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ANIMAL HEALTH GUIDE

Macro Minerals
Interpreting Herbage Test Results

Recommendations in this report are on the basis that animals are being fully fed on a pasture-based diet represented by the sample analysed.

Addition of supplementary feeds for example brassica crops, maize silage and PKE, will change the mineral composition of the diet potentially requiring different mineral recommendations. Higher levels of production may have greater requirements.

Calcium is a major component of bone with the majority of the calcium in the body stored in the skeleton. Calcium is required for normal nerve conductivity, muscle contractions and for the normal clotting of blood. It is present at high concentrations in milk, so in lactating animals', milk is the major source of calcium loss. In dairy cattle low blood concentrations (hypocalcaemia) can occur immediately prior to and after calving as a result of the failure to adapt to the increased demand for calcium as a result of the onset of milk production.

This can result in weakness and paralysis, a condition known as milk fever. Prevention of milk fever is achieved through careful formulation of the transition diet, especially ensuring magnesium supplementation is sufficient, and, if necessary, analysis and correction of the dietary cation anion deficit (DCAD). Consult with your nutrition adviser or vet if you are having problems with milk fever.

TYPICAL CALCIUM REQUIREMENTS FOR ANIMAL HEALTH (g/kg DM)			
SHEEP		**CATTLE**	
Growing lambs	2.6 - 4.3	Growing cattle	3.1 - 5.9
Ewes (maintenance)	1.8 (60kg)	Dairy cow (dry)	2.9
Ewes (pregnant)	2.8 - 3.0	Dairy cow (late pregnancy)	3.0
Ewes (lactation)	3.3 - 3.5	Dairy cow (early lactation)	3.1 - 5.1
		Beef cow (lactating)	3.2
Faster growing animals (e.g. 200g/day for a lamb and 1 kg /day for cattle) require calcium intakes at the high end of the recommended range.			

Ruminants require a daily supply of **Magnesium**. A deficiency results in grass tetany (hypomagnesaemia). The rumen is the major site of magnesium absorption and any factor that affects conditions in the rumen can dramatically reduce absorption of dietary magnesium. Lush spring grass and diets high in potassium reduce absorption of magnesium. Dairy cattle and lactating beef cattle are likely to need magnesium supplementation in the spring and it is essential if the pasture is high in potassium.

The higher values below reflect requirements during periods of high risk. Irrespective of pasture magnesium concentrations, magnesium supplementation during the dry period is essential to prevent hypocalcaemia and during early lactation to prevent hypomagnesaemia.

TYPICAL MAGNESIUM REQUIREMENTS FOR ANIMAL HEALTH (g/kg DM)			
SHEEP		**CATTLE**	
Growing lambs	0.2 - 0.6	Growing cattle	0.4 – 1.0
Ewes (maintenance)	0.3 - 0.6 (60kg)	Dairy cow (dry)	0.6 - 1.2 (500kg)
Ewes (pregnant)	0.35 - 0.7	Dairy cow (late pregnancy)	0.75 - 1.5
Ewes (lactation)	0.35 - 0.8	Dairy cow (early lactation)	0.75 - 1.7
		Beef cow (lactating)	0.75 - 1.5

Sodium is important for maintaining blood and body fluid volume and acid-base equilibrium. The salvia of ruminants contains high levels of sodium which is recycled following reabsorption by the large intestine. The first signs of deficiency are a craving for licking wood, soil or urine. Inland areas are the most likely to have low pasture sodium.

TYPICAL SODIUM REQUIREMENTS FOR ANIMAL HEALTH (g/kg DM)			
SHEEP		**CATTLE**	
All classes	0.9	All classes	1.2

Phosphorus is primarily found in bone but also plays an important role in energy metabolism and cell growth. Phosphorus levels in lush rapidly growing pasture tend to be high and consequently phosphorus deficiency in New Zealand pastoral production is uncommon. The introduction of supplement such as fodder beet however means that phosphorus intake requires closer attention than in the past.

TYPICAL PHOSPHORUS REQUIREMENTS FOR ANIMAL HEALTH (g/kg DM)			
SHEEP		**CATTLE**	
Growing lambs	1.2 - 2.2	Growing cattle	2.0 - 3.1
Ewes (maintenance)	1.0 (60kg)	Dairy cow (dry)	2.4 (500kg)
Ewes (pregnant)	1.1 - 1.3	Dairy cow (late pregnancy)	3.3
Ewes (lactation)	1.8 - 1.9	Dairy cow (early lactation)	2.3 - 2.5
		Beef cow (lactating)	2.3

Potassium intake of grazing animals typically exceeds their requirements as potassium requirements for optimal pasture growth are higher than those of livestock. Problems with potassium are more likely to be an excess as this reduces magnesium absorption and can play a role in the aetiology of both grass tetany and milk fever. Milk fever can be very difficult to control if potassium intake is >15 g/kg DM.

TYPICAL POTASSIUM REQUIREMENTS FOR ANIMAL HEALTH (g/kg DM)			
SHEEP		**CATTLE**	
All classes	5.0	All classes	10.0

Sulphur is found in the body in proteins, vitamins and hormones. The proteins in hair and wool are particularly rich in sulphur accounting for the higher sulphur requirement of sheep. Microbial protein synthesis in the rumen from ingested inorganic and organic sources of sulphur also requires fermentable carbohydrate and degradable nitrogen resulting in a complex interaction. However, under typical New Zealand grazing systems sulphur deficiency is not a problem, although where diets are high in non-protein nitrogen, sulphur supplementation may be required to support the production of microbial protein. Excess sulphur intake, particularly in combination with high molybdenum intake, will limit uptake of copper.

TYPICAL SULPHUR REQUIREMENTS FOR ANIMAL HEALTH (g/kg DM)			
SHEEP		**CATTLE**	
All classes	2.0	All classes	2.0

Values adapted from Mineral Nutrition of Livestock 4th Edition (2010) Suttle, N., CAB International, Wallingford, UK and Managing Mineral Deficiencies in Grazing Livestock 1st Edition (2010) Grace, N., Knowles, S. and Sykes, A., New Zealand Society of Animal Production, Hamilton, New Zealand.