# The Deer Industry Association of Australia

# **COPPER DEFICIENCY**

We talk a lot about "a balanced diet". In such discussions, the major inputs mentioned are protein levels, energy levels and roughage. For the maintenance of good health, all ruminants need a range of minerals and trace elements. Although these are only required in very small amounts, a lack of any of them has serious repercussions. Copper, a trace element, often seems to be lacking.

Copper is generally found deep in the soil, beyond the top soil utilised by average pastures. Browsing animals, such as deer, generally have high copper requirements. They will eat the newer growth of bushes, shrubs and trees which have deep roots and high concentrations of copper in their foliage.

It is an interesting element (or more precisely "micro-nutrient") in that it is involved in at least 10 enzymes in the body ranging from blood, to coat condition, through to reproduction. While it has been researched for many years it remains a problem for us in the Deer Industry since deer react differently from other ruminants to copper metabolism.

## Signs of Copper Deficiency

To-date no one knows the daily intake requirement of copper for deer.

Deer with apparently "normal" blood copper levels can show changes in their coat (particularly in summer) that is similar to the "steely wool" problem in sheep.

The 3 photographs below illustrate how you may use the coat appearance as an early indicator of copper deficiency.



#### **Deficiency Types**

There are two types of copper deficiency:

Primary: where there is insufficient copper in the diet. Secondary: where there is sufficient copper in the diet but some other factor prevents its utilisation.

Levels of molybdenum (Mo) & sulphur (S) are critical in causing this secondary copper deficiency. Only small increases in the Mo & S concentration of grass will cause major reductions in the availability of copper to the animal. This is particularly true of improved pastures. The Mo levels are directly related to the pH of the soil. Grasses grown on strongly acidic Mo-rich soils have LOW Mo levels while the reverse is true for alkaline soils - even on low Mo soil values. Heavily limed pastures are often associated with low copper intakes.

### **Testing Copper Levels**

Copper is an essential component of enzymes, protein and pigment within the body of all species. The process of copper absorption is complex but it ends up in the liver, where it is stored. It is released into the bloodstream when required. Knowing this simple fact implies that, if you are testing animals for their copper status, you should test their liver. The liver, being the supplier of copper to the blood, will be the first place to show a deficiency. The easiest way to check the copper status of your deer is from a liver sample. When you take stock to the abattoirs, collect a liver and take it to your Vet. to have it tested.

Alternatively, test the blood of 10 animals from a suspected low copper herd. If 3 are below 8µmol/L then you have a problem.

It may also be helpful to have a soil analysis and a plant tissue analysis performed to give you a broad idea of your farm's state of health.

"Normal" values of deer copper:

Blood - lowest level is 8µmol/L Liver - lowest level is 100µmol/Kg

#### **Nutritional Supplements**

There are a number of methods to build up the copper levels in your herd if they are copper deficient. Copper sulphate can be added to water, put in licks or top dressed (although it is very soluble and is easily leached out of the soil). These methods are unreliable as the amount consumed by a particular animal is unknown. The preferred method is copper capsules, given orally, twice a year. As deer metabolise copper quickly, this slow release treatment, although more work, seems to be the best.

#### Dosage

As a guide:

Hinds:Twice yearly - one month prior to the rut and calvingStags:Twice yearly - one month prior to button drop and the rutYearlings:Start at 9 months of age

#### **Copper Over-Dose**

Overdosing of deer with copper is difficult to do under normal farming conditions. This is one of the great mysteries of copper & deer. It appears that deer are able to utilise copper very well and would only show signs of copper poisoning under extreme conditions.