

Soil Testing

- the nutrient

management tool



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Why Soil Test?

Soil tests are commonly used to diagnose nutrient deficiencies and toxicities that may be limiting plant growth. They also help determine your soils structural status by testing for pH, aluminium and sodium content and the calcium:magnesium ratio.

Which Analysis Laboratory Should I Use?

There are several reliable soil testing laboratories to use within Australia. Check that the laboratory you use is accredited by the Australian Soil Plant Analysis Council (ASPAC) or holds National Analytical Testing Accreditation (NATA) or is ISO 9000 registered.

The key to consistent soil test results is to remain with the same laboratory. Contact your local agronomist or fertiliser representative and ask which analysis facilities they use. If you are happy with their service, stay with this lab. There are many variables that can influence soil test results, but you can eliminate one of these variables by being consistent with your choice of laboratory.

When Do I Soil Test?

There are two main seasons for soil testing: spring and autumn. Choosing between the two is a personal opinion but which ever you decide, make sure you keep your soil testing program consistent and continue testing in that season.

Spring is often chosen for two reasons:

- soil is usually still moist so extracting a soil core is significantly easier than after summer.
- soil test results are back in time to plan autumn fertiliser requirements and make use of 'early delivery options' offered by fertiliser companies.

Remember, when soil moisture is high, available soil nutrients are high. This means that your nutrient level readings of soil tests taken in spring will be higher (eg. higher Olsen P) than tests taken at any other time of the year and so can not be compared.

When Do I Soil Test? continued.....

Autumn is often chosen because landholders are beginning to thinking about fertiliser requirements.

- being closer to the time of sowing, autumn often gives a more realistic indication of nutrient levels available at sowing.
- You may need to allow 3 – 4 weeks for test results to return, so organise you soil testing in time to get your results back and fertiliser out.

The main message is to decide on a season and laboratory and stick to these so you can build up a comprehensive soil testing history of your property.

Which Paddocks Should I Test?

There are several ways of soil testing a farm to build a fertiliser history.

- Pick 3 – 4 paddocks (number depends on paddock size and number of paddocks on the property) on the farm which each represent a land-use class or soil type and test these ever one to two years.
- Work out a paddock soil testing rotation by which every paddock on the farm is tested every 3 – 4 years. For example, if you have 15 paddocks you may test paddocks 1 – 5 in the first year, paddocks 6 – 10 in the second, 11 – 15 in the third and then back to paddocks 1 – 5.
- Test paddocks that have been continuously cropped or pasture paddocks that will go into crop next year.
- Dairy farmers usually test paddocks before putting in a summer crop or paddocks that are performing poorly.
- Paddocks going into lucern or canola should always be tested prior to sowing to determine pH and therefore lime requirements.
- Paddocks going into a long pasture phase should be tested to determine whether lime and/or gypsum should be incorporated into the soil prior to sowing down.

Why Is Correct Nutrient Application Important?

Applying the correct amount of fertiliser is important for two reasons: the cost to you and the cost to the environment. Fertiliser application is often one of the highest monetary inputs into the farm, so should be carefully planned and monitored. If you use soil tests and the advice of agronomic advisers to plan your fertiliser requirements you can reduce the amount of money put into fertiliser and its cartage and spreading.

When excess nutrients are applied you are often paying for nutrients that do not remain on your property.

- Plants and soil can only retain a certain quantity of nutrients at any one time. The ability for soil to retain nutrients depends on your soil type.
- Applying more nutrients than your soil can hold results in fertiliser loss by surface run off or leeching through the soil profile.
- Surface run off deposit nutrients onto laneways, neighbouring properties or into rivers further down the catchment.
- Large amounts of nutrients, particularly phosphorus, accumulating in waterways can result in blue-green algae blooms.
- Extra nitrogen not used by plants can leach out, depositing hydrogen in the soil, and increasing soil acidification

How Do I Use Soil Tests As A Monitoring Tool?

Soil test results give you an indication of which nutrients are deficient, which are adequate and the general health of your soil. Results can be used with important information such as paddock history, fertiliser history, proposed use, enterprise and economic situation to decide on fertiliser and lime requirements and paddock management.

Results can also indicate to you whether in fact you need fertilisers. An unproductive pasture may be due to high acidity levels which would require lime rather than fertiliser. Acid soils tie up some nutrients, making them unavailable to plants and killing organisms in the soil.

There are also several relationships between nutrients that can influence requirements. For example, if the soils Olsen P is below 10mg/kg, applied nitrogen will not be utilised effectively by plants. Similarly, if sulphur is low (< 8mg/kg), nitrogen uptake will not be efficient. A fertiliser agronomist will be able to help you interpret your results.

Is Soil Testing Cost Effective?

Soil tests cost, on average, between \$60 – 100 per test. If you average 4 tests per year at a cost of \$80 per test you need to save *less* than one tonne of urea at \$380/t to cover the cost of your soil tests. With fertiliser being such a large financial input into farming, soil testing is an extremely cost effective way of managing inputs and applying only the nutrients required.

When Are Tissue Tests Used?

Tissue tests are a good indicator of plant deficiencies and toxicities. While soil tests indicate soil nutrient levels, nutrients are sometime 'tied up' or made unavailable to plants eg. when soils are acid. Tissue tests determine the nutrients available to the plant by measuring the levels in their foliage.

Tissue tests are used to determine trace nutrient levels. Trace nutrients are the nutrients that occur in such small amounts that they are not accurately recorded by soil tests. Molybdenum is an element that can not be accurately measured by soil tests and requires a tissue test of clover leaves to determine levels.

There are two methods of tissue sampling: mixed herbage sampling for animal health reasons and specific pasture or crop species sampling to determine trace element availability. Animal health sampling is often done to determine the quality of pasture the animals are taking in. Samples are taken when plants are actively growing, usually early to mid spring.

Tissue tests can usually be sent to the same laboratory as your soil tests. Check this when deciding on a laboratory to use.

Further information

Whole Farm Planning Courses, Field Days and Information Evenings are good ways to gain information and management ideas.

Books are available through the DPI/DSE Information Center and Book Shop (03) 9637 8325. Information fact sheets on a variety of topics are available from the Department of Primary Industries and are on the web-site www.dpi.vic.gov.au

If you require further information contact Shari Wallis (see front cover for contact details).

