

ANIMAL HEALTH GUIDE

Micro 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. High levels of production may have the greater requirements. If in doubt you should seek the advice of your vet or nutrition adviser. Further testing including blood or tissue samples may be required.

Manganese is widely distributed through the body and is an important cofactor in many enzymes. Manganese levels in pasture in New Zealand are usually high

relative to the requirements of grazing ruminants and consequently manganese deficiency is uncommon.

TYPICAL MANGANESE REQUIREMENTS FOR ANIMAL HEALTH (mg/kg DM)			
SHEEP		CATTLE	
All classes	25	All classes	25

Zinc is an essential component of many enzymes and proteins. Deficiency may result in poor appetite, poor growth, reduced male fertility and thickening of the skin. Pastures in New Zealand usually have adequate levels.

In the North Island very high levels of zinc are fed as a preventative for facial eczema and this may contribute to pasture levels.

TYPICAL ZINC REQUIREMENTS FOR ANIMAL HEALTH (mg/kg DM)			
SHEEP		CATTLE	
Growing lambs	13 - 18	Growing cattle	14 - 20
Ewes (maintenance)	14	Dairy cow (dry)	12
Ewes (pregnant)	14	Dairy cow (late pregnancy)	12
Ewes (lactation)	17 - 22	Dairy cow (early lactation)	20 - 25
		Beef cow (lactating)	22

Copper plays a role in a wide range of biochemical and physiological processes and signs of deficiency include poor growth, poor reproduction, bone abnormalities and notably swayback in sheep. The liver is the primary store for copper in the body. The levels of copper in pasture in New Zealand are marginal for animal health and deficiency is frequently reported. Dietary copper is poorly absorbed and the complex interaction of copper with molybdenum, sulphur and iron in the diet can further

lower absorption. In addition sheep breeds vary in their ability to absorb copper. This makes it difficult to establish the copper levels in herbage that are adequate for animal health. Blood and tissue sampling may be necessary to assess animal status. Before supplementing copper on the basis of herbage tests, account should be taken of all sources of copper for the animal, along with blood and tissue tests, as toxicity can also be a problem.

TYPICAL COPPER REQUIREMENTS FOR ANIMAL HEALTH (mg/kg DM) ASSUMING HERBAGE MOLYBDENUM LESS THAN 2mg/kg DM AND SULPHUR 2.5g/kg DM			
SHEEP		CATTLE	
Growing lambs	1.8 - 3.1	Growing cattle	5.3 - 7.6
Ewes (maintenance)	4.8	Dairy cow (dry)	10
Ewes (pregnant)	5.8 - 6.4	Dairy cow (late pregnancy)	10
Ewes (lactation)	6.4 - 6.5	Dairy cow (early lactation)	9.2 - 9.5
		Beef cow (lactating)	10.2

TYPICAL COPPER REQUIREMENTS FOR ANIMAL HEALTH (mg/kg DM) ASSUMING HERBAGE MOLYBDENUM GREATER THAN 2mg/kg DM AND SULPHUR 2.5g/kg DM			
SHEEP		CATTLE	
Growing lambs	8.6	Growing cattle	7.2 - 8.4
Ewes (maintenance)	4.8	Dairy cow (dry)	15
Ewes (pregnant)	14	Dairy cow (late pregnancy)	15
Ewes (lactation)	11.6 - 14.2	Dairy cow (early lactation)	8.8 - 10.4
		Beef cow (lactating)	15

Cobalt is not essential for plants but is required by the rumen flora to synthesise vitamin B₁₂. B₁₂ plays a vital role in energy metabolism both in the rumen and in the

animal. Sheep are more susceptible to cobalt deficiency than cattle and clinical signs include poor growth, anaemia and depressed appetite.

TYPICAL COBALT REQUIREMENTS FOR ANIMAL HEALTH (mg/kg DM)			
SHEEP		CATTLE	
All classes	0.10	All classes	0.06

Selenium is an important antioxidant and is also involved in the regulation of thyroid metabolism, immune response and fertility. Selenium supplementation has been shown to prevent white muscle disease in lambs and calves in New Zealand, as well as improving fertility and reducing mastitis risk.

Like cobalt selenium is not required by plants. Recommended selenium intakes in New Zealand, especially for dairy cattle, are generally lower than recommended elsewhere because of the sparing effect of vitamin E, the levels of which are usually high in pasture-based diets.

TYPICAL SELENIUM REQUIREMENTS FOR ANIMAL HEALTH (mg/kg DM)			
SHEEP		CATTLE	
All classes	0.03	All classes	0.03

Iodine is a constituent of the thyroid hormones which control metabolism. Most iodine in the body is found in the thyroid gland. Deficiency can cause an enlargement of the thyroid gland and affect fertility and milk yield. Deficiency can either be the result of inadequate iodine

in the diet (some soils are recognised as deficient) or consumption of goitrogens which are present in some feeds, particularly brassicas. The presence of goitrogens can increase requirements three to five fold. Iodine requirements can also increase in the winter.

TYPICAL IODINE REQUIREMENTS FOR ANIMAL HEALTH (mg/kg DM) IN THE ABSENCE OF GOITROGENS			
SHEEP		CATTLE	
All classes	0.2	All classes	0.25

Iron is an important component of blood and muscle, as well as in transport of protein or enzymes. Typically iron levels are high in pasture, ground water and soil ingested by grazing ruminants making iron deficiencies unlikely.

High iron levels are typically observed where pasture samples are contaminated and in this case care should be taken in interpreting the results of other micro minerals. Iron levels above 500mg/kg DM may interfere with copper absorption.

TYPICAL IRON REQUIREMENTS FOR ANIMAL HEALTH (mg/kg DM)			
SHEEP		CATTLE	
All classes	30	All classes	40

Molybdenum is an essential element, but only very small amounts are required and under normal conditions deficiency does not occur. Molybdenum excess is of more concern as molybdenum, in the presence of sulphur, can bind with copper in the digestive tract to form copper thiomolybdates which are less available to the animal

meaning there is a greater requirement for copper. Values of molybdenum of < 1mg/kg DM are unlikely to significantly interfere with copper absorption. At very high levels molybdenum can cause toxicity with clinical signs of diarrhoea and weight loss.

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.

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