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## **Cobalt (Co)**

Cobalt is a trace element which is vitally essential for grazing animals, especially ruminants. It is generally regarded as not being essential for plants, however, there is some evidence that Co has a beneficial effect on some plants. Co does however, play an essential role in nitrogen fixation by rhizobium bacteria in legume root nodules and in nitrogen fixation by blue-green algae.

The key role played by Co in ruminant animals, especially lambs, is in the formation of vitamin B<sub>12</sub> in the rumen. Vitamin B<sub>12</sub> is important in enzyme metabolism and in the formation of red blood cells. As a result, Co deficiencies in animals result in anaemia, loss of appetite and poor growth rates. If the Co deficiency is only marginal, reduced growth rates might be the only symptom, however, where deficiencies are severe, death often results. Sheep require more Co than cattle. Usually young stock are more susceptible to Co deficiency than older animals because they have had less time to accumulate Co reserves in their livers.

The amount of Co required for legume nitrogen fixation is very low. As a result, Co deficiency is unlikely to be an issue in this regard.

Soil Co availability to plant roots is impacted by both soil pH and moisture levels. Very wet or waterlogged soils or soils which are quite acidic generally have higher Co levels than soils which are freely drained or which have higher pH (> 6.5) values. As a result, liming can lead to a significant reduction in Co uptake by plants. There are often seasonal variations in soil Co availability in the soil, with levels generally lower in the spring and early summer, when pastures are growing rapidly, but higher in the autumn and winter. Animal Co requirements can be significantly improved when stock graze soil contaminated pasture and obtain Co directly from ingesting soil.

Co deficiency in the soil may be the direct result of low levels of Co but availability is also impacted by interactions with other elements, particularly manganese. Co deficiency is well known on the North Island pumice soils where it causes “bush sickness” in both cattle and sheep. Co deficiency is also quite common on the granite based soils in the northwest Nelson and Westland areas and in other leached or podzolised soils in both Westland and the Southland region.

Co deficiencies can be overcome very effectively by addition of this trace element to fertiliser applications. This is generally more effective than direct supplementation methods which are only effective for a few weeks. Excessive concentration of Co in feed can be toxic but cases of Co poisoning are the exception rather than the rule.