Agnote

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Soil Analysis Results for Pastures

A. G. Cameron, Principal Pastures and Extension Agronomist, Darwin

A typical pasture soil analysis for a red earth soil in the Top End of the NT would look like this:

Cond.	ms/cm	0.02
pH		5.9
Avail phosphorus (P)		2.5
Avail potassium (K)		61
Avail calcium (Ca)		399
Avail magnesium (Mg)		89
Avail sulphur (S)		5
Avail zinc (Zn)		0.5
Avail copper (Cu)		0.2

Other determinations which may be included in the analyses are total nitrogen (N), nitrate nitrogen (NO_3 - N), organic carbon (C), boron (B) and iron (Fe).

I will explain each of the factors/nutrients in the order in which they appear above.

Conductivity (ms/cm)

This is a measure of the soluble salts in the soil, measured as the specific electrical conductivity of the soil solution, recorded in millisiemens per centimetre (ms/cm). These are generally low in the Top End. Less than 0.15 ms/cm is very low, while over 0.91 ms/cm is high.

pH

This is a measure of soil acidity. The optimum range for the growth of most plants is 6.5-7.0. Tropical pasture species generally grow well in slightly acid soils (pH 5-6.0); pH 7 is neutral.

In acid soils (pH 4-4.5), plant nutrients such as P, K, S, Ca and Mg become unavailable to plants.

In alkaline soils (pH 7.5-8.5), plant nutrients such as Fe, Mg, Cu, Zn and B become unavailable to plants.

Available levels - parts per million, (ppm)
The available figures are indicators of how much of the P, K, Ca, Mg, S, Zn, Cu, B or Fe in the soil is available to plants growing in the soil.

Available P
In most virgin soils in the Top End, this is generally less than 5 ppm.

Available K
This is low in most Top End soils.

Available Ca
Generally adequate for pastures in most soils.

Available Mg
This is often low, but there has been no response to applied Mg in any pasture soil fertility trials.

Available S
As with P, S is low in virgin soils in the Top End - generally less than 5 ppm.

Available Zn
This is often low.

Available Cu
Cu levels are often low, but there have not been any responses to Cu fertilisers in pasture soil fertility trials.

Available B and Fe
Soil levels are often low, but there have been no responses to B or Fe fertilisers in pasture soil fertility trials.

Total N
This is a measure of the total amount of N in the soil, not what is available to plants. It is a measure of the fertility of the soil. Less than 0.10 % is regarded as low, while over 0.25% is high.

NO_3 – N
This is an indication of the N readily available in the soil for plant growth. NO_3 - N is mobile in soils and it is rapidly taken up by plants. Levels in Top End soils are generally low.

Organic C
This is a measure of soil organic matter. The C content of organic matter is about 62%. Less than 1% organic C is low, while over 4% is high.

Organic matter is important in soils in that it improves soil structure, helps to conserve soil moisture and releases nutrients as it decomposes.

Levels in Top End soils are generally low.

Adequate levels of soil nutrients

The table below lists the low and adequate levels of soil nutrients which are generally important for the growth of pastures in the Top End of the NT.

SOIL NUTRIENT LEVELS FOR PASTURES IN THE NT (PPM)

Element	Low	Adequate
	Less than	
NO_3	5	15
P	6	10
K	80	80
S	6	10
Ca	100	100
Mg	100	100
Zn	1	2

Based on these levels, the soil analysis sample presented at the start of this Agnote is low in P, K, S and Zn and marginal in Mg.

To estimate fertiliser requirements, a rule of thumb is that it takes an application of 2 kg of the element per hectare to raise the available soil levels of that element by 1 ppm. The red earth soil would need 12-20 kg P, 38 kg K, 22 kg Mg, 2-12 kg S and 1 kg Zn.

The soil levels presented are adequate only for the growth of tropical pastures. These levels should not be used for crops which have higher, more specific and/or more timely nutrient requirements.

Higher levels of nutrient applications are generally required for hay production, where there is a high removal of nutrients from the soil.

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