

Mineral supplementation improved the calcium status of pregnant ewes grazing cereal crops.

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Introduction

Grazing vegetative wheat, barley and oats (both dual purpose and traditional spring varieties) is becoming an important strategic and tactical grazing option on farms where crops and livestock coexist. Surveys of producers and consultants indicate 15 to 60% of farmers with sheep and crops have adopted this practice. The high winter growth rates of the crops offer the opportunity to fill the winter feed gap and the high nutritive value (metabolisable energy and protein) make these crops well suited to meet the requirements of reproducing ewes. However, metabolic disorders have been reported and many producers avoid grazing these crops with reproducing ewes, others accept the risk even though they have encountered metabolic disorders. The project aimed to define the risk associated with grazing cereal crops and develop supplements that would minimise ewe mortality and ill health. The hypothesis for this study was in three parts. The first was that Mg and Ca status will be low in some but not all grazing situations and that risk of metabolic disease will be increased. The second was that a mineral supplement providing Ca, Mg and Na to pregnant ewes grazing vegetative crops will improve Ca and Mg status of the ewes and, the third was that a mineral supplement designed to reduce dietary cation - anion difference (DCAD) while providing Ca, Mg and Na, will be more effective than a supplement that has no influence on DCAD.

Methods & Results

The project was conducted over two years. In the first year the mineral status of both forage and of reproducing ewes grazing wheat, oats or barley was monitored on 18 farms in Western Australia (6 farms) southern New South Wales (7 farms) and central New South Wales (5 farms). The average period of grazing was 20 days. In the second year the effectiveness of two mineral supplements was assessed on six farms over three weeks. On each farm 90 twin bearing ewes in late gestation (day 115 to day 129 of gestation) were divided into three treatment groups (n=30/treatment). The control group was given no supplement a second group was provided with the industry standard supplement (40% causmag, 40% limestone and 20% salt) and the third group was provided with a newly formulated supplement (12.5% magnesium chloride, 32.5% gypsum and 55% salt). In both experiments samples of blood plasma and urine were collected pre and post grazing from ewes and samples of crop and soils also collected for mineral analysis for calcium, sodium, magnesium and potassium.

Across both experimental years ewes gained condition score (3 to 3.2) when FOO ranged from 200 to 3400kg DM/ha. A high proportion of farms had forage Ca (70%), Na (70%) and Mg (18%) below published requirements and K (70%) above the published Maximum Tolerable Level. Analysis of samples collected from the ewes at the end of crop grazing indicated ewes on 94% of farms had alkaline urine and on 88% of farms Ca concentrations in the urine were in the marginal range. The supplemented ewes showed significant increases in Ca concentration in urine, plasma and Ca fractional excretion (Fig 1) on all but one of the six farms. There were no clear or consistent differences between the two supplemented groups of ewes.

The forages had a complex mineral composition meaning grazing ewes had an increased risk of direct or induced Ca (hypocalcaemia) or Mg (hypomagnesaemia) deficiency. Preliminary analysis indicated higher risks from grazing wheat and/or grazing crops grown on high K soils. The Ca status of ewes grazing vegetative cereal crops in late pregnancy can be improved by providing supplements containing Ca, Mg and Na. No production responses to the supplements were apparent, however this was not surprising as large commercial scale experimentation is required to detect changes in ewe mortality.

Conclusions & Recommendations

In summary, vegetative cereal crops can provide a high nutritive value forage suitable for grazing reproducing ewes even with FOO < 200 kg/ha. The forage has a complex mineral composition that means the grazing ewe may have an increased risk of direct or induced Ca (hypocalcaemia) or Mg (hypomagnesaemia) deficiency. The low Na and high K content of these crops may also pose a direct risk to production. Our analysis indicates higher risks from grazing wheat and/or grazing crops grown on high K soils. Furthermore, these results indicate that either of the two supplements used can be effective in increasing Ca status in pregnant ewes at intakes up to 30 g/day. The results support the inclusion of Ca, Mg and Na in the supplement although some caution is required as Ca supplements in pregnancy have also been reported to increase the risk of hypocalcaemia. Further work is planned to quantify the effects of different supplementation strategies on ewe and lamb mortality.

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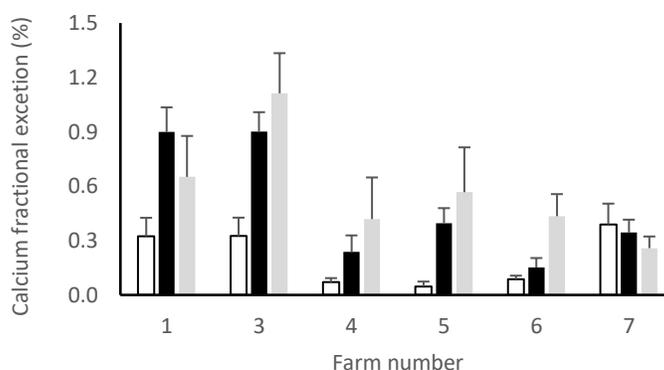


Fig 1: Fractional excretion of Ca from sheep fed no supplement (open bars), industry supplement (black bars) and new supplement (grey bars)