Volume 6 Issue 1
February/March 2002

Agriculture & Agri-Food Canada/Alberta Agriculture, Food & Rural Development

Western Forage/Beef Group

Tetany Problems When Feeding Cereal Straw or Greenfeed

Many beef producers are utilizing cereal straw or greenfeed as the main forage in their winter feeding program. When feeding straw it is necessary to supplement with a concentrate that is high in crude protein and energy. Greenfeed when cut in the soft dough stage or earlier, tends to have good levels of crude protein and energy and satisfies the requirements of many rations.

During the past few years, an increasing number of cattle herds are exhibiting problems with "winter or grass tetany" and in some cases, milk fever. Winter tetany is a metabolic condition caused by lower than average blood magnesium levels. It is seen in cows in late pregnancy or after calving. Signs of grass or winter tetany in the cowherd are often a dead cow or cows with marks of struggling or paddling on the ground around head and legs. Cows that have not died are often excitable, uncoordinated, trembling or staggering. Occasionally, affected cows look like those with milk fever in that they are down, very quiet and unable to get up. Older cows are more susceptible than first- and second-calvers because of lower magnesium stores and decreased efficiency of absorption of magnesium from the gut. Dry cows and bulls are rarely affected. Producers should contact their veterinarian immediately if their cattle show any of these symptoms. Treatment may include intravenous or subcutaneous administration of solutions containing magnesium and calcium salts.

Winter tetany in Alberta and across the Prairie Provinces is often associated with feeding grain, straw or greenfeed rations. Cereal feeds are low or borderline in magnesium compared to the cow's requirements (gestating cows need 0.12% and lactating cows need 0.20% Mg of dry matter intake). Also, high levels of potassium in feeds can reduce the amount of magnesium that is absorbed from the diet.

Repeated or high levels of manure application to soil can cause high accumulation of potassium in feeds. Dry growing conditions and regions where acidic soils exist (low soil pH) contribute to the accumulation of potassium in plants. Normally the levels of potassium in feeds range from 1.5 to 1.9% on dry matter basis. Feed tests in Saskatchewan in cereals grown in 2001 indicate potassium levels as high as 4.2%. Similar results are being reported in Alberta. Gestating cows need 0.6% of dry matter intake as potassium and lactating cows need 0.7% potassium. Indeed, the maximum tolerable level is 3% of dry matter intake. Thus, the high dietary potassium reduces absorption of

Inside this Issue:

magnesium from the gut of the cow and also reduces the efficiency with which calcium is mobilized from the bone for productive purposes by the cow.

Prevention of this condition is possible through supplementation of the diet with magnesium oxide and limestone. Limestone is a source of calcium. Supplementation programs should be designed to provide approximately 40 grams of magnesium oxide and 80 grams of limestone per cow per day. Greater amounts may be required if the potassium level in the diet is very high. Magnesium oxide is very unpalatable and needs to be mixed with grain or screening based supplements to achieve this level of intake. Producers should work with a nutritionist from a feed company to design a program that fits with their management program. The goal should be to reduce the K/(Ca + Mg) ratio to less than 2.2 in the diet. Levels of the K/(Ca + Mg) ratio greater than 2.2 indicate a potential for winter tetany in your herd. The nutritional program should also aim to get the Ca:P ratio to greater than 2 in the total diet. Cereal-based rations also require supplementation of salt, trace minerals and vitamins and, if a lot of straw is used, protein.

For additional information contact Bryan Doig, Livestock Agrologist, Saskatchewan Agriculture & Food, North Battleford, SK at 306-446-7477 or Tennis Marx, Beef Specialist, Alberta Agriculture, Food and Rural Development at 780-653-5130.

Grant Lastiwka, Pasture Agronomist, Western Forage/Beef Group, comments:

We are finding in central Alberta and other areas of the province that tetany is also occurring. The minerals taken in by animals in their drinking water also affects the situation, positively or negatively. As Brian has said, the calcium/ magnesium imbalance has the greatest likelihood of occurring just before or during calving in the form of tetany or milk fever. Cases may be visible by finding a dead cow that was calving or laying on her side in a slight hollow. These could be misdiagnosed as calving difficulty or weak cow syndrome.

If your feed samples were analyzed, ask yourself, "Were they properly collected and are you comfortable that it is a representative sample of what you are feeding?" Check to see if you have analyzed for calcium, phosphorus, potassium and magnesium.

Do you have a water analysis you can provide to your nutritionist?

Check to see if your feed analysis was done by the more costly, wet chemistry or the cheaper Near Infrared Reflectance Spectroscopy (NIRS) method. In the NIRS method the mineral analysis is less accurate than a wet chemistry mineral analysis and should be used only with great caution.

Finally, if you are now providing the necessary mineral package to the animals' free choice, are their intakes at the recommended levels? Calcium is not palatable and magnesium is very unpalatable. If feeding a free choice mineral mix, add flavoring agents and a 58% granulated magnesium oxide for best results. Granulated gets better intake than other more powdery magnesium forms.

Monitor the intakes to see that they are meeting recommendations. Manage the location and freshness of the mineral.

If intakes are still low, you are concerned and have not had a feed analysis done, you may want to force feed 1-2 ounces of magnesium and some additional calcium in a grain ration. This is a much more preferred method for feeding minerals.

Force feeding 1 ounce of magnesium oxide if the problem is just a magnesium deficiency works well or, up to, but no more than 2 ounces if the ration also has an excess of potassium. To compensate for the excess of potassium affecting calcium and magnesium absorption (called the DCAB ratio - we lack good information on DCAB critical values in beef cows) the feeding of calcium and magnesium needs to be higher than recommended.

Consult a nutritionist, beef specialist or livestock specialist for more details.

Coming Events

Western Forage/Beef Group
Pasture School
June 18, 19 and 20, 2002
Lacombe Research Centre
Lacombe, AB
Contact: 403-782-8030 for more information

Western Canadian Grazing Conference
December 4 - 6, 2002
Red Deer, AB
Contact: Richard DeBruijn, Alberta Forage Council, 403-782-0772 for more information

Alternative Fall and Winter Feeding Systems for Spring Calving Beef Cows

Duane McCartney, John Basarab, Vern Baron and Erasmus Okine
Western Forage/Beef Group

During the past four years the Western Forage Beef/ Group at Lacombe, AB has evaluated the effect of early and late weaning in combination with three winter feeding strategies on calf growth, cow growth and reproductive performance and profitability of spring calving cows. The spring calving herd were allocated to early weaning (EW); i.e. late August, and late weaning (LW); i.e. mid October groups and to three winter feeding strategies. Winter feeding strategies were:

1) Feeding every day (ED) a barley silage supplement with two row barley straw fed free choice; 2) Alternate day feeding of the silage supplement (AL) with free choice two row barley straw; and 3) Swath grazing late seeded annual cereals swathed in the soft dough stage just prior to the killing frost in mid September (SW).

Each November those cows that were pregnant and had weaned a calf continued on the same treatment as the previous year. All cows were weighed and back fat scored at the start of the winter feeding period in mid November and at the end of the period in late-February just prior to calving. Swath grazed cows were then housed in winter feeding pens and fed the straw and silage ration every day during the calving period similar to the every day fed cows. When the fields were dry the swath grazed cows and their calves returned to graze swaths kept for spring and had access to any residue remaining from the swaths grazed in winter. They were also supplemented with some concentrate to help meet their lactating nutrient needs. The every day and alternate day cows remained on their previous feeding strategy with rations balanced for their increased lactating needs until the perennial pastures were ready for grazing in early June.

Effect of Early Weaning on Calf Performance

During the 56 day time period between the weaning date for the EW calves and the weaning of the LW calves, the EW calves grew 0.34 kg per day or 35.4% slower than the LW calves on pasture nursing their mothers. The result was consistent across production cycles, winter feeding treatments, cow breed cross group and gender of calf. In our study, LW calves were grazing good quality fall pastures and suckling their dams, while the EW calves were combating the stress of weaning and acclimating to a backgrounding diet formulated for an ADG of 0.68 kg per day. By the time LW calves were weaned at 211 days of age, they weighed 15.3 kg more than their EW cohorts. EW calves did not undergo compensatory gain during the 132 day backgrounding period and grew similarly to LW calves. This resulted in the LW calves maintaining their weight advantage of 14.8 kg entering the finishing phase.

No significant differences were observed between EW and LW calves in finishing performance, days on the finishing diet, age and weight at slaughter, percent shrink, carcass weight or in any other carcass quality trait. Thus, while EW calves did eventually catch-up to LW calves at finishing, they also incurred the extra feeding costs due to being in drylot for 64 days longer than LW calves. This result shows that young weaned calves need to grow at a rate at least similar to that achieved on the cow. If they do not, early weaned calves will require more days on supplement feed to attain similar weight and finish comparably to their late weaned counterparts.

Effect of Early Weaning on Cow Growth Performance

EW cows gained 5.6 kg more over the 56 day period than LW cows that were still nursing their calves. In our study EW cows continued to gain weight at 0.33 kg per day from the late weaning date to the beginning of the winter feeding period. EW cows throughout the winter weighed more than LW cows and by breeding time they were still 15 kg heavier. The body weight differences caused by early weaning were also reflected in EW cows having slightly more backfat and BCS than LW cows at the beginning of winter feeding and at precalving. These results were consistent across production cycles, winter feeding treatment (every day, alternate day and swath grazing) and cow breed group. Because of this increase in backfat and body condition score there is an opportunity to winter EW cows on less feed and harvest some of this stored body energy.

Effect of Early Weaning on Cow Reproductive Performance

The subsequent year's calf birth date and weight, date of first calf, date of last calf, calving pattern, calving interval, pregnancy rate, weaning rate and twinning rate were similar between EW and LW cows. There was a trend for the EW cows to have a shorter calving span than the LW cows. EW and LW cows were similar for cumulative cull and open rates for cows tracked for five production cycles.

Effect of Winter Feeding Strategies on Cow Growth Performance

Cows that were grazing swaths gained weight more slowly than cows under an every day or an alternate day winter feeding program (0.06 vs. 0.42 vs. 0.39 kg per day). Prior to calving the swath grazing cows were removed from pasture and placed in drylot and fed a diet similar to the cows fed every day. Cow weight and backfat thickness at the time of the start to the breeding season were lowest for the swath grazing winter feeding strategy, intermediate for the alternate day winter feeding strategy and highest for every day winter feeding strategy. By the end of the third production cycle, cows on the swath grazing winter feeding strategy were the lightest and had the lowest backfat thickness as compared to cows on the every day and alternate day winter feeding strategies. The SW cows, although lighter with less backfat, had no negative impact on cow reproduction as all cows were in BCS 2.5 to 3.0. It should be noted that the positive differences in the ED and the AL cows was also dependent on the amount of barley silage supplement being fed to them. Less silage would have made the results more similar to the SW cows. Although there was no negative effect on reproduction caution must be exercised if cows enter the swath grazing period in a BCS of 2.5 or less.

Effect of Winter Feeding Strategies on Cow Reproductive Performance

Winter feeding strategies were similar for the subsequent years for all production factors and cumulative open or cull rates for cows tracked for five production cycles.

Effect of Winter Feeding Strategies on Feed Consumption

Swath grazed cows consumed barley swath forage at a rate of 10.9 kg DM per day which was similar to the amount of silage and straw DM consumed by every day and alternate day wintered cows. Although the kg's of DM were the same, swath grazed cows consumed more digestible energy than the cows fed the silage supplement feed. Despite consuming more energy, swath grazed cows gained less weight (SW 0.06 vs. ED 0.42 vs. AL 0.39 kg per day) from the start of the winter grazing or feeding period until a couple of weeks before calving. These results indicate that cows grazing swaths required about 20% more energy than the other treatment groups, possibly to offset the energy costs associated with walking and digging through the snow to obtain forage. The extra 20% energy needed by the swath grazing cows did not include energy to keep warm. Throughout the three wintering periods (1997-2000), only a few days were below -20 degrees Celsius, the temperature below which some beef cows may begin to feel cold (the lower critical temperature) and need extra feed and energy to keep their body temperature from falling.

Effect of Winter Feeding Strategies on Economic Performance

Swath grazing required 44% less labour and cost 47% less per cow than every day feeding; and 28% less labour and cost 42% less per cow than alternate day winter feeding during the first 100 days of winter feeding. This labour advantage for alternate day feeding was dependent on the size of the feed truck as only one trip was required in our study. If two trips are required on the alternate day to deliver twice the amount of feed, then the only difference in labour saving is the warm-up time for the truck and loader.

Alternate day winter feeding for 100 days cost 8.6% per cow less than every day winter feeding. While these costs reflect small paddock and pen costs under research conditions at the Lacombe Research Centre, they might not reflect the true cost of these winter feeding strategies under commercial conditions in the Western Canadian Parkland.

A survey of 31 Alberta cow-calf producers revealed that the total cost of swath grazing every day, feeding the silage supplement every day and alternate day winter feeding strategies were $ 0.61, $1.14 and $1.12 per cow per day. Thus, the proportional difference between every day and swath wintering systems as determined by our study and the survey was similar. This was not the case for the proportional difference in the cost of winter feeding for the every day and alternate day feeding system in our study (8.6%) and in the survey (1.8%). In our study, labour was based on one feeding trip every alternate day, while in the Alberta producer survey two feeding trips every alternate day were required.

A feeding strategy of 100 days of swath grazing would save between $53/cow or approximately $66.8 million annually (based on Alberta survey results) and $72/cow or approximately $90.2 million annually (based on this research project) for the 1.26 million beef cows estimated to inhabit central and northern Alberta.

Additional savings would occur when cows and calves return to swath grazing, once the ground is dry enough after calving. However, extra energy and protein must be supplemented to meet the demands of the nursing cow. Grazing swaths in the spring will provide an excellent substitute forage source for cow/calf pairs versus turning them out too early onto perennial pastures, and damaging these pastures with overgrazing. The spring swath grazing system allowed the perennial pastures to grow sufficiently prior to a more timely initial grazing in June.

Swath grazing can play a valuable role in lowering winter labour and feed costs. The big advantage of alternate day feeding is the flexibility of time management; i.e. one day free and the other day to haul feed to the cows. One caution however is that swath grazing might not work in situations where wildlife is a problem.

For additional information contact Duane McCartney at 403-782-8104; email: mccartneyd@em.agr.ca

Western Forage/Beef Group Advisory Committee Members

- John Buckley, Box 6, Site 6, RR2
  Calgary, AB T2P 2G5 Ph: 403-932-2486
- Brian Luce, RR4
  Ponoka, AB T4J 1R4 Ph: 403-783-6518
- Bill Lee, Box 19
  Camp Creek, AB T0G 0L0 Ph: 780-584-2323
- George Lidster, Box 100
  White Fox, SK S0J 3B0 Ph: 306-276-2567
- Murray Kerik, Box 107
  Flatbush, AB T0G 0Z0 Ph: 780-681-2254
- Edith Fontaine, Box 1666
  St. Paul, AB T0A 3A0 Ph: 780-645-6595
- Doug Wray (Co-chair), Box 95
  Irricana, AB T0M 1B0 Ph: 403-935-4642
- Craig Van Stryland, RR2
  Clive, AB T0C 0Y0 Ph: 403-784-3545
- John Hastie, 459 Queen Charlotte Rd., SE
  Calgary, AB T2J 5H8 Ph: 403-225-1822
- Tim Nerbas, Box 6
  Waseca, SK S0M 3A0 Ph: 306-893-2352
- Kathy Keeler, 215, 6715 - 8 St., NE
  Calgary, AB T2E 7H7 Ph: 403-275-4400

Western Forage/Beef Group Members

- Arvid Aasen, Provincial Forage Agronomist
  Phone: 403-782-8027/1-800-340-9178
- Vern Baron, Forage Physiologist
  Phone: 403-782-8109
- John Basarab, Beef Management Specialist
  Phone: 403-782-8032/1-800-340-9178
- Myron Bjorge, Provincial Forage Specialist
  Phone: 403-782-8026/1-800-340-9178
- George Clayton, Head, Plant & Soil Research
  Phone: 403-782-8123
- Darren Chase, Economist
  Phone: 780-422-4056
- Adele Depalme, Technologist
  Phone: 403-782-8100 (ext. 263)
- Ann de St. Remy, Industry & Public Relations
  Phone: 403-782-8126
- Neil Harker, Weed Physiologist
  Phone: 403-782-8134
- Cathy Hendrickson, Administration
  Phone: 403-782-8030/1-800-340-9178
- Grant Lastiwka, Pasture Agronomist
  Phone: 403-782-8028/1-800-340-9178
- Ross Hutchison, Forage Branch Leader
  Phone: 403-782-8025/1-800-340-9178
- Duane McCartney, Forage/Beef Management Systems
  Phone: 403-782-8104
- Vince Ohama, Technologist
  Phone: 403-782-8033
- Erasmus Okine, Animal Nutritionist
  Phone: 780-492-7666
- Bill Starr, Farm/Animal Manager
  Phone: 403-782-8139
- Dave Young, Technologist
  Phone: 403-782-8100 (ext. 303)

We're on the Web!
www.agric.gov.ab.ca/crops/forage/wfbg/index.html

Western Forage/Beef Group's Mission Statement:
"To improve the profitability and sustainability of the forage-based beef industry through development, integration and transfer of knowledge and technology"

Agriculture & Agri-Food Canada/Alberta Agriculture, Food & Rural Development
Lacombe Research Centre, 6000 C & E Trail, Lacombe, AB T4L 1W1
Phone: 403-782-8030 or 1-800-340-9178
Fax: 403-782-6120