FORAGES – Immediate Management Following a Frost
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Sorghum-Sudan

These crops require 28 F for a killing frost, however even a "light" frost requires special management. Prussic acid accumulates in the frosted tissue within a few hours after thawing and wilting. A "light" frost may damage just the tops of plants. If this occurs, delay grazing or harvest a few days after frost to allow the prussic acid to dissipate from the plant tops. Livestock can be returned to frost injured sudangrass (18 inches or taller) and sorghum-sudan (28 inches or taller) once the frost-damage parts of the forage dry-out, usually 7-10 days.

Sometimes a "light" frost enhances development of young shoots from the base of the plants. If this occurs, delay sending livestock to graze this forage since these new shoots would be high in prussic acid. Ideally, wait for the new shoots to get to a proper grazing height (sudangrass 18 inches or taller and sorghum-sudan 28 inches or taller), but more than likely a complete killing frost will occur before that would happen. Once a complete killing frost occurs, wait until the frosted tissue is drying out (usually 7-10 days) before grazing or harvest.

If haying the forage, the curing process decreases the prussic acid content as much as 75%, which removes the feeding concern. However, haying these forages this late in the season is nearly impossible because of poor dry-down conditions. If green-chopping the forage, chop only as much forage as the cattle will consume in 4 to 5 hours. Never green-chop the forage and let it sit on the wagon overnight. If ensiling, harvest at proper moisture for your storage structure to ensure good fermentation. Good fermentation takes a minimum of 4 weeks. The fermentation process will reduce the prussic acid content. Since immature plants can contain higher prussic acid levels, leave this forage ferment for at least 8 weeks before feeding. Never allow horses to graze sorghums or sudangrass at any time.

Alfalfa, Clovers and Other Bloat Potential Forages

In hay, 24F is often considered a killing frost. In pasture with plant growth of a shorter stature relative to a hay crop (closer proximity to radiant heat from the soil) may require a colder temperature. But even 26F will cause some frost damage. In either case, when alfalfa and clovers are frosted, they have a short-term risk of a higher bloat potential, and more so if that early morning forage also has heavy dew. For an explanation of this and suggested management, please read the article below.

"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*

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 arisk of bloat. In fact, the first frost ruptures plant cells producing small plant cell wall fragments and increasing the amount of K+, Ca2+, Mg2+, 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?opendocupartment/deptdocs.nsf/all/agdex6769?opendocument

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