



# Steps Toward Bloat-Safe Grazing of Alfalfa: Keys to Maximizing Gains of Backgrounding Cattle and Cow-Calf Pairs on Pasture



Alfalfa is one of the few forages with the nutritional "oomph" on pasture to be able to sustain levels of production that are comparable to those achieved in the feedlot. The potential for increased stocking rates and enhanced beef production as a result of grazing alfalfa have been estimated to have an annual value of \$332 million to Alberta's producers. Compared to grazing mixes of grass and legumes, grazing pure stands of alfalfa can more than double the net farm income generated. Under irrigation, beef production from grazing alfalfa can be phenomenal. Production yields of 1,371 pounds of beef per acre of alfalfa have been reported. In spite of the fabulous potential of beef production from alfalfa, the problem of pasture bloat continues to limit the widespread adoption of alfalfa grazing systems. Numerous technologies including bloat reduced alfalfa (AC Grazeland, developed by Agriculture and Agri-Food Canada), the CRC bolus (Elanco Animal Health) and Bloat Guard (Pfizer Animal Health) are currently available. Over the past few years, a new pluronic detergent, Blocare 4511 has been tested by Agriculture and Agri-Food Canada Researchers in Lethbridge, Kamloops and Lacombe and Alberta Agriculture Food and Rural Development Researchers in Lethbridge for bloat prevention.

## Factors Affecting Bloat in Animals Grazing Alfalfa

### The plant

Alfalfa has a initial rate of ruminal digestion that is five to ten times greater than that of most grasses. The rapid microbial colonization and digestion of alfalfa reduces particle size and increases the passage of digesta from the rumen, enabling the animal to consume greater quantities of forage. Whereas this rapid digestion and particle size reduction is responsible for the high productivity of cattle on alfalfa pasture, it also is in part responsible for bloat. Although the scientific jury is still out, there is ample evidence to suggest that the soluble protein in alfalfa plays a major role in pasture bloat. For example, the reduction in soluble protein levels that occurs as alfalfa matures is closely associated with a reduction in bloat risk. Bloat risk is highest when alfalfa is in vegetative to early bloom stages of growth. As alfalfa enters into the full bloom or post bloom stages, soluble protein levels decrease, plant cell walls thicken, lignin content increases and the rate of digestion of alfalfa in the rumen decreases. Consequently, many experienced producers do not allow their cattle to graze alfalfa until it is in full bloom. Soluble protein levels may also be higher in the plant early in the day and this may be why many researchers recommend that cattle be turned into alfalfa pastures after the morning dew is off the alfalfa. Other strategies of bloat prevention such as wilting of alfalfa also lower soluble protein levels in the alfalfa and reduce bloat risk. Although one might think that the same effect would be achieved after a good fall frost, freezing can rupture plant cell walls and increase the release of soluble protein in the plant. Thus, the idea that alfalfa is bloat-safe after a frost is not true. It is likely that the risk of bloat in frozen alfalfa decreases with time as proteins complex with carbohydrate in a manner similar to that achieved with wilting or drying. However, as many a dairy farmer can attest to, cattle can still bloat on alfalfa hay, and long term frozen alfalfa should be considered bloat reduced, not bloat safe.

### The animal

Proper management of the animal is just as pivotal to bloat prevention as management of the plant. Although there are few experiments to prove the concept, most experienced producers would agree that cattle must learn to graze alfalfa. Cattle that have not grazed alfalfa will invariably consume most of the other forages (e.g., grasses, dandelions) that are present in the pasture. This may result in a false sense of security as cattle will seldom bloat while these alternative forages remain in the stand. However, as these forages become depleted, the risk of bloat increases and such a scenario is often responsible for bloat outbreaks two to three days after animals have been moved to a new pasture. Uniform and regular intake is the key to managing animals on alfalfa pastures. Cattle should never be introduced to an alfalfa pasture when they are hungry. Providing cattle with a mixture of good quality alfalfa-grass hay can provide the rumen fill that is necessary to prevent over-consumption of fresh alfalfa when cattle are first introduced to the pasture. High stocking densities increase competition for the alfalfa and reduce the likelihood of any one animal selectively grazing only the top portion of the plant. Keep in mind that a high stocking density is not the same thing as over-grazing the alfalfa stand until it looks like it has been run over by a lawn mower. Once introduced, every effort should be made to maintain the herd on alfalfa pasture. Animals will often experience mild bloat when they are first introduced to alfalfa, but this condition can often be treated by simply keeping the animal walking until the gas dissipates. Removing the animals from the pasture and reintroducing them at a later date often only increases the risk of bloat, unless the initial grazing attempt was made in the bud or pre-bud stage of growth. If rotational grazing is used, care should be taken to ensure that the initial paddock is not over grazed to the point that animals are hungry when they are introduced into a fresh paddock. Cattle should be moved to the next paddock with 3 to 4 inches of forage still in the stand.

Management of cattle on alfalfa pasture is a dynamic art and must be done with an appreciation of the factors that can cause fluctuation in the intake of alfalfa. Environmental factors that interrupt regular grazing bouts on alfalfa pasture such as storms, exceptionally hot weather or biting flies can alter intake patterns and increase the risk of bloat. During these periods of high risk, animals should be observed for symptoms of bloat more often as these conditions often lead to multiple bloats or bloat storms. Cattle generally have three to four grazing bouts per day on alfalfa pastures. Major bouts tend to occur shortly after sunrise and early in the evening. Bloat usually occurs an hour to one and a half hours after a major grazing bout. Consequently, familiarity with the grazing patterns of the cattle can enable producers to adjust their management practices to observe the animals during times of greatest bloat risk.

### **Controlling bloat with Blocare 4511 ®**

Numerous additives have been developed to prevent bloat in cattle grazing alfalfa pastures. Rumensin and Bloat Guard have been successfully used to allow animals to graze pure stands of alfalfa. These additives have been generally administered to cattle through pelleted supplements or in the mineral. Administration of bloat preventatives in the mineral is not fool proof as studies have shown that there is substantial variation in mineral intake among cattle. Cattle must receive bloat preventatives on a daily basis if they are to effectively manage bloat risk. Elanco Animal Health has overcome the problems with inconsistent additive intake through the development of a ruminal bolus which continuously releases Rumensin into the rumen. Although this device reduced the incidence of bloat by about 80 to 90% in field experiments, it did not completely eliminate it. A team of Agriculture and Agri-Food Canada and Alberta Agriculture Food and Development researchers is in the process of evaluating a new bloat preventative, Blocare 4511 manufactured by Ancare New Zealand Ltd. This product consists of a mixture of pluronic detergents and alcohol ethoxylate and is administered through the drinking water. Experiments at the Lethbridge, Lacombe and Kamloops Research Centres have found that this product was 100% effective at preventing bloat in cattle and sheep that were allowed to graze alfalfa for 6 hour periods. The 6 hour grazing period was used in order to "trigger" bloat as the animals were kept without supplementary feed after they were pulled off the pasture, a definite "no-no" under normal production conditions.

My work focussed on using sheep as a model to try to figure out how Blocare was working to prevent bloat. Blocare did not change the passage rate of liquids or solids through the rumen, but greatly reduced the production of ammonia per ml of rumen fluid. Possibly, Blocare is preventing bloat by reducing de-amination and proteolysis in the rumen. Digestibilities of dry matter, protein and fibre were not changed by treatment with Blocare, which shows that we are not changing alfalfa into grass, so we shouldn't expect any decreased productivity from animals treated with Blocare. The viscosity of rumen fluid was greatly reduced in the Blocare-treated animals. Viscosity of rumen fluid is related to stable foam, no foam = no bloat. From this series of

experiments, Blocare looks extremely promising as a bloat control method in animals grazing alfalfa. To use Blocare, animals must have access only to Blocare-treated water, with dosages controlled by a medicator attached to the water trough. Other sources of water (dugouts, lakes, creeks) need to be fenced off so that the animals get a dosing of Blocare at least once daily. Although further studies are needed it is possible that animals recognize that the "foamy pink water makes me feel better" and may even seek out the Blocare in conditions of lush growth where water consumption is normally minimal. Currently, FP& I is considering registration for Blocare under a 90 day withdrawal period. A large team of researchers including myself, Y. Wang, T. McAllister and B. Berg from Lethbridge; D. McCartney and V. Baron from Lacombe and W. Majak from Kamloops are continuing the investigation of Blocare and other methods to control bloat in animals grazing alfalfa.

## Conclusion

Although several technologies have been developed to reduce the risk of bloat, it is highly unlikely that any of these will completely eliminate the occurrence of bloat on alfalfa pasture. Even treatment with Blocare is unlikely to be completely effective under all conditions. Increased management and the risk of bloat can be seen as the cost that is associated with the high levels of productivity and associated profitability that are possible with grazing alfalfa. As with production of cattle in a feedlot, producers will only be comfortable with grazing alfalfa if they are prepared to adopt the concept of an acceptable level of death loss. It is amazing how cattle grazing grass pastures can die of a number of factors (e.g. pneumonia, hardware disease, grass tetany...), but cattle grazing alfalfa are only ever thought to die of bloat.

A knowledge of the interactions between the animal, plant and environmental factors that lead to bloat is the key to profitable grazing of alfalfa with minimal death loss. Bloat prevention technologies such as Blocare 4511 can then be coupled with management to remove some of the stress on both the cattle and the producer.

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