



University of Minnesota Extension Forage Program

# Forage Quarterly

To improve and promote the economic and environmental value of growing forages in Minnesota

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UNIVERSITY OF MINNESOTA  
**EXTENSION**

## Alfalfa 1<sup>st</sup>-Cutting Management

This task starts with knowing the needs of your livestock or market. Talk with your nutrition advisor, and consider other feed resources you'll have and past experience. Refer also to Jim Paulson's article on page 3. And get your equipment ready early.

High input costs relative to livestock-produce prices put a premium on harvesting good-quality alfalfa. And it's still important to get good functional fiber. Many nutrition advisors like to work with alfalfa between 160 and 200 RFV. Haylage with RFV >200 can create challenges with soluble protein levels.

Both for the feed bunk and for the hay market, it's just as important to get hay put up in good physical condition as it is to catch it with favorable test levels.

For good dry hay: cut early in the day to get a full day of drying, form the widest

swath possible, rake at 40-50% moisture and bale at ~18% moisture to save leaves, and store hay under cover. Many large square baler operators would rather be at 15-16% moisture to avoid mold, or at 18-20% moisture with preservative. Consider making baleage at 40-50% moisture if weather looks uncooperative.

For haylage: minimize drying time to reduce respiration loss (again, cut early in the day into wide swaths), chop to 3/8" theoretical cut-length, ensile at 40-50% DM (50-60% moisture) to optimize fermentation, fill quickly to minimize oxygen, and keep sealed for >2 weeks. Past experience counts. In bunkers, remember the key is to pack, pack, pack!

*Dan Martens, marte011@umn.edu; Extension Educator-Benton, Morrison, and Stearns Co.*

### Inside this issue...

Alfalfa 1st-Cutting Management	1
Scissors-Cut Harvest Alert	1
Winter-Injured Alfalfa Options	2
Reducing Alfalfa BRR with Rotation	2
Dairy Forage-Quality Goals for 2009	3
Late-Planted Forage Options	3
Sugars in Pastures: Equine Concerns	4

## Central MN Alfalfa Scissors-Cut Harvest Alert

The Central MN Forage Council, Extension Staff, cooperating farmers, and agribusiness personnel are taking scissors cut and PEAQ readings again this spring. This follows a similar pattern to 2008 with cooperators in Stearns, Benton, Morrison, Wright, Meeker, McLeod, Scott and Carver counties. Results are available as follows:

**Web.** Reports will be posted on the UMN Extension Crop eNews page at [www.extension.umn.edu/cropenews](http://www.extension.umn.edu/cropenews).

**Radio.** When there is new information, a live report will be given at ~6:30 a.m. on KASM 1150 AM. Results may also be shared on other radio stations by Extension staff in individual counties.

**Phone.** An effort will be made to post a report that can be heard by phone after May 14. Call 1-800-964-4929 (Benton Co. Extension Office). When the phone is answered, enter 5081.

Sampling started May 11, and will continue Monday and Thursday mornings.

For information about alfalfa scissors-cut and PEAQ sampling procedures, visit: [www.extension.umn.edu/forages](http://www.extension.umn.edu/forages), select 'Research', and then 'On-farm Trials'. If you have an alfalfa/grass mixture, use Dr. Jerry Cherney's (Cornell) directions for harvest-quality estimates at <http://alfalfa.50webs.com/quality.html>.

**WEATHER.** Yes, first crop hay harvest is often weather-driven. Most years, we don't have the privilege of picking a cutting date when the RFV, RFQ, PEAQ numbers read just right. Instead, we're looking for the ballpark when a weather window gives us a chance. Scissors-cut sampling or PEAQ numbers can help us stay tuned to the crop as we are watching the weather. Dwain Meyer at NDSU recommends that as alfalfa approaches 22-24", we should take a close look at the weather forecast.

Best wishes for a safe and profitable 1st-crop hay harvest!

*Dan Martens; Extension Educator-Benton, Morrison, and Stearns Co.*

### Upcoming Events

**2009 AFGC Conference**  
Grand Rapids, MI  
June 21-23  
Visit [www.afgc.org](http://www.afgc.org)

**SE MN Grazing School**  
June 24, July 1, July 8  
Contact John Zinn  
[John.Zinn@mn.usda.gov](mailto:John.Zinn@mn.usda.gov)

**Alfalfa/Grass Plot Tour**  
Hutchinson, MN  
~July 23  
Contact Nathan Winter  
[wint0146@umn.edu](mailto:wint0146@umn.edu)

**NCROC Beef/Forage Day**  
Grand Rapids, MN  
Mid-August  
Contact Ryon Walker  
[walke375@umn.edu](mailto:walke375@umn.edu)

**WC MN Corn Silage Day**  
Ottertail City, MN  
Late August  
Contact Doug Holen  
[holen009@umn.edu](mailto:holen009@umn.edu)

# Winter-Injured Alfalfa Stand Options: Act Now!

**Patchy winterkill.** Most winterkill reports this spring have been patchy and topographical; low spots where water ponded and/or ice sheets formed, and high spots where snow blew off and crowns were exposed to lethal temperatures.

The optimum time to repair these dead patches has passed, but re-seeding can still be attempted a.s.a.p. in southern MN, and until ~June 1 in northern MN. However, shoots of healthy plants surrounding the patches will be damaged by machinery traffic, so yields around patches will be reduced in 1<sup>st</sup> cutting. Also, the re-seeded patches will contribute nothing to 1<sup>st</sup> cutting.

Dead patches in alfalfa stands seeded  $\leq 1$  year ago can be re-

seeded to a winter-hardy alfalfa variety. Patches in stands >1-year-old being maintained for production beyond 2009 should be re-seeded to red clover. In either case, seeding the legume together with a wet-, cold-tolerant grass is wise to avoid repeat total stand loss in these patches. If the stand is in its final production year, Italian or annual ryegrass are good patching options.

To minimize similar challenges on rolling topography in the future, consider seeding alfalfa/grass mixtures from the get-go.

**'Uniform' thinning.** Stands that appear fairly uniform should still be checked for stem density. Stands with high yield potential will average >55 stems/ft<sup>2</sup>. Stands will <40

stems/ft<sup>2</sup> have reduced yield potential. Check the spring crop in all fields, particularly older stands, using these criteria. If high-quality forage inventory prospects are good, consider terminating older stands with <40 stems/ft<sup>2</sup> after 1<sup>st</sup> cutting.

There are no dependable inter-seeding options to attempt to improve 'uniformly' thin stands after 1<sup>st</sup> cutting. Instead, rotate these fields to an annual warm-season grass crop that can capitalize on the 'free' fixed N left behind by alfalfa. Options include single-harvest corn silage or foxtail millet; or multi-harvest sorghum-sudan, sudangrass, or hybrid pearl millet.

*Paul Peterson, Extension Forage Agronomist*

## Reducing Alfalfa Brown Root Rot with Crop Rotation

Stand injury associated with brown root rot (BRR) of alfalfa, caused by *Phoma sclerotoides*, has been noted this spring as stands have emerged. BRR development occurs primarily over the winter and is favored when stands are covered with snow for an extended period of time.

Known as a snow mold, the pathogen is adapted to cold soil temperatures. It is at this time of year when dark-colored root lesions on susceptible plants become established or increase in severity. In spring, diseased plants are often slower to green up than their healthy counterparts, and may be less thrifty throughout the summer. Severely diseased plants die during the winter. This symptom, often known as "winterkill", is commonly used to describe plants killed from harsh winter weather conditions.

Widespread in Minnesota, BRR is the subject of ongoing investigations in the Department of Plant Pathology. Options for disease management are limited since it cannot be controlled with seed treatments. There are currently no known BRR-resistant alfalfa varieties adapted to our production environment, although field tests to identify resistant varieties are in progress. **Crop rotation is our**

**most effective management strategy at this time.**

We conducted trials to determine which type of crop residues increased or decreased survival of the fungus over the winter. During 2006 and 2007, crop residue was mixed into pots containing BRR fungus-infested soil, and the pots were placed outside in Crookston and St. Paul. Results showed that BRR fungus populations were greater in soil with corn, soybean, and canola as opposed to fallow soil, or soil with alfalfa, oat, spring wheat, or winter wheat. Moreover, pathogen populations appeared to be greater in St. Paul than in Crookston, most likely because of more favorable conditions for pathogen growth.

Specific plant tissues were examined for differences in colonization by *P. sclerotoides* on 10 crop species. Alfalfa, barley, canola, corn, oat, soybean, spring wheat, winter wheat, hairy vetch, and winter rye were grown in the greenhouse. Plants were separated into root, leaf, and stem fractions, and each fraction was inoculated and maintained at a stable temperature within a controlled environment chamber for several weeks. Samples were analyzed to determine which crop and plant

fraction supported the greatest fungal growth.

Leaves of barley, winter wheat, and spring wheat appeared to be most suitable for colonization by the fungus, while roots of soybean appeared to be least.

The BRR fungus is a well-adapted saprophyte that can survive on a large number of hosts. Previous disease management recommendations of spring-sowing small grain crops in rotation with alfalfa are supported by this work.

While pathogen growth was supported on barley and wheat leaves, the stems and roots were colonized less. In soil, leaf tissues are expected to decompose rapidly, effectively removing the preferred food source for the fungus over the long term. For fields with high populations of *P. sclerotoides*, rotating into corn for grain and soybean is not recommended, as it may not reduce inoculum levels between alfalfa crops.

Plants can be tested for BRR by contacting Deborah Samac at [dasamac@umn.edu](mailto:dasamac@umn.edu).

*Charla Hollingsworth, Extension Plant Pathologist; and Deborah Samac, USDA-ARS, St. Paul.*

# Dairy Haylage Forage-Quality Goals for 2009

*What is dairy-quality forage?* Increasingly, dairy producers and alfalfa growers are realizing the value of haylage and hay exceeding the traditional target of 150 RFV. Composite data for 2008 haylages (Figure 1) show that legume and mixed haylages averaged close to a target RFV of 150.

Figure 1. Forage-quality values for 2008 haylages.

	Legume		Mixed	
	Range	Avg.	Range	Avg.
CP, %DM	16-26	21	14-26	20
NDF, %DM	31-49	40	30-52	41
NDFD, %NDF	44-64	54	35-57	46
Lignin, %DM	6-10	8	5-11	8
RFV	103-200	152	95-197	146
RFQ	107-239	173	100-235	167

However, we see a wide range in all measurements of quality; with many very high in CP, NDFD, RFV, and RFQ. This suggests that many producers want haylage >150 RFV. This may be due to higher CP goals, but may also reflect the potential to get greater intake and greater milk production from such forage. What should our goals be for 2009?

What numbers are important as we look at our forage analyses? A typical forage test report may have over 30 numbers to consider. The categories in Figure 2 are the

parameters I consider important for a quick assessment when feeding dairy animals. Goals and guidelines are provided depending on the group of animals we are feeding.

**Relative Forage Quality (RFQ)** is an index for ranking forages based on dry matter intake (DMI) and total digestible nutrients (TDN).

$$\text{RFQ} = (\text{DMI, \% of BW}) \times (\text{TDN, \% of DM}).$$

While the formulae for both DMI and TDN are different for grasses vs. legumes, NDFD is part of both equations.

**Relative Feed Value (RFV)** is based on ADF and NDF, but due to variability in measuring ADF and not using digestibility in the equation, applicability to actual feeding value has been more difficult to ascertain. Also, under the RFV system, grasses are usually undervalued since neither lignin nor NDFD are determined.

With the introduction of **RFQ**, we have the ability to better predict digestibility of forages. Should we change our target numbers?

It depends on our target animal. When feeding lactating dairy cows, we should now target RFQ >165. This should provide forage with an NDFD of >50% and CP levels >22%. This quality of forage will result in greater intakes and be able to support higher milk production due to greater NDF digestibility.

Can forage quality be *too good*? That is a question I hear frequently. Correct answers can include a) probably not, b) it depends, c) sure, or d) all of the above. It depends on what animals we are feeding, how much we're feeding, and what else we're feeding along with it.

Figure 2. Haylage forage-quality goals for dairy animals.

	Milk Cows	Heifers <6 mo.	Breed-ing Age Heifers	Dry Cows & Preg-nant Heifers
CP, %DM	>22	20-22	16-18	13-15
NDF, %DM	38-42	40-42	40-45	45-55
NDFD, %NDF	55-65	50-55	45-55	45-50
Lignin, %DM	<8.5	8.0	8-10	8-10
RFQ	>165	>150	>135	>125

For high-producing dairy cows that are fed a balanced ration with adequate amounts of NDF from forage, forage quality can and should be very high to support high production. On most dairy farms, without a concerted effort to put up high-quality forage, the forage can often fall below optimum.

Matching the right forage to other classes of dairy animals may mean using forage that wasn't harvested at top quality due to weather or other factors. It may also mean designating older stands for dry cows and bred heifers, or specifically planting a mix that will be higher in fiber and lower in protein, such as a grass mix that is harvested at more mature stages.

Good luck with your forage harvesting in 2009!

Jim Paulson, [jcp@umn.edu](mailto:jcp@umn.edu);  
Extension Educator-Dairy

## Late-Planted Forage Options

Spring-planting perennial forages after mid-May in southern MN and after ~June 1 in northern MN is risky. After these dates, annual warm-season forages are often more dependable options. In 2002-2004, we studied late-planted annual forage options with Univ. of WI personnel.

Corn for silage was generally the most dependable option for high energy yield, even when planted as late as July 1. Sorghum-sudan, sudangrass, and hybrid pearl

millet provided multiple cuttings with greater protein and earlier availability, but less energy and less total-season yield than corn silage. Soybeans provided good yields with alfalfa-like forage quality.

Foxtail millets were dependable 1-cut options that produced moderate-quality forage within ~2 months after seeding. Late-planted small grains did not perform well.

Doug Holen and Paul Peterson, UMN Extension

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## Sugars in Pasture Grasses: Equine Concerns

Recently, there has been significant interest in the sugar content of forage grasses. Pasture-induced laminitis (founder) can be triggered when susceptible horses ingest high amounts of sugar or fructans that are naturally found in forage species commonly grown in Minnesota.

Susceptible horses include, but are not limited to, overweight or easy-keeping horses, ponies, horses with metabolic syndrome, and horses that have foundered in the past. These horses should have limited grazing, or no grazing at all.

Sugar content depends on the weather, plant stress, forage species, species maturity, time of day, and time of year. When plants photosynthesize (produce energy from sunlight), they produce sugars. When plant growth is limited by temperatures <40°F or from drought, sugars that are normally used for growth will begin to accumulate in plants. During these plant stresses, susceptible horses should not graze.

Minnesota's cool spring and fall weather can cause sugar accumulation and increase the risk of pasture-induced laminitis for susceptible horses. Safer times to graze susceptible horses are when pasture plants are using sugars for rapid growth during warm weather or during respiration (using energy during dark periods). However, laminitis in susceptible horses can still occur if over-eating is allowed. Better times to graze include cloudy days and dark hours.

If grazing is tied to exercise, consider using a grazing muzzle to limit the amount of forage the horse can ingest, and restrict grazing to periods when the sugar content

should be less. Specifically, graze between 3 AM and 10 AM, on cloudy days, and during periods when the night temperatures are >40°F.

Grazing in areas shaded by trees or buildings may enable longer access to grass, as sugar accumulation will be less. Allowing pasture grasses to become more mature should also reduce the sugar content and will result in less and slower intake. However, following these grazing guidelines does not guarantee that sugar content will be less.

There are other factors to consider that contribute to sugar content. Some pasture species have a greater genetic potential to accumulate sugars under stressful conditions than others. These species include timothy, brome grass, orchardgrass, and most cool-season grasses that are commonly used in horse pastures in Minnesota.

Most grass species store sugars in the bottom 3-4" of growth. Making sure pastures are not over-grazed will help avoid laminitis. Forage plants store sugars when they are under stress. Make sure pastures are properly fertilized, and avoid grazing susceptible horses during drought and in the fall when nights are cool (<40°F).

Keeping horses regularly exercised and in good body condition will help reduce the risk of pasture-induced laminitis as well. Not all horses need to follow these recommendations, but susceptible horses should. Some horses should not be allowed to graze because their risk of foundering is too great.

*Krishona Martinson, Equine Extension Specialist*

## 40 Attend Alfalfa Stand Assessment Workshops

The UMN Extension Institute for Agricultural Professionals conducted two successful alfalfa stand assessment workshops in early May; in SE MN (Altura) May 1, and in central MN (Freeport) May 7.

Agricultural professionals participated in hands-on, in-the-field workshops together with USDA-ARS Plant Pathologist Deborah Samac; and UMN Extension staff Dave Nicolai, Dan Martens, Dean Malvick, and Paul Peterson.

The 4-year-old alfalfa stand at Altura proved to be a perfect 'lab' for training. Patchy winterkill associated with cumulative stresses, including brown root rot, was evident. In addition, plants that appeared healthy aboveground showed evidence of crown rot and brown root rot belowground.

The younger alfalfa stand at Freeport had excellent stand/stem density. However, crown rot was evident in soil-stressed areas of the field where yields have been less.