

The Benefits of Timely Soil Mapping

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The recommended time to EM map and soil sample a paddock is directly after harvest prior to any cultivation, unless major laser work is planned for the fallow.

It is recommended to take soil samples directly after final harvest prior to any cultivation. Tillage accelerates the breakdown of the organic material and increases mineralisation so you get a flush of nitrogen. This can lead to an artificial representation of what is available in your soil and also reduces the risk of picking up any old fertiliser bands. Sampling as early as is practicable also allows time for planning and accurate application of ameliorants.

For plant cane blocks, the Sugarcane Reef Regulations state that a soil test can be up to 12 months old before a new test is required. Work out the earliest date you are likely to plant and plan with your agronomist to test all next year's fallow blocks within 12 months of that time frame.

Benefits of amelioration

For maximum utilisation, ameliorants such as lime, gypsum and lime/magnesium blends are best applied following plough out of cane and before the wet season. The products can be worked into the soil and the fallow period allows time for the products to correct pH and for any calcium and magnesium applied to become plant available.

Soil testing following harvest allows for the correct ameliorants to be applied at the required rate. An E43 (Nutrient Advantage) soil test allows for calculation of required calcium and magnesium, as well as lime or gypsum, rate to correct pH, aluminium saturation and sodicity. Without this information the important process of amelioration is simply guess work. Farmacist's Agricultural Advisors can recommend the correct application based on the soil sample report, as long as the analysis includes results for pH, aluminium saturation (useful in the far north and central region), sodicity, calcium and magnesium levels, and soil texture.



Benefits for fallow crops

Growers planting legumes or other crops (cover or for harvest) will benefit from correcting all of these issues.

Legumes, sunflowers, etc tend to be more sensitive than sugarcane to issues such as pH, aluminium saturation and deficiencies in micronutrients. A pH below 5.8 will limit root growth, nodulation, plant vigour and nitrogen fixation in legumes such as soybean and mung bean.

Aluminium saturation should be kept below 15% for optimal legume growth (GRDC, 2016).

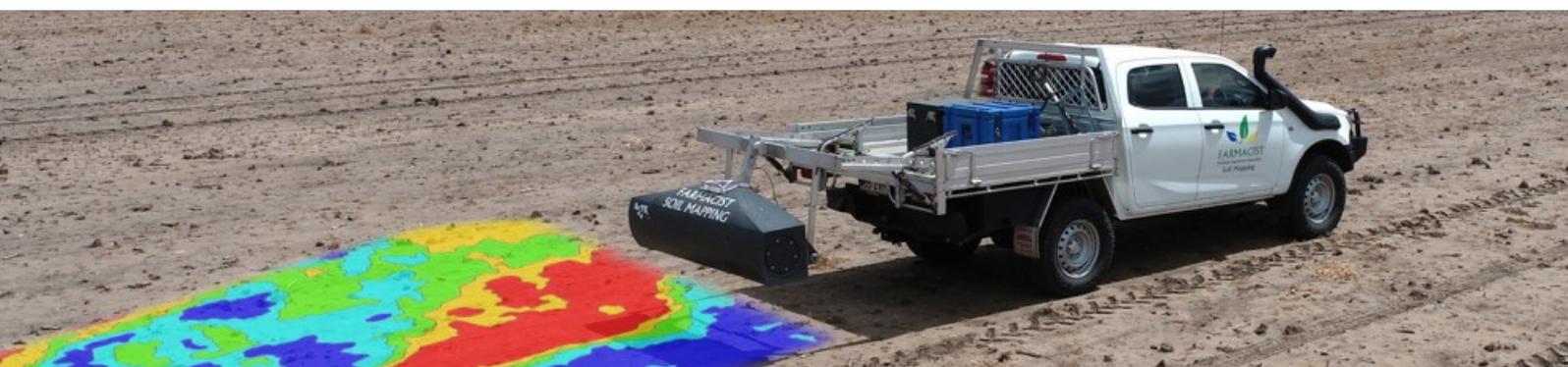
Sunflowers also require a pH at or above 5.8 and aluminium saturations of above 5% can impact vigour (GRDC, 2017).

For those growing multi-species fallow crops, correcting pH will increase diversity below the ground as well as increasing the vigour of the full range of species sown.

Most soil microbial communities require neutral pH to thrive with the optimal pH (water) range of 5.5 – 6.5. This is in part because this is the range within which plants thrive, ensuring a good supply of root exudates for the microbes to survive and multiply.

Strongly acidic or alkaline soils will favour select species, particularly bacteria, while being inhospitable to most soil microbes (Msimbira & Smith, 2020). Don't forget that any rhizobia inoculant applied to legume seed will struggle to survive in an acidic or alkaline environment.

A soil test will also provide a basis for any fertilising requirements for fallow crops. While inoculated legumes can supply their own nitrogen in the right conditions, they have requirements for phosphorus, sulphur, potassium, zinc and often other trace elements. Basing inputs on soil analysis will definitely put you in the right direction to create a better environment to grow your crop.



Benefits for planning

A soil testing program that is completed before the end of December also allows plenty of time for planning and developing your whole farm nutrient plan and N & P budget. Fertiliser can be ordered early, price comparisons can be supplied and your agronomist can work with you to find alternative recommendations where needed.

The use of EM generated maps can reveal the in-field variability which can assist in determining representative sample locations within in field zones. Taking separate soil samples from zones of significant variation allows for variable rate ameliorant application and, in some cases, variable rate nutrient application. Geo-referencing soil test locations allows the monitoring of specific sites over time. Additionally, the GPS position remains constant even if the block number changes in the future.

Pachymetry spore counts should inform the variety of cane planted the following year. Ideally a pachymetry test will be undertaken two years prior to plough out, allowing time to propagate a resistant variety if required. However, if this has not been done you will have approximately six months to source a suitable variety.

Take action!

Once your fallow plan is finalised give your agronomist a call to put together a sampling strategy. Remember it's best to take soil samples before the ground has been worked.

If you are a part of the Precision to Decision project in the Far North or Burdekin, or Point of Difference in Mackay, any soil tests beyond those required by legislation can be covered by the project to assist your move towards precision farming. If you have blocks with more than one soil type they can be EM mapped and additional samples taken to better understand the requirements of the block.



Why is soil testing so important? Soil sampling is key to:

- Identifying soil nutrients or chemical factors that are limiting crop growth
- Improving productivity and profitability by putting fertiliser dollars where they are most beneficial
- Increasing fertiliser use efficiency by determining appropriate nutrient application rates
- Informing decisions and management tools for your whole farm nutrient plan
- Using effective ameliorants to improve possible physical and chemical imbalances
- Improving environmental protection by preventing over-fertilising
- Measuring changes in soil fertility and record trends over time

Checking for pachymetra and nematodes

Before you plough the sugarcane crop in talk to your agronomist about testing for pachymetra and nematodes. Sampling is best done into the roots of the sugarcane where the pachymetra and nematodes are concentrated.

Analysis is done by Sugar Research Australia in Tully and sugarcane growers receive a discounted price. The information on nematodes can be used when selecting a legume species to plant. Most legume crops can reduce numbers of Root Lesion Nematode in the soil, benefiting the subsequent sugarcane crop. If the legume you select is not resistant to Root Knot Nematode and it exists in high numbers in your block, both the legume crop and following cane crop may suffer. Resistance information is available on common nematodes Root Knot Nematode (RKN) and Root Lesion Nematode (RLN).

Legume	RKN	RLN
Lablab	Highly susceptible	Resistant
Cowpea	Highly susceptible	Resistant
Meringa Cowpea	Moderately susceptible	Resistant
Soybean Leichardt	Highly susceptible	Resistant
Soybean – A6785	Resistant	Resistant
Soybean – Stuart	Resistant	Resistant
Soybean other cultivars	Highly susceptible	Resistant
Peanut	Highly resistant	Resistant
Velvet bean	Resistant	Resistant

A guide to legume resistance of Root Knot Nematode and Root Lesion Nematode (Sugar Research Australia, 2022).



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