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

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Managing Forages During Drought

Many parts of Minnesota are experiencing some degree of drought, leaving farmers with questions regarding harvesting and feeding forages during a drought year.

Alfalfa. One of many nice attributes of alfalfa is its relatively good drought tolerance and its ability to recover after drought. Drought-stunted stands can be machine harvested or grazed. If stands are flowering and tall enough (>10-12") to be machine harvested economically, go ahead. If shorter and flowering, consider grazing to get the feed at minimal cost. Grazing enables free manure spreading as well. Once alfalfa is well-flowered, new growth generated after rain will develop mostly from crown buds, whether the mature growth is harvested or not.

Monitor and control potato leafhoppers, and ensure that fertility is adequate. Though yield is reduced, drought stress often improves forage quality by increasing leaf-stem ratio and reducing fiber content. Since regrowth is mostly from crows, harvest or graze close.

Buying Hay – RFV is important, but not the only factor to consider. Consider lower RFV hays if economical supplement options exist, or if grass hays with higher fiber digestibility are available.

Pastures. Maintaining adequate residual height (>3") is key. Do not allow cattle to overgraze. Rest is key to maximizing chances of good cool-season pasture productivity in fall, when cooler temperatures and rains return. Over-grazing pastures provide openings for weeds, and reduces energy reserves that power regrowth. Identify a sacrifice area and feed hay, and/or graze corn or alfalfa fields. Stockpiling is still an option, but wait for rain before applying N; orchardgrass and tall fescue fields are the best candidates for this option. Consider drought tolerant pasture species in the future – reed canarygrass and tall fescue are among the best. Kentucky bluegrass and smooth bromegrass quickly go dormant to survive drought.

Corn. Make silage (see pages 2 and 4) or graze. If there is no evidence of kernel growth and most plants have tasseled and shed pollen, those plants will remain barren even if it begins to rain. If kernel growth is occurring, delay harvest to allow more yield to accumulate. Grazing is the lowest cost option. Strip graze using portable electric fencing to reduce loses significantly.

Check for nitrates; they are mostly in the lower 1/3 of the stalk. Feed value of drought-stressed corn will be reduced somewhat, but can be acceptable with proper fermentation. Ensiling reduces nitrates by 1/3 to 1/2 with good fermentation. Don't feed until fully fermented, after about one month. Beware of dangerous silo gases the first few weeks after filling. Check nitrates and quality before feeding.

Consider Native Warm-Season Grasses. Despite low RFV, warm season grasses have high protein quality and highly digestible fiber, however, establishment can be challenging. They can consistently produce 2.5-4 tons of DM/acre during the summer slump of cool-season species.

Author: Paul Peterson, PhD, U of M Extension.

MN Drought Website Resources

MN Drought Information:
www.extension.umn.edu/administrative/disasterresponse/wi_drought.htm

MN Forage Information:
www.extension.umn.edu/forages

Upper Midwest Hay List:
www:haylist.umn.edu

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Programs and Events

Beef Forage Day
August 22, 2007
Grand Rapids, MN
Contact: Ryon Walker
888-241-0719

2008 Regional Forage Programs
February 12, 2008
Northwestern MN

February 13, 2008
Central MN

February 14, 2008
Southeastern MN

February 15, 2008
Northeastern MN

Contact: Paul Peterson at peter072@umn.edu or 612-625-3747 for more information.

More information on the 2008 Programs will be in the November Newsletter.

Harvesting and Storing High Quality Corn Silage

A major goal for harvesting and storing corn silage is to have minimum shrinkage and spoilage. Generally, the rule of thumb is to have less than 10% loss from field to feed bunk. Whether using bunkers, piles or bags, research has shown there can be up to 25% or more in loss. In comparison, the dry matter losses in a well managed tower silos range from 2-15% with 8% being average.

Moisture Content. Corn plant moisture, rather than kernel milkline, should determine when to start chopping. Storage moisture recommendations are as follows: Stave silo – 55-65%; Oxygen limited silo – 50-60%; Bag – 55-68%; Bunker/pile – 63-68%.

Fiber Length. This affects corn silage quality, compaction for proper fermentation and roughage value for proper rumen function. The recommended cut is ¼ inch. If a corn processor is being used, then ¾ inch is recommended. If particle size is being reduced by the silo unloader, augers or TMR mixing equipment, a somewhat longer cut may be needed.

Corn Silage Storage System. There is no one best type for all farm situations. With proper management, there is little difference in silage quality from the various types. The key is to get anaerobic fermentation and to reach a pH below 5.0 as rapidly as possible. The factors that influence this goal include: fill as rapidly as possible to minimize exposure time to oxygen, keep knives sharp and cut forage at correct length, ensile at correct moisture, and make sure the density per cubic foot is adequate throughout the storage system.

Tractor weight, packing time, layer thickness, height of silage, and moisture content all affect packing. Bunkers and silage piles need to be covered as soon as possible using 6 mil plastic with tires touching each other and then sealing the edges (see photo). Keep it covered for at least 2 weeks to minimize undesirable fermentation and spoilage.

Density. High density increases storage capacity, reduces silage porosity, which reduces oxidation loss and preserves the high quality feed harvested. It is recommended that the density be at least 14 lbs dry matter/ cubic ft. in the storage area. For bunkers and silage piles, density depends on allowing 5 minutes per ton of packing time and spreading the silage in less than 6" layers. For silage bags, density will depend upon the bagging machine and the operator.

Maintenance. Whatever the storage system, plastic covers should be protected from punctures by rodents, livestock, and animals. Inspect weekly for holes in the plastic cover and repair them to exclude air and water. Mowing around the silo and bags tends to discourage rodents. Each sq. ft. of surface exposed could result in loss of 10 lbs. of silage DM.

Author: Neil Broadwater, U of M Extension

Alternative Forage Options for Horses

When horse owners are looking for ways to extend their hay, it is important to remember that forages should comprise at least 2/3 of their horse's diet. Lower amounts of forages can lead to an increased risk for ulcers and colic. The easiest approach to lack of hay is to avoid the situation by planning ahead. Know how much you need. Horses eat roughly 2% of their body weight a day, adding about 10% for waste. If you do experience a shortage of hay, it is best to extend the good hay you have with other fiber sources. A slow transition to other forages is essential. To help evaluate your options, following is a list of common alternatives to regular baled hay for horses along with benefits and disadvantages of each.

Hay Cubes. Pros- little waste, easily handled and transported, good baled hay extender or replacement. Think of them as very small hay bales. Cons- can be expensive.

Beet Pulp. Pros- Good source of energy and protein, you can feed 5-10 lbs a day. Cons- should soak before feeding if giving large amounts to prevent swelling while in the horse, need to supplement vitamins and minerals, particularly calcium.

Complete Feeds. Pros- nutrients are balanced, good hay extender. Cons- not enough total fiber, it needs to be divided up into small meals because feeding large amounts can increase chances of colic and choking.

Miscellaneous. Occasionally you hear of people feeding straw, corn stalks, and haylage to horses. These are not recommended for horse feed as they have very little nutritional value and haylage has been linked to botulism.

Author: Betsy Gilkerson, U of M Extension

Management Options for Beef Pastures

Much of the pastures in the Upper Midwest consist of cool-season perennial grasses and grass/legume mixtures, with the greatest production of forage yield occurring during the spring (May-June) and fall (September-October) months. Parts of Minnesota are experiencing drought, negatively affecting the cost of production for beef producers. There are methods that can reduce the need for forage intake, thus reducing stress on pastures. These methods include: creep feeding, early weaning, and culling management.

Creep feeding, supplying grain to calves, can reduce grazing pressure on pastures. During summer months, spring born calves rely less on their mother's milk as their nutritional needs increase.

Early weaning can reduce forage consumption by as much as 30%/day; however, facilities must be available for growing and backgrounding these weaned calves until the appropriate time for marketing. When cows cease milk production, their daily consumption and nutrient requirement's decrease, resulting in lower forage intake.

There are several methods or criteria to use for culling cows in your herd: cull older/broken mouth cows (milk productivity starts to decline after 7 years of age); unsound cows with feet, leg, and udder problems; and open cows. Feeding open cows is not affordable.

These three methods will reduce total forage intake/day, relieve stress on droughty pastures, and expedite recovery of those pastures for the fall.

To read more on the latest beef cow/calf management articles, or to sign up for the Beef Times newsletter, visit the Beef Team website at: www.extension.umn.edu/beef.

Author: Ryon Walker, PhD, U of M Extension

Getting The Most From Mower—Conditioners

A key factor in achieving a high quality harvest is getting the crop cut and off the field as fast as possible to avoid weather damage. One way to achieve this is to cut quickly. This is why the disk cutterbar mower-conditioner (disk) is rapidly becoming the dominant machine for cutting forage.

Engineers and machine operators know the formula for high field productivity, cut wide and cut fast. Of course there are limits to speed and width. Mower-conditioner width is limited by transport concerns, non-uniform cut in irregular fields, and slow drying times from the large mass of crop in the windrow or swath. The speed of cutting is limited by available power, field roughness, and something engineers call "critical travel speed".

Critical travel speed is defined as the maximum ground speed at which the cutting systems can operate without pushing the crop forward and leaving a ragged, uneven cut. The cutting mechanism speed and the effective cutting length per stroke or revolution of the cutting mechanism dictates the critical travel speed. This speed is about 12 to 14 and 5 to 6 mph for disk and sickle cutterbar machines (sickle), respectively. These numbers tell an obvious story, disks are more productive than sickles. The adoption of disks will allow producers to harvest forage at a faster rate, resulting in higher overall forage quality.

Table 1. Advantages of Disk and Sickle Cutterbar Mower-Conditioners

Advantages of Disk Cutterbar	**Advantages of Sickle Cutterbar**
Faster ground speed	Cost about 10 to 20% less per foot
Better cutting in lodged forage	Requires about 50% less power per foot
Better cutting of fine stem grasses	Open station tractors can be used
Will cut through gopher mounds	Less streaking in light crops
Replacing knives simpler and faster	Lower repair costs if major obstruction hit
Fewer moving parts	

Through much of the 1970's and 1980's, the sickle dominated the North American market. In Europe, where fine stem grasses are grown, disks dominated. In the 1980's, the disks were introduced into the North American market. These machines experienced some initial resistance due to some early models that were known to have expensive failures of the cutter gear bed when large field obstructions were hit.

However, the advantages of the disk have slowly won over customers to the point where the industry is selling 2 disks for every 1 sickle. However, self-propelled windrowers are still dominated by sickles. When mower-conditioner and windrower sales are combined, 40% of the market continues to choose the slower sickle technology.

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Optimizing Corn Silage for Dairy Cattle

High quality forage is the foundational ingredient in dairy rations. Corn silage is an excellent feed and may make up 50-75% of the forage dry matter for lactating cows. Harvesting at proper moisture level is critical for high quality corn silage. Concerted efforts by agronomists, nutritionists, and extension personnel to communicate local plant maturity and harvest conditions have greatly improved with the use of sample dry downs.

PROFIT POINTS

- Whole plant moisture content at ensiling is the single most important factor affecting overall feed value.
- Check whole plant moisture, not kernel line or calendar date.
- Minimize storage losses by chopping at proper moisture, utilizing the proper chop length, and excellent packing and sealing of the silage.

However, every farm, field, and variety of corn is different. Within corn variety, digestibility of corn silage is greatly influenced by moisture content and physiological maturity. These two factors are usually very closely correlated. This is not to diminish the effect of corn variety, but variety advantages can be lost by harvesting too late and dry.

As corn matures, the stover portion increases in NDF and lignin content, but digestibility of the NDF decreases. Digestibility of starch also decreases up to 1% for every 1% drop in moisture. Corn silage has a range of NDF digestibility from 35 – 70% with an optimal at >60%.

Corn silage has an optimal moisture range of 62-68% with target of 65% to reach a balance of dry matter yield, grain starch accumulation to NDF, starch digestibility, and good fermentation. The type of storage structure may influence harvest moisture (see page 2), but does not change the optimal moisture for feed value. Freezing and seepage losses can increase at higher moisture ranges in upright silos, leading to an increase in use of bags, bunkers, and piles.

How do we decide when to chop? Agronomic traits of corn varieties have changed. Many hybrids now stay green longer. Because of this, kernel milk line is no longer an accurate estimation of whole plant moisture. Wisconsin data showed a range of whole plant moistures of 52-72% at half milk line with an average of 63% which would be on the low side of optimal.

Begin checking milk line 40 days after pollination as a starting point. Variety, planting date, and growing season all effect moisture, which is why calendar date is not reliable. An accurate way to estimate whole plant moisture is to chop 5-6 plants from several locations in the field and dry them down with a Koster tester, microwave, or send to a commercial lab.

Remember, corn plants dry down an average of .5% per day but can range from 0-1%.

Author: Jim Paulson, U of M Extension

Extension Launches New Forage Website

A new Forage Website and Newsletter have been launched by the University of Minnesota Extension Forage Team.

The website highlights current events and programs, research updates, hay auction results, and recent publications.

There is also a wealth of information on a variety of topics including alfalfa, clover, corn silage, economics, establishment, fertility, forage quality, grasses, harvesting and storage, livestock, and weed control.

The website address is www.extension.umn.edu/forages.

Website users can also sign-up for the new Forage Newsletter, *Forage Quarterly* , on the website.