

## **Nitrate Poisoning**

With new grass paddocks about to be grazed it is important to remind you of the risks associated with nitrate poisoning. Nitrate poisoning is quite common in new grass paddocks especially short rotation Italian ryegrasses, and it can occur in crops such as sorghum or oats. There are certain weather conditions that predispose to high plant nitrate levels. Dry conditions cause nitrate to build up in and around roots of plants. When followed by rain there is a sudden uptake of nutrients and a growth spurt of the plant. Nitrate levels in plants can also build up to toxic levels during warm, over-cast days.

### **What is nitrate?**

Nitrate is a building block for protein materials in the plant. It is taken up from the soil, then converted into protein by the action of photosynthesis. In general, the highest concentration of nitrate is found in the roots, stalks and stems. Plants with high nitrate levels tend to be grown in well fertilised soils, and have often had nitrogen fertilizers applied. Plants containing more than 1% nitrate are toxic to grazing animals.

### **What happens and what are the signs?**

Microbes in the rumen usually convert nitrate to ammonia, however when the amount of nitrate goes over 1% the rumen microbes are unable to convert all the nitrate in the grass which results in an accumulation of a compound called nitrite in the rumen. Nitrite is absorbed into the blood stream where it combines with the red blood cells preventing oxygen from binding with them. By the time 20% of the red blood cells have become affected the animal begins to show signs such as breathing faster and looking drunk. They may also salivate and froth at the mouth, and as more red blood cells become affected the cows start to gasp for breath. Severely affected animals will often go down, and by the time 80% of red blood cells are affected they will die. The animal is essentially suffocating. A cow can consume a toxic amount of nitrate in one hour, and will start to show signs very soon after. If cows are grazing a toxic paddock, then there will very quickly be more than one animal affected and it is a real emergency.

### **What do you do if you suspect nitrate poisoning?**

Call the vet and outline how many animals are affected. Extra help may be required if the outbreak is severe. The first thing to do is move animals that are able to walk out of the paddock. If possible feed them some maize silage, PKE or hay. Treatment of affected animals is possible with a product called methylene blue (MB) injected into the vein. This "knocks" the nitrite off the red blood cells allowing them to carry oxygen again. In severe poisonings, more nitrite may be absorbed from the gut following treatment causing relapses, and requiring further treatment.

### **How to avoid nitrate poisoning?**

Test for nitrate levels in at risk crops, especially grass crops before first grazing, or in cloudy conditions. If there is a risk of high nitrate levels then ensure cows are fed before grazing the crop. Only graze the crop for 1-2 hour, preferably in the afternoon when the crop has had maximum exposure to sunlight to help decrease the nitrate levels. Poisoning will most likely

occur on day 3 and 4 of grazing, as bacteria that form nitrite from nitrate are beginning to multiply in the cow's gut. However if the crop is very high in nitrate, cows can get poisoned after the first grazing.