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Farmnote

Soil testing high rainfall pastures

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Soil testing can help you:

- make more informed decisions on fertiliser use
- monitor soil acidity and develop a liming program
- work out why some areas of your farm are less productive than others.

For soil testing to be useful, you need to:

- collect a representative sample from each paddock or area within a paddock
- have the sample analysed at an accredited laboratory
- have the analysis results interpreted by a Fertcare accredited adviser
- have a paddock record system which allows you to compare paddock tests over time.

To be able to track changes in levels for individual paddocks or areas over time, you should:

- sample at the same time each year
- sample along the same transect or at the same locations
- use the same sampling tool
- send your samples to the same laboratory.

Collecting the sample

Collecting a consistent and representative sample is the most critical step in a soil testing program—and it is the step over which the farmer has most control. If the sample isn't collected properly, soil testing can be a waste of time and money. A hectare of soil 10 cm deep contains about 1,300 tonnes of soil so a 100 g sub-sample from a 10 hectare paddock represents only 1 part in 130 million! Each sample should contain 30–40 individual cores. If the paddock is less than about 10 ha and the soil is reasonably uniform, one sample should be enough. If there are areas of different soil types within the paddock which are large enough to be managed separately, collect a sample from each of these areas and have them analysed separately. For paddocks larger than 10 ha, collect one sample for every 10 ha, even if the soil type appears relatively uniform.

How deep to sample?

The standard depth for soil sampling pastures in Western Australia is 10 cm. Because the concentration of phosphorus in the soil decreases with depth, sampling to less than 10 cm will give a higher reading, while sampling to deeper than 10 cm will give a lower reading. Our soil testing standards and critical nutrient levels have been developed with 10 cm sampling depth so it's critical that this is adhered to.

Sampling method

Traditionally, samples have been collected by walking across the paddock with a sampling tube or 'pogo stick' which is pushed into the ground at the selected spot and the core tipped into a bucket or plastic bag. More recently, mechanised sampling equipment has been developed which makes things easier and quicker. This equipment is generally more suited to soil sampling contractors. It is critical that this equipment is robust enough to consistently sample to 10 cm.

Samples cannot be collected accurately with a shovel or trowel. If the individual sample cores are collected in a bucket, make sure that the bucket is clean and completely emptied between samples. If you use a soil sampling kit supplied by a fertiliser company, read the instructions supplied carefully as they may have specific sampling instructions.

Sampling pattern

There is no one 'correct' sampling pattern but, once you select a sampling pattern, stick to it. The same pattern should also be used when collecting samples for plant tissue testing. Three options include:

- Fixed transect across a paddock; start in one corner of the paddock and walk in a straight line to the diagonally opposite corner, collecting 30–40 sample cores on the way. Ear tags or wooden stakes can be fixed to fences to mark a transect and it can be marked on your paddock map so that you sample along the same transect each year.
- Zig-zag across a paddock; start in one corner of a paddock and zig-zag across it to the diagonally opposite corner, collecting 30–40 sample cores on the way. It is difficult to sample along precisely the same zig-zag transect each year.
- Fixed points in a paddock; select reference points in the paddock or record GPS coordinates so you can locate them in future years and collect a number of samples within a set distance of that point, for example 5-10 m. You need to have enough points to give you a total of 30–40 cores for the paddock.

Whichever sampling pattern you use, make sure that you avoid:

- areas where stock have been congregating—trees, water troughs and gates in particular
- areas where fertiliser, lime or hay have been dumped in the past 1–2 years
- dung and obvious urine patches; this is particularly important when using mechanical systems linked to GPS—don't just collect the sample where the machine says you should without taking a closer look.

When to sample

Non-irrigated pastures should be sampled from late December through to March. If you are sampling by hand, soils which set hard when dry should be sampled before they dry completely. Sampling at the same time each year will reduce some of the variation inherent in soil testing.

Irrigated pastures should be sampled in early spring, generally when the soil has dried enough to make sampling possible, and at least four weeks after the last application of phosphorus or potassium fertiliser.

Where to send the samples

Most farmers in Western Australia soil sample through one of the major fertiliser companies who arrange analysis at their laboratories. Whichever laboratory you use, make sure that it is accredited by the Australasian Soil and Plant Analysis Council [ASPAC] and uses the analytical methods recognised as being most appropriate for Western Australian soils (www.aspac-australasia.com).

What to analyse for?

Laboratories can analyse for almost anything you can think of but, as a minimum, ask for:

- soil pH, measured in calcium chloride
- soil phosphorus, as measured by the Colwell method
- soil potassium, as measured by the Colwell method
- Phosphorus Buffering Index [PBI], a measure of the ability of a soil to retain phosphorus. This measure is needed to allow the soil phosphorus level to be interpreted. Phosphorus Retention Index [PRI] is another measure which can be used.

Most of the other analyses offered are either not really useful for pastures—nitrogen—or are nice to know but you don't need to measure them every year—organic carbon—or you can get better information from tissue testing than soil testing—for example, trace elements.

How often to sample

Most soil characteristics don't change rapidly so you generally don't need to sample every paddock every year. If you want to map the distribution of nutrients around the farm, sampling the whole farm every two or three years is the best way to go. Alternatively, sample one third of the farm each year but make sure you sample all paddocks within the three year cycle.

Record keeping

To be able to track changes in your soils over time, you need to be able to store your soil and tissue testing records in a form that allows you or your adviser to retrieve them easily. The written reports supplied by your fertiliser company should be filed for easy retrieval but many farmers are looking to computer spreadsheets or databases, preferably linked to a paddock mapping program which will allow you to download the laboratory results without having to enter them manually.

Once you have accumulated a few year's records, you will get to know what sort of figures to expect from your paddocks. If a completely unexpected figure turns up, it may be worth asking for a retest.

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