Putting sheep in to graze young cereal crops is increasingly popular and confers many benefits but care must be taken with providing mineral supplements to prevent metabolic disorders. Photo courtesy DAFWA.

Mineral imbalance in sheep grazing crops

A survey of sheep producers revealed that although the practice of grazing cereals was widespread and increasing in popularity, there is concern about the risk of metabolic disease associated with the imbalanced mineral content of young cereal crops.

AT A GLANCE

- Current research on sheep grazing cereals appears to confirm there is some risk associated with pregnant or lactating ewes grazing young cereal crops.
- Supplementing pregnant or lactating ewes with magnesium and salt will minimise the risk of hypomagnesaemia, however, a potential acute calcium deficiency which causes hypocalcaemia is not well understood and a calcium supplement may even make the problem worse, due to the complexity of calcium metabolism.
- Magnesium and salt supplements should also be provided to young animals, dry ewes or wethers grazing young wheat crops.

The survey of producers and consultants across Western Australia, South Australia, Victoria and New South Wales confirmed the growing popularity of grazing young cereal and canola crops. The practice appears to be more widespread in the eastern states with around 60% of surveyed producers or their neighbours grazing crops, compared to 15% in the west.

Those grazing crops claim that it provides feed to fill the winter gap and if grazing is well managed there is no yield loss at harvest time. Analysis of the plant material supports the high feeding value claim as the forage is highly digestible with a high energy density (>12MJ/kg DM), high in crude protein (21-32%) and has a rapid rate of dry matter growth (often 20-40kg/ha/d) (See *Farming Ahead* June 2014).

The concern expressed by some producers, both in a detailed one-to-one phone survey, and with a subsequent more broadly distributed internet survey, was the risk of metabolic disease, particularly hypocalcaemia (milk fever) and hypomagnesaemia (grass tetany) in ewes grazing crops in late pregnancy and lactation. In the internet survey, 29% of producers who graze crops with ewes in late pregnancy reported having problems with sheep health and 18% of producers who graze crops avoided doing so with pregnant ewes. Most interestingly, 85% of the producers who avoided grazing crops during late pregnancy came from NSW, ACT or Victoria – very few WA producers had observed any problems.

MINERAL COMPOSITION OF COMMONLY GRAZED CROPS

As part of the continuing research to understand these metabolic problems, and also the difference between the east and west of the country, crop analysis data were obtained from CSBP in WA and the Nutrient Advantage Laboratory operating in the eastern states.

Western Australia

Results from the analysis of 5451 wheat samples, 328 oat samples, 2098 barley samples and 1109 canola samples collected in June, July or August 2014 were processed. Given that WA producers appeared to be least concerned with the risk of metabolic disease when grazing young cereals, the analytical results were surprising. Across all rainfall zones, a high proportion of wheat samples were deficient in sodium (70.6%) and/or calcium (26.4%), and contained 7-8 times more potassium than the reproducing ewes requires (Figure 1). The high potassium combined with low calcium, sodium and marginal magnesium resulted in a high grass tetany index in many samples (67.8%) and indicated a high risk of potassium/sodium/magnesium imbalance (58.6%) (see text box). There were also a high proportion of oat samples deficient in calcium (28.4%) and with a high grass tetany index (57.5%) (Figure 2). For barley, the grass tetany index often exceeded the at-risk threshold (37.5%), but less than 10% of samples were deficient in any of the major minerals (Figure 3).

The canola samples were not consistently deficient in any of the measure minerals.

The conclusion from these results was that reproducing ewes grazing young wheat crops are at high risk of metabolic disease (hypocalcaemia and/or hypomagnesaemia) and sodium deficiency. There is also some risk with grazing oats or barley but this is a much lower than grazing wheat.

Interactions between potassium, sodium, magnesium and calcium

Grass tetany is often an induced magnesium (Mg) deficiency; high potassium (K) together with low sodium (Na) and calcium (Ca) in the diet reduce magnesium absorption. Risk can be expressed in terms of a grass tetany index. The index is calculated as K/(Mg + Ca), where all minerals are expressed as milliequivalents. A ratio of >2.2 is considered to present a risk of grass tetany in cattle; less is known of the risk for sheep. The ratio of K/(Na+Mg) has also been suggested as an indicator of the risk of mineral imbalance, with a ratio >4.5 indicating a potential depression in growth.

Eastern States

Results from the analysis of 1090 wheat samples, 28 oat samples and 122 barley samples collected across NSW, ACT, Victoria and SA in May, June, July, August or September (2008-2014) were processed. Given the smaller number of samples available, analysis was by state and data were pooled across years and crop type. Some samples were whole tops while others were youngest emerging blade.

Across all states, a high proportion of wheat samples were deficient in sodium (52-87%) and/or calcium (40-52%), and had a high risk of causing grass tetany (76-92%) or sodium/magnesium imbalance (52-58%) (Figure 1). There was also a high proportion of oat samples deficient in calcium (44-71%) and with a high grass tetany index (67-77%) or potassium/sodium/magnesium imbalance (17-50%). A high proportion of oats samples (50%) from NSW were deficient in sodium, but this was not apparent in other states (figure 2).

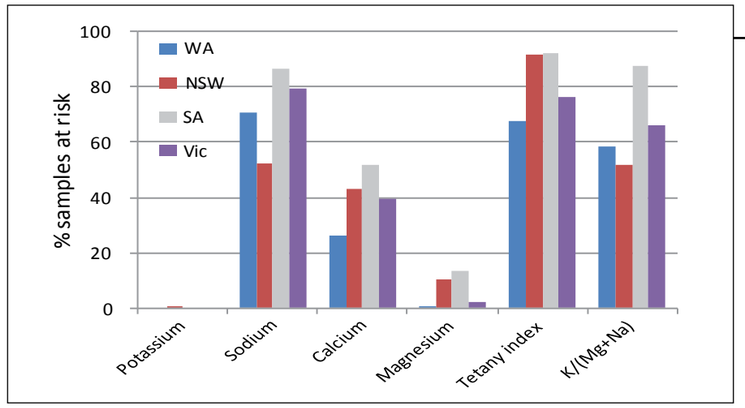

Figure 1. Percentage of wheat samples with mineral concentrations below requirements for pregnant ewes or with a grass tetany index above 2.2 or K/(Mg+Na) above 4.5. At-risk assessment is based on mineral requirements of pregnant ewes.

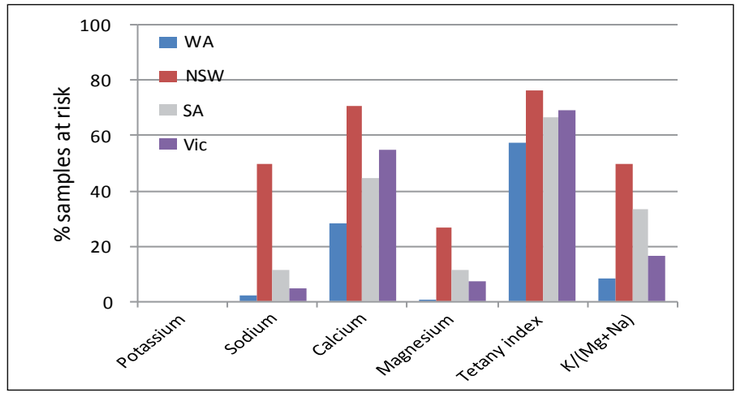

Figure 2. Percentage of oat samples with mineral concentrations below requirements for pregnant ewes or with a grass tetany index above 2.2 or K/(Mg+Na) above 4.5 . At-risk assessment is based on mineral requirements of pregnant ewes.

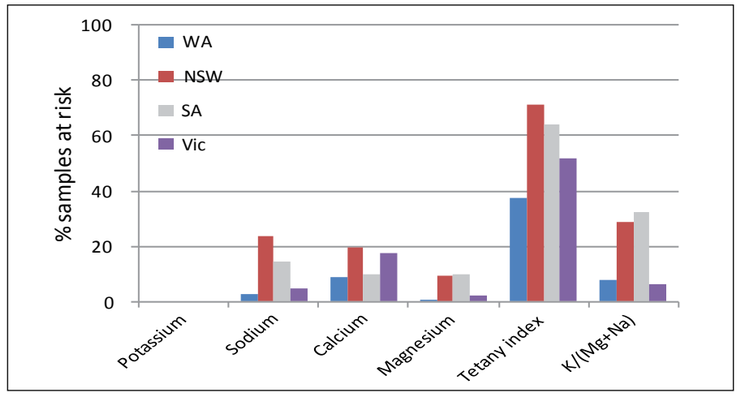

Figure 3. Percentage of barley samples with mineral concentrations below requirements for pregnant ewes or with a grass tetany index above 2.2 or K/(Mg+Na) above 4.5. At-risk assessment is based on mineral requirements of pregnant ewes.

For barley, a moderate proportion of samples from NSW were deficient in sodium (24%) and grass tetany index often exceeded the at-risk threshold (52-72%). Samples from NSW and SA also indicated a moderate risk of sodium/magnesium imbalance (29-33%) (Figure 3).

These results indicate that reproducing ewes grazing young wheat crops are at high risk of metabolic disease (hypocalcaemia and/or hypomagnesaemia) and sodium deficiency. There is also a risk of metabolic disease in reproducing ewes grazing young oats in all states along with a high risk of sodium deficiency when grazing oats in NSW. There are some risks with grazing barley but this is much lower than grazing wheat.

In comparing WA with eastern states, there is some justification for a more detailed comparison. In the eastern states, a higher proportion of wheat samples were deficient in calcium and also indicated higher risk of grass tetany than in WA. Similarly, a higher proportion of oat samples in the eastern states indicated calcium deficiency than in WA. These observations may account for differences in reports from producers in different states however the analysis of crops still indicates a risk of metabolic disease on both sides of the country.

SUPPLEMENT OPTIONS

Other researchers have successfully used a mixture of causmag and salt (1:1) to improve growth rates in young sheep. The results of crop analysis support the use of these supplements for wheat and possibly oats for young sheep. A supplement of causmag and salt would also lower the risk of hypomagnesaemia in reproducing ewes. More research is still required to address the possibility of hypocalcaemia.

While hypocalcaemia is due to a failure to mobilise sufficient calcium from bone during times when requirements rapidly increase, use of calcium supplements for dairy cows in late pregnancy has been shown to increase susceptibility to milk fever, therefore there is currently insufficient information to know if the same risk apply to the use of calcium supplements with pregnant sheep.

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