

## Alfalfa is not Bloat Safe After a Killing Frost

by Dennis Cosgrove - UW River Falls, Peter Jeranyama - SDSU, Dwain Meyer - NDSU, Paul Peterson - UM, and Dan Undersander - UW Madison

With the recent killing frost in much of the area questions are arising concerning grazing frosted alfalfa. One concern is frost causing alfalfa to become toxic. This can occur with sorghum species due to an increase in HCN concentration due to frost. This is not the case in alfalfa. Of greater concern is a possible increase in bloat potential in frosted alfalfa.

There are several factors known to affect the bloat potential in any legume. They include (i) the amount of soluble protein in the legume and possibly the type of protein, (ii) the presence or absence of condensed tannins, and (iii) the release rate of the soluble protein. Condensed tannins are responsible for precipitating some of the soluble protein and responsible for the non bloating legumes like birdsfoot trefoil, crownvetch, etc. Cicer milkvetch is the only known basically non bloating legume that does not have tannins and is the reason the release rate of the soluble proteins is considered a third factor affecting bloat.

According to the traditional theory of legume pasture bloat, froth was attributed to soluble proteins in the rumen fluid, which were produced by legume forages. Current theories place more emphasis on the involvement of small particles and microbial activity. Alfalfa, which is rapidly digested, provides for bacterial blooms, producing large quantities of both gas and slime. The rumen bacteria attached to these particles have an abundance of carbohydrates, both internal - in the form of storage granules - and external - in the form of slime. The occurrence of bloat is consistently associated with increased levels of these particles in the rumen fluid.

Alfalfa has a reputation of being bloat-safe after a killing frost. However, as long as the alfalfa remains green and succulent, there is a risk of bloat. In fact, the first frost ruptures plant cells producing small plant cell wall fragments and increasing the amount of  $K^+$ ,  $Ca^{2+}$ ,  $Mg^{2+}$ , all of which can increase the risk of bloat. Not until standing herbage actually dries substantially does bloat incidence decline. At least one week is usually required to dehydrate or dry down frost-killed alfalfa before bloat risk is reduced. Bloat is not a concern in alfalfa that has been field cured for baling.

The claim that the risk of bloat may be reduced by waiting until the dew is off the alfalfa before allowing cattle to graze has been substantiated by several research outcomes.

However, the claim that creeping-rooted alfalfa is bloat safe is unfounded.

The stage of alfalfa development/maturity is an important factor in preventing pasture bloat. Bloat potency is highest at the vegetative (prebud stage) and decreases progressively as plant grows to full bloom.

Moving to new pasture in the afternoon reduces the predisposition of cattle to bloat. Pasture management systems that promote continuous and rapid ruminal clearance (more bypass, less gas production) are most likely to reduce the incidence of bloat. Grazing alfalfa plants that have been swathed and wilted give another strategy for reducing bloat.

### **Therefore, frothy bloat potential of alfalfa is increased by frost but is lessened:**

- If alfalfa has begun to flower
- If cattle are moved into new pasture in the afternoon
- If grazing is continuous and not interrupted
- If bloat reducing supplementary products are used as the alfalfa plant dries

*Reference: Stanford, Kim. Agriculture, Food and Rural Development. Alberta, Canada.*

[http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex6769?opendocument](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex6769?opendocument)