

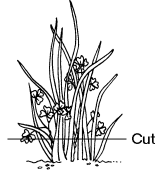


## Sampling Notes

Mixed pasture (i.e. clover/ryegrass sward) samples are taken primarily to assess the pasture as a feed for grazing animals. Some assessment can be made as to the adequacy of nutrients for maximum pasture growth, but because there are usually at least two plant species present in pasture, this cannot be done with great accuracy. If plant growth is of concern, then clover only samples should be collected.

### Leaf

<b>Sampling Time:</b>	At a vegetative growth stage, usually during late spring or autumn.
<b>Plant Part</b>	Cut sward at grazing height (upper 2/3).
<b>Collect From:</b>	Randomly selected areas of the field.
<b>Quantity per Sample:</b>	500g.
<b>Recommended Tests:</b>	Basic Plant (BP), Molybdenum (Mo), Cobalt (Co), Selenium (Se)
<b>Comments:</b>	<p>When collecting a mixed pasture sample, realise that the sample is essentially a feedstuff sample. Collect the sample from areas likely to be selected by the grazing animal, avoid dung and urine patches, and other areas of rank growth.</p> <p>Some consultants ensure the sample collected has approximately 25% clover content. By standardising this ratio of clover to grass, a more reliable assessment of the nutrient requirement for plant growth is possible.</p> <p>When collecting a sample to evaluate the grazing animal's needs, the sampling time or growth stage is not critical, even though the mineral levels vary according to the season. Provided the sample represents the animal's intake, it may even be taken during periods of drought stress. However, because some interpretation about the adequacy of nutrients for plant growth is also usually made, a vegetative growth stage is recommended. The spring growth period also coincides with the animals' peak production period, and when metabolic problems are more likely.</p> <p>Soil contamination of the herbage sample should be avoided, as it will produce elevated levels of some elements, particularly cobalt.</p>



### Soil

<b>Sampling Time:</b>	Two to three yearly, at the same time each year, but not within two months of a fertiliser application.
<b>Core Depth</b>	7.5cm.
<b>Collect From:</b>	Randomly selected areas of the field.
<b>Quantity per Sample:</b>	12 - 20 cores.
<b>Recommended Tests:</b>	Basic Soil (BS), Sulphate Sulphur (SO <sub>4</sub> ).
<b>Comments:</b>	<p>When collecting soil samples, realise that the prime areas of concern are those that are not performing well. Avoid localised high fertility areas, such as dung and urine patches. If these are included in the composite sample then the deficiencies in the low fertility areas will not be revealed.</p> <p>Collecting to the specified sampling depth is critical. Soils under permanent pasture are extremely fertile in the top few millimetres, where fertiliser and plant residues are being added to the soil. As this fertility declines rapidly with depth, it is important to adhere to the fixed sampling depth, otherwise variable amounts of the deeper soil will alter the levels found.</p>

## Interpretation

Interpretation of the laboratory's results is possible by comparison with normal levels expected for the crop in question. The interpretation given is based on the best information available and relate specifically to the sampling instructions given.

Leaf			Soil		
Analyte	Unit	Range	Analyte	Unit	Range
Nitrogen	%	4.0 - 5.0	pH	pH	5.8 - 6.3
Phosphorus	%	0.38 - 0.45	Olsen Phosphorus	mg/L	20 - 30
Potassium	%	2.5 - 3.0	Potassium	me/100	0.50 - 0.80
Sulphur	%	0.30 - 0.40	Calcium	me/100	6.0 - 12
Calcium	%	0.60 - 1.0	Magnesium	me/100	1.0 - 3.0
Magnesium	%	0.20 - 0.30	Sodium	me/100	0.20 - 0.50
Sodium	%	0.15 - 0.30	CEC	me/100	12 - 25
Iron	mg/kg	100 - 250	Volume Weight	g/mL	0.60 - 1.0
Manganese	mg/kg	60 - 150	Sulphate Sulphur	mg/kg	7.0 - 15
Zinc	mg/kg	30 - 50			
Copper	mg/kg	10 - 12			
Molybdenum	mg/kg	0.50 - 1.2			
Cobalt	mg/kg	0.10 - 0.20			
Selenium	mg/kg	0.080 - 0.15			

## Comments

Interactions between nutrients and other influences make accurate assessments difficult, and the results should be assessed in conjunction with animal tests, visual symptoms and a knowledge of identified deficiencies of the area. Some known interactions are as follows:

**Copper, Molybdenum, Sulphur:** The availability of copper in the feed is influenced by molybdenum and sulphur levels. High levels of molybdenum (3 - 10 mg/kg) and sulphur (0.35 - 0.50 %) mean that higher levels of copper may be required.

**Iron, Copper, Zinc:** High iron levels (possibly arising from soil contamination) can affect zinc and copper availability, and consequently higher levels of these minerals are desirable.

**Potassium, Sodium, Magnesium:** High potassium in feed will not only suppress sodium and magnesium uptake by the plant, but also the absorption of these elements by the animal. It is therefore important that the potassium level is not excessive in the mixed herbage.

It should be realised that these levels are concentrations in the feed. Also of importance is the amount of feed available. When it is abundant, marginal nutrient levels may adequately supply the animal's requirements, but during a feed shortage, the same levels may be inadequate.

Animals may also obtain nutrients from sources other than the herbage. For example, some waters may contain significant amounts of sodium.

High iron levels (greater than 300 mg/kg) often indicate a soil contaminated pasture sample, which will also elevate the cobalt level significantly and, to a lesser extent, copper and zinc.

## References

- NZ Society of Animal Production, 1983. The mineral requirements of grazing ruminants.
- McNaught, K.J. 1970. Proceedings of the XI international grassland conference. p334.
- Cornforth, I.S. and Sinclair, A.G. 1984. Fertiliser recommendations for pastures and crops in New Zealand. MAF Publication, Wellington.
- Turner, M. A. 1977. Trace elements in human and animal health in New Zealand. Proceedings. August.
- Edmeades, D.C., Sinclair, A.G., Watkinson, J.H., Ledgard, S.F., Ghani, A., Thorrold, B.S., Boswell, C.C., Braithwaite, A.C. and Brown, M.W. 1994. Some recent developments in sulphur research in New Zealand agriculture. Sulphur in Agriculture, Vol 18.

## Disclaimer

Normal Range levels quoted relate specifically to the sampling procedure given. The Normal Range levels and Comments provided are the most up to date levels available, but may be altered without notification. Such alterations are implemented immediately in the laboratory histogram reports. It is recommended that a consultant or crop specialist be involved with interpretations and recommendations.