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Nutritionist

# Nitrate/Nitrite Poisoning

In recent days have fielded a number of calls regarding dead sheep on grazing cereals. In the all cases looked at, the cause has been nitrate poisoning, with one producer at Corowa (southern NSW) losing 40 crossbred ewes.

Often occurring in the years after droughts, nitrate poison can also occur on pastures and crops, when urea topdressing is followed by cloudy/wet/overcast weather such as we have seen this week.

When we talk about nitrate poisoning, we are actually talking about 2 different disorders, although they are both linked.

## Causes of nitrate/nitrite poisoning.

Plants absorb nitrogen from the soil in the form of nitrates, which is then converted into plant proteins. Normally, the level of nitrates in the plant is quite low as the conversion occurs quite rapidly.

When consumed by ruminants, the nitrates are converted to nitrites and then to ammonia by rumen microbes. Importantly, nitrates are converted to nitrites quicker than nitrites are converted to ammonia. When there are high levels of nitrates in forage, nitrite levels build up in the rumen and are then absorbed into the bloodstream where they convert haemoglobin into methaemoglobin, which cannot carry oxygen. Death occurs through oxygen deprivation.

## Environmental Factors

During dry periods, nitrate levels in the soil can increase markedly due to reduced leaching, lack of uptake by the plant together with the decomposition of organic matter.

Rainfall following the dry and /or adverse weather after topdressing with urea leads to a much higher uptake of nitrates, with levels tending to be higher

### AT A GLANCE

- *Nitrate/Nitrite poisoning is occurring at the moment*
- *Animals can cope with high nitrate levels providing they are allowed to adapt*
- *Poisoning can be prevented with good management.*

in stems than in the leaf. Moisture stress, decreased light (overcast and shorter days) and low temperatures can exacerbate the situation as can the use of phenoxy herbicides.

Weeds such as Capeweed, pigweed and variegated thistles have long been recognized as nitrate accumulators, but the

problem can also occur in canola, wheat, barley, oats, maize, sorghum and millet. Pastures such as Lucerne, clover and some ryegrasses can also accumulate large amounts of nitrates.

## Toxicity Factors

Ruminants can handle high levels of nitrates in feed, provided the increase is gradual and once accustomed, the feeding is spread over the whole feeding day. As well, healthy animals are less likely to be affected than those in poor health. The diet also needs to contain a good source of ready available carbohydrates to fuel microbial fermentation.

## Clinical Symptoms

Signs of nitrate poisoning are related to oxygen deprivation, and can occur between 30 minutes and 4 hours following consumption. The onset of symptoms can be extremely rapid and can include:

- bluish/chocolate brown mucus membranes
- rapid/difficult breathing
- noisy breathing
- rapid pulse
- salivation, tremors, staggering
- weakness, coma, death

- In recently deceased animals, the blood can be a brownish colour, however this returns to normal red after about 3 hours.
- pregnant females that recover from nitrate poisoning will often abort their foeti 10 – 14 days following exposure.

### **Prevention**

- Introduce stock to questionable feeds slowly over 7 – 10 days, allowing the rumen microbes to adapt to increasing nitrate levels.
- Feeding hay to hungry stock prior to grazing questionable feeds.
- Avoid introducing hungry stock to questionable feeds for 7 days after, rainfall, frost or cloudy days.
- When introducing stock to risky pasture, delay grazing until afternoon on a sunny day.
- Nitrates can interfere with the conversion of carotene to Vitamin A. Consider ADE injections.
- Consider providing a mineral lick containing high levels of soluble carbohydrates. **Fabstock's Pasture Lactation Lick** can easily be fortified with additional soluble carbohydrates to further fuel microbial fermentation.

For further information and assistance – please contact the author or your local Fabstock distributor.