

NITRATE OR NITRITE POISONING, JUST BE CAREFUL!

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A recent lamb trial at TAIC where a sub clinical case of nitrate poisoning was suspected is a timely reminder of the risks of grazing ewes and lambs on canola and grazing cereals over the winter. With recent rain getting the growing season off to a good start, there are several factors that could potentially provide an added risk over the next few months. So what are the symptoms, what are the risks and how to avoid nitrate poisoning?

Nitrate by itself is relatively low in toxicity however nitrite is 10 times more toxic and is the main culprit of what we know as nitrate or nitrite poisoning. In the rumen the conversion of nitrate to nitrite by rumen bacteria is relatively rapid whereas the detoxification of nitrite to ammonia is much slower. When the nitrite levels in the rumen exceed the rumen flora's capacity to detoxify it, we have nitrate poisoning and the nitrite enters the bloodstream where it combines with haemoglobin to reduce the capacity of red blood cells to carry oxygen. This transfer of nitrite into the bloodstream is influenced by several factors including rate of feed intake, rate of digestion, nitrate conversion and movement of nitrite out of the rumen. Highly digestible green crops are a prime cause due to the first 2 factors mentioned. Nitrate by itself can have a caustic effect on the lining of the gut if present at high concentrations

There is however a degree of variation in the tolerance of some animals to nitrate poisoning and some degree of conditioning animals to higher levels of nitrates in feed is possible however the conditions that usually occur over the winter months all add to the risk of grazing sheep and lambs on cereal and especially canola crops. This coupled with the fact that many crops will be top dressed with nitrogenous fertilizer this season due to both the cheaper price of urea and the fact that heavy crops last season will necessitate the need for higher levels of nitrogen topdressing this year. This coupled with the added risk when weather is cold and cloudy makes this season potentially a risky one. The application of some herbicides can also increase the risk of high levels of nitrate accumulating in the plant. Canola is an especially risky plant and the lamb trial at TAIC where lambs were grazing on volunteer canola was a good example of just how risky canola can be, especially in a mono culture situation where no alternative grazing options are present. Whereas the offer of a loose lick supplement can provide some assistance for animals grazing cereals, it would seem the risk is increased on canola when supplements are provided.

The signs of nitrite and nitrate poisoning are slightly different. Nitrate poisoning causes diarrhoea and vomiting, excessive saliva production and obvious stomach pain. Nitrate poisoning may take a few days to develop whereas nitrite poisoning will occur within 6-24 hours after ingestion of toxic feed. Nitrite poisoning causes rapid difficult breathing, rapid pulse, staggering, tremors, blue chocolate coloured mucus membranes and the animals blood is dark and chocolate in colour and clots poorly. The lambs at TAIC showed none of these signs except some belligerence when moving them to the yards. Subsequent weights showed they had not gained any weight after a 2-week period on actively growing plants. No lamb losses were recorded but 2 weeks without weight gain

was significant indicating a possible subclinical case of poisoning. Pregnant ewes that experience even a slight case of nitrite poisoning are prone to abortion due to lack of oxygen to the foetus.

The attraction to use grazing cereals as a feed source in mixed farming operations is becoming more common practice as producers search for practices to improve efficiencies in the operations. So how do we ensure we are not putting a significant section of our enterprise at risk. Although

testing for nitrates is an obvious first step, it is probably not going to be the answer if cereal crops were sown with the intent to utilise them as a grazing option. There are a few practices that can minimise the risk albeit coupled with the obvious proviso that the stock are to be watched closely for symptoms at all times. If animals are hungry, do not put them into lush cereal crops, especially if they have been recently top-dressed with urea. Avoid grazing crops for a week after rainfall, heavy frosts or damp, miserable cloudy days. If we happen to experience



a dry spell over the winter, wilting crops are also an added risk as nitrates are accumulated in the plant. One practice that is labour intensive but eliminates risk is to rotate the animals on and off the cereal paddocks which allows time for nitrites to escape the rumen. Within the plant, nitrate levels are highest in the lower third of the stem and in lower concentrations in the leaves so don't be fooled by thinking a well grazed cereal crop has a lower risk. Anything that inhibits growth will increase nitrate accumulation in the lower half of the plant. Soil deficiencies in either Sulphur, Molybdenum and Phosphorus will boost nitrate uptake into the plant. Also be aware that if heavy rain has fallen during the growing season, watering dams may also contain higher than normal levels of nitrates especially if early applications of urea have been done.

What to do if you suspect a case of nitrate or nitrite poisoning? Very calmly move the affected animals off the crop back onto lower quality pastures. Be aware that some cereal hay or Lucerne hay may not solve the problem as dried forages can also contain high levels of nitrates. Treatment for affected animals is limited and although they can be treated with intravenous injection of methylene blue, it is no longer approved for use by food producing animals so prevention is definitely better than the alternative.

A measured approach to the use of grazing cereals is best, oat crops are most dangerous along with canola but weather conditions and the use of fertilisers and herbicides, can make any cereal crop a potential risk of other factors are not in favour. Be aware of the risk, especially given the probability of higher than usual use of nitrogen fertilisers and protect the value of your livestock enterprise. If in any doubt, remove animals from the risk and consult your vet if you have any ongoing concerns.