Extended Grazing and Reduced Stored Feed

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Feed costs represent the major cost in most livestock production systems. A recently completed analysis of 225 Standardized Performance Analysis (SPA) Beef Cow Records on herds in Illinois and Iowa showed that feed cost was the overriding factor determining profitability, explaining over 57 percent of the herd-to-herd variation. Typically the cost of supplying nutrients to ruminant livestock is much greater usingharvested feedstuffs as opposed to grazing pastures or crop residues. The primary function of a grassland farm is to convert solar energy to marketable livestock products in the most efficient manner. The fewer steps between the animal product and the solar energy, typically, the more economically efficient the production systems will be.

Eight Financial Measures Capable of Explaining Over 82% of Variation in RLM in Beef Cow Enterprise	
DEPENDENT VARIABLE	R2
Feed Cost	.567
Depreciation Cost	.086
Operating Cost	.049
Calf Weight	.046
Capital Charge	.024
Calf Price	.027
Weaning Percentage	.017
Herd Size	.007
Total	**.823**

A. Miller, R. Knipe, University of Illinois SPA, 2004

Providing grazable forage, in a cost-effective manner to the animal, for as many days of the year as possible should be the goal of the grazing manager.

Feeding Hay

We have been raised in the cattle industry that we need to feed hay at least 120 days a year. But do we really know what it cost to produce or feed hay on our farm. Very few farmers have an ideal what it cost to raise hay. Let look

at an example where we had 50 beef cows weighing an average of 1,200 pounds and we are going to feed hay at 36 pounds per head for 120 days. That would require 216,000 pounds of hay. At 4 tons per acre that would require 27 acres of hay to raise 108 tons of hay to meet our requirement.

Hay Production Cost					
Acres of Hay	27 Acres				
Expected Yield	4 tons per acre				
Number of Harvest	3				
Weight of Bales	1,000 lb square bale				
Total Hay Produces	108 tons				
Bales Per Acre	8				
					Cost Per Acre
Land Rent					$50.00
Establishment Cost					$60.00
Maintenance Fertilizer					$177.00
	Cost/Lb	Removal	Application		
Nitrogen	$0.55	0	0	$0	
Phosphorus	$0.45	60	1	$27.00	
Potassium	$0.70	200	2	$140.00	
Spreading	$5.00		2	$10.00	
Mowing-mow-cond	$18.00/acre		3		$54.00
Rake-side-delivery	$8.40		3		$25.20
Baling-1,000 sq. bale	$8.23-8 bales				$65.84
Cost per acre					$432.04
Cost per ton					**$108.01**
Cost per bale					$54.00
Cost per lb					**$0.054**

With a cost of $108.01 per ton that would mean it cost $1.94 per day to feed the cow for 120 days. When we feed the hay we need equipment to haul and feed the hay. We need feeders to reduce the amount the cattle waste. Then we must haul the manure. Plus there is depreciation on the equipment.

EXTENDING GRAZING IN THE FALL AND WINTER

Several strategies can be employed to supply forage into the fall or early winter and effectively extend the grazing season by 60 to 90 days, thus reducing the need for stored feeds. These strategies can be categorized into three major groups: 1) stockpiling (conserving cool-season forages in late summer for use in the fall and winter), or 2) utilizing forage crops that continue to grow into the fall, early winter and early spring, and 3) grazing crop residues.

Not all cool-season species are adapted to stockpiling because most species reduce growth in the fall because of shorter day lengths and/or lose leaves (quality) after being frosted. Tall fescue and birdsfoot trefoil are two forage species, which are suited to stockpile management because they continue to grow into the fall and do not lose leaves, as readily as other cool-season species after frost.

Stockpiling Tall Fescue

Tall fescue is a deep-rooted, long-lived, sod-forming grass that spreads by short underground stems called rhizomes. It is drought resistant and will maintain itself under rather limited fertility conditions. Animals readily graze tall fescue during the fall and winter, but show some reluctance to graze it during the summer months of July and August. Some of this reduced summer palatability, which results in poor animal performance, is associated with the presence of a fungus in the plant (endophytic). Endophyte-free varieties are now available. Tall fescue is the best-adapted cool-season grass for stockpiling.

Tall fescue will maintain more active growth at lower temperatures than most other cool-season grasses and so will continue to accumulate yield later into the year. In response to shortening day length and cooler night temperatures, tall fesuce accumulates a high level of soluble carbohydrates in both the leaves and stem bases. With up to 20 percent of the dry weight of the plant as free sugars, the nutritive quality of fall grown tall fescue is quite high. The heavy waxy layer or cuticle on the leaves makes the plant more resistant to frost damage than most other cool-season grasses.

To stockpile tall fescue, don't graze it from early to mid August through mid-October. Cattle and sheep perform less than optimally on it during this period. Tall fescue is also very responsive to nitrogen fertilization. To produce a high yielding, high quality stockpile, the pasture should be grazed or clipped fairly short and 40 to 80 pounds of nitrogen per acre applied 60 to 90 days prior to the end of the growing season. Normally, that is early to mid-August. If soil moisture is favorable, the higher rate of N may be applied. If the summer has been dry, application of more than 40 lb N/acre may not be profitable.

If the red clover component of a mixed fescue-clover pasture is greater than 30 to 40 percent, it is probably not cost effective to apply additional nitrogen. Some recent work has indicated that a mixture of Orchardgrass and tall fescue can be stockpiled for early fall grazing.

Stockpiling Birdsfoot Trefoil

Birdfoots trefoil is a perennial legume adapted to production on poorly drained, low pH soils. It can reseed itself, is

resistant to Phytophthora root rot and numerous alfalfa insects, responds well to fertilization, and does not cause bloat in animals. Birdsfoot trefoil is well suited for stockpiling since it holds its leaves at maturity and after frost, thus maintaining a relatively high level of quality.

To stockpile birdsfoot trefoil, avoid grazing between September 1 and the first killing frost. This period is needed to accumulate root reserves that improve winter survival and growth the following spring. The forage that accumulates during the stockpiling period can be grazed anytime after a killing frost.

FALL GROWING FORAGE

The growth of some forage species is not adversely affected by cooler fall weather and shorter day lengths, as are many cool-season types of forage. The species, which seem to grow best in the fall, are perennial ryegrass, small grain cereal crops such as rye, wheat, oats and triticale, and certain brassica crops like turnips, rape and kale.

Brassicas

Brassicas are annual crops that continue to grow during the fall and into the winter. They are highly productive and digestible and contain relatively high levels of crude protein. Sheep producers probably more commonly use these than cattlemen. Early to mid-August establishment is best suited for November-December grazing. Animals will readily consume the plant tops and will also grub the root bulbs out of the ground. The plants tops will typically contain 16-18 percent crude protein and the roots are highly digestible carbohydrates. These crops are best suited for crop rotation pastures or no-tilled into light sod. Total dry matter yield is very variable and is highly dependent upon soil type, fertility, time of seeding, and precipitation.

Turnips grow fast and can be grazed as early as 70 days after planting. They reach near maximum production level in 80 to 90 days. Some of the newer forage type turnip varieties can often be grazed in 30 to 45 days including spring oats or cereal rye with the turnips increases the total production, durability and digestibility of the forage. The proportion of top growth for turnips to roots can vary from 90 percent tops/10 percent roots to 15 percent to/85 percent roots. Moisture content is almost always greater than 90 percent. This is why they work so well in mixtures with small grains or with crop residues. Turnips can be seeded any time from when soil temperature reaches 50 degrees until 70 days prior to a killing frost. Ideal time for fall seeding is sometime during the first 15 days of August in central Illinois.

Rape is more easily managed for multiple (generally more than two) grazings than are the other brassica species. Approximately six to ten inches of stubble should remain after the first grazing of rape; this practice promotes rapid regrowth. Regrowth of rape may be grazed at four-week intervals. On the final grazing, the plants should be grazed close to ground level.

Swedes, likes turnips, produce large edible roots. Swedes yield more than turnips but require 150 to 180 days to reach maximum production. Swedes is one of the best crops for fattening lambs

and flushing ewes. Yield is maximized with a 180-day growth period for many varieties while most hybrids; on the other hand, produce greatest yields when allowed to grow 60 days before first harvest and 30 days before the second harvest.

ESTABLISHMENT OF BRASSICAS

Brassicas require good soil drainage and a soil pH should be in the range of 5.5 to 6.8. Brassicas can be no tilled into a sod provided it has been killed with glyphosate. This reduces insect problems. They can also be seeded into wheat stubble. Clean till seeding works well but may have increased insect pressure. If seeding after crop farming, herbicide carryover residues are an enormous problem for Brassicas and small grains. Some commonly used herbicides can affect the establishment and growth of Brassicas for up to 24 months. As a rule, carry-over label recommendations for sugar beets are usually applicable to most members of the Brassicas family. Use 2 to 4 lbs/acre of seed for turnips and 3.5 to 4 lbs/acre for rape or kale. Drill the seed on 6-8 inch row spacing and place seed no more than 0.5 inch deep. When seeding spring oats or cereal rye with turnips the usual seeding rate is 1.5 to 2 bushels per acre of the small grain. Some producers have had success in aerial seeding of turnips, spring oats and cereal rye in to standing corn in mid-August. Again, check out your herbicide program for potential carryover and grazing restrictions before trying this method of seeding.

Fertilizer should be applied at the time of seeding to give the brassicas a competitive edge on weeds. Apply 60 to 80 pounds per acre of nitrogen and fertilize with phosphorus and potassium similar to what would be applied for a small grain.

How to Graze

When possible, turnips should be strip-grazed (size of available grazing are controlled by temporary electric fencing) during the growing season, much like a rotational grazing system. During the growing season strip grazing with a break wire in front of and behind the animals can be used to control consumption, allowing regrowth, preventing wastage, and conserving available dry matter. Strip grazing limits grazing damage to the root and lower leaf, allowing leaf surface for regeneration of plant growth. If regrowth is desired, at least two inches of leaf should be left intact. Generally animals will consume the leafy portion of the plant before progressing to the root portion.

Levels of Utilization:

Length of grazing period	Expected % utilization
1 day or less	80
3-4 days	70
6-8 days	60
10 – 14 days	50
> 20 days or longer	40 or less

FSRC, University of Missouri

SMALL GRAINS

The use of winter cereal crops such as wheat, rye, spring oats, barley, or triticale can provide fall or early winter grazing opportunities. However, certain management practices need to be modified from what is normally done for grain production. When small grains are used for grazing, plant them three to four weeks earlier than for grain production. Increase the seeding rate to 2 ½ to 3 bushels per acre and apply nitrogen at the rate of 40 to 60 lb/N per acre at planting time.

Rye will be more productive than wheat or triticale for both fall and spring production. However, grazing quality will be better with triticale than for rye. Spring oats seeded in the fall can be very productive but will die out over the winter. However, with adequate fall moisture, grazing should be available from October through December and then again in early spring for the rye, triticale and wheat.

Stocking rate and time of grazing will be somewhat determined by the intended use of the crop. If you are planning to take a silage or grain harvest, grazing should only be moderate. Heavy grazing can reduce grain yields. Moderate grazing in the fall will not result in significant silage or grain losses provided that moisture and soil fertility are adequate. In fact, fall pasturing can be beneficial where the small grain was seeded early and has made excessive growth and soil conditions are dry.

Spring grazing may be started when growth resumes. If a grain or silage crop is to be harvested, grazing should be discontinued when the plants start to grow erect, just before jointing (growth stage). Grazing at any time after their growing points are above the ground will injure small grain plants.

The Following table summarizes important characteristics of Cereal Grains and Annual Ryegrass.

Characteristic	Oats	Rye	Triticale	Wheat	Annual Ryegrass
Regional Adaptation	Anywhere	Anywhere	Anywhere	Anywhere	South/Central
Winter Hardiness	Low	High	Moderate	Moderate	Variable
Yield Potential	Moderate	High	High	Moderate	High/Variable
Forage Quality	High	Moderate	Variable	Moderate	High
Fertility Requirement	Moderate	Low	Moderate	Moderate	High
Regrowth Potential	Moderate	Moderate	High	Low	High

All of these designations are site and management dependent.

CROP RESIDUES

Corn Stalks

In mixed crop and livestock operations, corn and grain sorghum stalk fields can be used to supply substantial grazing days. As grassed waterways, terraces, and field borders become more widely used, this option becomes even more attractive.

The crop residues represent about one-half of the plant dry matter and, therefore, a field producing 120 bushel corn grain will have close to 3 to 4 tons of roughage dry matter per acre. The optimal grazing allowance on corn crop residue fields is dependent on the weight gains necessary to obtain a desired body condition. With low supplementation, cows can maintain bodyweight with as little as .5 acres corn crop residues per cow per month, but may need as much as 2 acres per cow per month if bodyweight gain is necessary.

Because grazing cattle will select the portions of crop residues with the highest digestibility and protein concentration, needs for supplemental feeds beyond trace mineral salt and vitamin A are likely to be minimal for the first month of grazing. Simultaneous grazing of stockpiled grass or legume forages (late summer growth) may also supply protein and energy and, thereby, reduce needs for supplementation. As winter progresses and crop residue quality decreases because of grazing selection and weathering, supplementation of protein and phosphorus may become necessary.

Table 1. Effects of strip-grazing management on cow economics

Item	Treatments		
	1 / acre (2 wk)	1.5 / acre (2 wk)	1.5 / acre (1 wk)
Corn stalks ($10/acre), $/hd/d	$0.24	$0.16	$0.16
DDGS ($100/ ton @ 4 lbs/hd/d)	$0.20	$0.20	$0.20
DDGS feeding labor[a] , $/hd/d (1.5 hrs for all 192 hd)	$0.09	$0.09	$0.09
Fence moving labor[a] , $/hd/d (20 minutes – 2x or 5x)	$0.01	$0.01	$0.02
Total cost, $/hd/d	$0.54	$0.46	$0.47

[a] Labor @ $12/hr

Shike, Faulkner, Ballard, U of I, 2008

Grazing Dormant Alfalfa

Another option that has become increasingly popular for extending the fall grazing season has been to graze the regrowth of alfalfa hay fields or pastures after cold weather has ensured dormancy. Usually 2 to 3 days of successive temperatures in the 24-27 degree Fahrenheit range should be experienced before grazing alfalfa. It is important to graze early enough to utilize the forage while still in a leafy palatable state. If grazing is delayed until freezing has desiccated the plants and caused most of the leaves to drop, then the cows or sheep had just as well be kept off. An added benefit to fall grazing alfalfa is that research and farmer experience indicates a reduction in alfalfa weevil populations the following spring. This is due to removal of some of the stems where weevil egg masses overwinter. Some points of concern when grazing alfalfa hay fields are not to graze when the soil is saturated, as this will cause long term stand damage and roughen the field. Enough stubble, 3 to 4 inches, should be left to catch and hold snow to reduce winter damage to the plant crowns and minimize temperature fluctuations, which result in plant heaving.

Grazing Maize (Corn)

Grazing Maize is a selectively bred composite designed to graze by livestock. Grazing Maize can be grazed during late summer months or allowed to mature and be grazed as standing corn during the winter months. Also, to prevent corn wastage, daily strip grazing is required. Some source of dry feed should also be fed to cattle while grazing Maize.

Plant population should be nearly the same as traditional planting rates and can be planted with a regular corn planter.

Frost Seeding

Legumes can be interseeded into grass stand by several methods. The important criterion for success is to achieve good seed-soil contact. If the seed never makes it into the soil, it is not likely to ever become established. Different seeding methods are appropriate for different legume species.

Frost seeding works very well for all clovers and lespedeza. Seed-soil contact is achieved through freezing and thawing action drawing the seed down into the soil. If there is a heavy thatch layer on the soil surface, the seed may never actually reach the soil. Frost seeding where cattle have grazed during the fall or winter and disturbed the thatch is a good strategy. The clovers tend to be more tolerant of cold temperatures in the seedling stage than is alfalfa or birdsfoot trefoil, thus making clovers better adapted for frost seeding. In Illinois the window of opportunity for frost seeding is between February 15 and March 15.

Frost seeding red clover into tall fescue can help improve the quality of the pasture while also helping to keep it more productive during the summer months. Ideally a mixture of 30 to 40 percent red clover and the remainder tall fescues will help decrease the summer slack production of straight tall fescue.

The keys to frost seeding success are to graze the grass down in the fall. Then frost seed the legume in the spring and next graze back the early flush of spring

grass and then allow for a rest period from grazing providing time for the legumes to become established.

EXTENDING THE SUMMER GRAZING SEASON

Cool-season Grass-Legumes Mixtures

Growth of cool-season grasses such as tall fescue, Orchardgrass, perennial ryegrass, or smooth bromegrass is limited in the summer by both high temperatures and soil moisture deficiency. Photosynthesis in cool-season plants becomes much less efficient at higher temperatures. Heavy grazing without rest also reduces total leaf area available to the plant to support maintenance and growth. The combined effect of reduced photosynthetic efficiency and diminished leaf area is low summer pasture production.

Cool-season legumes such as alfalfa and red clover have somewhat higher optimum growth temperatures than do the cool-season grasses and are frequently more deeply rooted. For these reasons, cool-season legumes tend to be somewhat more productive in the summer months. Interseeding legumes into grass dominant pastures can be the first step toward extending the summer grazing season. Grazing management, which provides planned rest periods for the pasture plants, is essential for the maintenance of legumes in pasture.

In a Management Intensive Grazing system, we can also control grazing pressure to the extent that reproductive stems in the grasses can be grazed off in the early stages of elongation. This will typically result in early initiation of tillering and production of more vegetative regrowth during the summer months. The same management used to accomplish this goal of seedhead suppression will also encourage legume development in the sward. The combined effect is greater levels of higher quality cool-season forage in the summer months.

Warm-Season Perennials

Warm-season grass species can be used as an alternative to cool-season pastures in the summer months. Warm-season perennial species would include the native tall grass prairie species such as big bluestem, eastern gamagrass, indiangrass, and switchgrass as well as introduced species such as Caucasian bluestem and bermudagrass.

The native species are quite sensitive to grazing management and will respond well to plan rotational grazing. In fact, some recent evidence has shown that under control grazing systems cool-season and warm-season grasses can be interseeded and the warm-season grasses will become an important part of the stand and help increase production during the warm summer months.

Warm-season Annuals

Summer annual crops such as sudangrass, sorghum-sudan hybrids, pearl millet, and crabgrass can also be used to supplement cool-season pastures. The limiting factor for the use of these crops by many producers is land availability. While overseeding and no-till establishment can be used successfully for some warm-season annual species, many respond more favorably to seeding on a tilled seedbed. Cost of establishment and potential for

erosion losses are two main deterrents to the use of conventionally seeded annual crops.

Because annual crops are typically high investment crops, management to fully utilize the crop is essential. This is particularly true with the taller growing species where wastage can be very high if feed budgeting is not tightly followed. Animal output per acre can frequently be doubled if grazing periods are kept to fewer than 3 days compared to periods of 14 days or longer.

Cost is normally ten to twenty cents more per grazing day compared to cool season grasses.

References

Don Ball, Ed Ballard, Mark Kennedy, Garry Lacefield, Dan Undersander

Extending Grazing and Reducing Stored Feed Needs, 2008

Jim Gerrish, Kick the Hay Habit-A Practical Guide to Year-Around Grazing, 2010

Jim Gerrish and Craig Roberts, Missouri Grazing Manual, 1999