Winter Feeding Concepts

Julie Walker, South Dakota State University

Cows are ruminant animals, so they can utilize low quality forage. The cheapest forage available may be from winter grazing, thereby reducing expensive feeding costs. Producers understand making the animal harvest its own forage is a source of cost reduction; however, do they still need a supply of hay when animals cannot graze? This becomes a debate for many producers. If producers know they need to have hay on hand to feed in the winter, then maximizing their pastures for summer grazing makes sense. However, if some portion of the winter season is not snow covered, stockpiling summer pasture for winter use may be most economical.

Grazing dormant forage is an art. It is difficult to know the actual nutrient intake of grazing animals because of varying winter weather conditions and changes in the stages of production. Based on numerous research studies, a few things about winter grazing are known. When esophageal/rumen fistulated samples are compared to hand clipped forage samples, the animal usually selects a diet higher in nutrient content. Winter intake of dormant forage generally ranges between 1.2-2.5% of body weight. This may or may not be enough dry matter (DM) to support maintenance and growth needs. Typically, in the Northern Great Plains, protein is the first limiting nutrient followed by energy in dormant winter forage. The question is how can winter grazing be managed for success?

Dry cows in the second trimester of gestation often consume enough forage to meet their protein and energy requirements because 1) maintenance requirements are low since they are dry and in the middle third of pregnancy, 2) weather stress is lower in the fall compared to winter, and 3) protein content of the diet is often near or above 6%. Thus, the middle third of pregnancy is a good time to utilize dormant fall/winter stockpiled pasture. Nutrient requirements increase during the last third of pregnancy into early lactation, so meeting the nutrient demands of the grazing animal becomes more difficult.

Options of using dormant forage in the last third of pregnancy and early lactation include: 1) supplementation of limiting nutrient(s), 2) wind protection, and 3) rotating to higher quality pastures. Pastures should be tested for forage quality annually; however, if this is not feasible, one could estimate from book values. To estimate protein supplementation (usually the first limiting nutrient), refer to this typical dry cow example. Based on the estimated forage intake and quality, the animals are short 0.85 lbs of protein per day. If the selected protein feed source is 30% crude protein (CP), one would feed 2.8 lbs of the protein source per day (0.85 lbs needed divided by 0.3 (30%) in the source). Winter cold stress creates higher energy demands on the animals. However, providing wind protection to reduce the wind influence can positively improve energy balance of the animal. The third option of rotating pastures may help to maintain a higher quality of forage. By providing animals with a new pasture of dormant winter forage, a higher quality forage supply to start the new grazing time is available.

Table 1. Forage inventory.

Forage Sources	Number of Bales or Tons (tons)	Nutrient Content (Dry Matter Basis)						
		DM (%)	CP (%)	TDN (%)	NEm (Mcal/lb)	NEg (Mcal/lb)	Ca (%)	P (%)
Hay 1	575	93	8.4	54	0.50	0.25	0.35	0.19
Hay 2	300	92	12.5	58	0.57	0.31	0.40	0.21
Silage	425	29	8.3	61	1.00	0.61	0.31	0.27

Producers in the Northern Great Plains can graze up to the middle third of gestation and feed harvested forages during the last third of pregnancy and early lactation. The remainder of this article will focus on supplying animals with harvested forages. It is important to develop a winter feeding plan to keep input costs low. A winter feeding plan requires knowing: 1) inventory of forage, 2) the animals (size, stage of production, and length of feeding period), and 3) forage management.

Forage inventory includes more than the number of tons. Knowing the nutrient content of each forage is required to best match the forage with the optimum time to utilize that forage for a specific class of livestock. Nutrient content of feeds cannot be determined by the human eye. Each hay type and cutting should be sampled and analyzed separately. Since growth conditions, harvesting time, and rainfall vary greatly from year to year, it is important to get a good representative sample for each forage/hay type. Use a hay probe to sample to full depth of the bale, ideally taking 12-20 samples per hay type. A simple way to start the inventory is by making a table (Table 1) with all of the available forages to avoid flipping between forage analysis results and missing something.

Part two of making a winter feeding program is animal allotment. This starts with classifying the livestock into cows, calves, yearlings, and bulls. Key information is size, stage of production, and desired performance. Remember, sometimes it is cheaper to supplement with non-forage feeds to meet a specific nutrient deficiency.

Table 2. Livestock inventory.

Class of Livestock	Number of Animals	Weight (lbs)	Stage of Production	Desired Gain (lbs/day)	CP (%)	Energy TDN (%) or NEm (Mcal/lb)	Planned Forage
Cows	100	1200	Dry-mid gestation	0	6.25	TDN 46%	
Cows	100	1200	Late gestation	0	8.00	TDN 52%	
Weaned Heifers	75	500		1.5	10.20	NEm: 0.61 Mcal/lb NEg: 0.35 Mcal/lb	

Based on the forage supply in Table 1 and livestock inventory in Table 2, what are the options? Dry cows in mid-gestation can use hay 1, which will provide extra protein and energy (expect that cows would be gaining during this time). Dry cows in late gestation can be fed hay 1 to meet their nutrient requirements (note: adjusting for cold stress has not been considered in this example). Cold weather stress increases energy requirements. The rule of thumb is for each 10°F drop below a wind chill of 30°F, the energy requirements increase 13% for cows in good body condition with a dry, winter hair coat and 30% for thin cows or cows with a wet or summer hair coat.

Forage management includes the type of feeding system and amount of hay. Smith et al. (1974) showed that dry pregnant cows would consume 20-30% more hay than her need if allowed free access to hay. Many producers select to provide a multi-day supply of hay to reduce labor cost. This could require a larger forage supply than anticipated. For example, if a cow needs 30 lbs of hay per day to meet her nutrient needs, a 25% loss/waste would equal 7.5 lbs. If fed for 120 days, it would add up to 900 lbs of extra hay wasted. At a price of $75/ton, the extra hay cost would be $33.75 per cow.

Buskirk et al. (1999) at Michigan State University compared the amount of hay wasted by cattle when using various feeders; ring, cone, cradle, and trailer types. They found that the cone and ring feeders had the least waste. A key point is feeding in any feeder "normally" has less waste than feeding on the ground. Waste and sorting can be reduced by grinding or chopping hay. Increased palatability of coarse or stemmy hays is improved by grinding. Grinding of hay also allows the use of mixed rations or combining two or more hays to balance a ration for the animals.

Taking time to develop a plan for a winter feeding program allows producers to manage their feed resources to meet the nutrient requirements of their animals and reduce supplemental costs. Forage testing is critical to determine the nutrient value and allow management of harvested forages.