

SOIL TESTING

Soil tests are one of the tools available to the primary sector to enhance sustainable resource management and productivity. A primary producer or consultant might undertake a soil test for a number of reasons i.e. to determine the nutrient status of a soil; to ascertain the existence of any nutrient deficiencies, excesses or imbalances; or to establish a basis to determine fertiliser requirements of the pasture or crop being grown in the soil. The soil testing programme undertaken will largely depend on the nature and situation of the enterprise concerned, as well as the attitude and aspiration of the farmer/grower and the competence of the consultant.

For a new client or property, it is often useful at the outset to establish a nutrient baseline, particularly in pastoral farming situations. An initial comprehensive soil test will give a good pointer to the current macro and trace element regime as well as organic matter levels, and thus provide a foundation to improve fertility and soil function going forward. For an existing client in a comparable situation, all that might be required is a basic test every 2-3 years, just to monitor and maintain soil nutrient status.

In most cropping situations, it is vital to know what crop will be sown (if it's an annual crop) and the nutrient status of the paddock into which it will be sown. This information should be obtained well in advance of crop sow-down. This allows adequate time to address/correct any nutrient issues arising from the test, and provide the best opportunity for a high crop yield which will not be limited by nutrient deficiencies.

Clearly then, it is important to think about the reason(s) for undertaking a soil test before it is taken. Questions which could be considered in this regard are:

- What is the current/proposed land use of the sample area?
- Is this the most appropriate time to sample this area?
- Which test option would be the most useful for the current/proposed land use?
- What area should be sampled? (Should sampling be undertaken on a paddock by paddock basis or can several paddocks be combined into one bulk sample?)
- Should a 75mm or 150mm depth sampling probe be used in this situation?
- Should sampling be taken in a random manner or along a fixed transect line?
- How many sampling cores will be required to gather a representative sample?
- Will it be possible to replicate a similar sampling methodology in future years?
- Will the proposed soil test give appropriate benefits relative to the cost involved?
- Is there sufficient information on the Request Form to enable both the lab and/or consultant to easily be able to do their jobs?

The analytical labs providing soil testing services in NZ all do a good job with quality control. As a result, soil test variability is not usually the result of a problem at the lab, but much more likely to arise from sampling variability, generally because the sample collector has not adequately thought through the above questions. Clearly then, the more care and thought that takes place prior to collecting the soil samples, the more likely it is that sampling variability will be minimised.

Sampling variability can often also arise from seasonal fluctuations i.e. in a good growing season, soil nutrient levels often decrease simply because the plants have been able to take up more nutrients from the soil than is normal in an “average” season. As seasonal variations can often lead to anomalies, soil test results are generally of most value when they are able to be compared to previous tests taken in earlier years: a sampling history of several tests (taken in the same manner from the same sampling area over time), typically leads to higher levels of confidence in the test results than just one isolated test result.

Finally, it is critical to appreciate that a soil test is nothing more than a diagnostic tool. It is not an absolute indicator of everything that is taking place within the dynamic environment which is a soil. A soil test is an attempt to gather representative data (collected at just one point in time), to aid the farm management process. All soil tests should therefore be interpreted rather cautiously, and especially if there is no existent baseline of earlier data to compare results against. A good “big picture” question to consider is:

- “What information does the test provide which helps to explain production and management observations?”

The better a grower appreciates the place and role that a soil test plays in the overall scheme of things, the more likely it is that soil tests will yield better outcomes for all parties i.e. a better understanding of the soil testing process should lead, over time, to better of where and how to best use and apply these tools. The end result should be better resource management and better productivity.

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