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Selenium (Se)

Selenium is a trace element which is essential for animals but not for plants. In animals, Se is important for the immune system and also for the thyroid gland.

About 30% of the agricultural land in New Zealand is affected by Se deficiency including most of the farmed land between Canterbury and Southland. If Se is deficient in stock it can have serious animal health consequences, in particular, white muscle disease of lambs (born dead or die soon after birth). A delayed form of this disease also occurs in both lambs and calves, generally with symptoms of a stiff gait, an arched back, and an unwillingness to move, which can eventually result in the death of the animal affected. At a sub clinical level, low Se in the animal diet can lead to decreased disease resistance and general ill thrift in sheep and cattle of all ages. Se deficiency has also been linked to a variety of reproductive problems, ranging from reduced submission rates to increased foetal death.

The level of selenium found in plants is largely related to total soil Se levels but is also affected by plant type - Se levels in grasses are generally higher than in clovers, whilst deep rooting plants (docks, lucerne) accumulate more Se than shallow rooted species. Ryegrass and browntop accumulate more Se than some other grass species. Climatic conditions are also important - Se levels in plants decrease with increasing temperature and increasing rainfall. Soil availability of Se increases with increasing soil pH. Consequently, the application of lime can improve Se availability. However, liming will be completely ineffective in this regard if soil Se levels are low to begin with. Even if soil Se levels are adequate, interactions with other elements can impact Se availability i.e. high sulphur levels can reduce the absorption of selenium. Care is therefore necessary when applying heavy applications of sulphur fertiliser.

Selenium levels are often checked in plant herbage and in livestock blood, however, both of these measurements are subject to large seasonal fluctuations i.e. low in spring – associated with high rainfall. As a result, it is a distinct advantage to also have information from a soil test as an extra indication of likely selenium status. As a general rule, only very small amounts of Se are required and this can be applied as fertiliser prills (1% Se as selenate).

Selenium levels in excess of requirements is equally as serious as a deficiency, not only to animals but also to humans. Accordingly, care is required with any form of Se supplementation. Se toxicity symptoms include lesions on tails, ears and limbs and loss of appetite, lameness, poor growth (and wool production), delayed conception and blindness. Se toxicity can occur naturally if stock graze Se accumulating plants which are growing in a Se rich soil. Prolonged exposure to a high Se diet (5 – 30 mg Se/kg dry matter) causes chronic toxicity.