pen) and place the leaves on the paper towel.
- Place another layer of paper towel on top of the leaves and pat down to absorb excess water from the leaves. Put the leaves on a dry length of paper towel and allow the leaves to dry before placing in paper bags. Leaves normally dry within a day.

More information

A video on leaf sampling and leaf selection is available on the NSW DPI Citrus Nutrition web page.

For updates go to
www.dpi.nsw.gov.au/factsheets

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