

Extending the Grazing Season for Beef Cattle

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Feed costs represent over 50% of the costs to produce beef in Minnesota. Well-managed pasture provides forage for only about 1/3 the cost of home-grown hay (or silage) because forage conservation requires substantial expenditures for equipment, fuel, labor, and infrastructure with inevitable and sometimes significant losses in dry matter and feeding value during harvest and storage. In addition, challenges faced in harvesting and storing high quality hay often force producers to purchase supplemental feed.

Snow depth, ice encasement, and extremely high moisture should be the only conditions that limit our ability to graze. While forage conservation is a necessity given Minnesota's winters, every additional day of grazing saves money and thus increases potential for profit to the beef operation. We must recognize that the "grazing season" is not limited to the period of time when forages are actively growing (i.e. the "growing season"). Our goal should be to provide pasture forage to our beef cattle on every day of the year when serious weather limitations don't occur.

One of the best methods by which to extend the grazing season through fall, and possibly even into early winter in some areas and years, is by stockpiling perennial forages. Stockpiling is the practice of accumulating forage growth in the field and deferring its use as pasture to a later date.

Forage Species for Stockpiling

Any forage species or mixture can be stockpiled for fall grazing, but certain species are more suitable than others. Tall fescue is among the best grass species for stockpiling because 1) it is productive in the fall, 2) its feeding value deteriorates relatively slowly after a hard frost, 3) it accumulates a high concentration of soluble carbohydrates (readily digestible energy for grazing cattle) in response to fall conditions, and 4) it forms a tough sod which can recover from animal trampling during the wet conditions which can sometimes occur during the stockpile grazing period. Much of the documented success with stockpiled tall fescue has occurred in the southeastern US where it can often provide grazing through the entire winter.

However, there are some serious limitations to increased use of tall fescue in Minnesota including low palatability until freezing and marginal winterhardiness. Nevertheless, recent experiments in Minnesota and Wisconsin support its potential for use for stockpiling in Minnesota, and a current Minnesota project is addressing its potential further.

Figure 1 shows fall yield of a variety of forage species stockpiled beginning July 15 and harvested prior to a killing frost at Morris, MN. Species are arranged in descending rank for fall yield from left to right. Tall fescue had the greatest fall yield and among the greatest total season yields of the eight species evaluated. Reed canarygrass and orchardgrass were second to tall

fescue in stockpile yield, producing about 600 lb/ac less forage dry matter (about 20% less). Yield data for alfalfa represents the sum of two harvests (mid-Aug and mid-Sept) since alfalfa would likely not be a good candidate for stockpile management. Even birdsfoot trefoil produced over 1 t/ac of stockpiled forage; however, it would be important to use this forage prior to a killing frost since substantial loss in yield and quality would be expected. Wisconsin data presented in Figure 2 also demonstrates tall fescue's superior fall-winter productivity over three locations and two years. In addition, in their study, early-maturing orchardgrass had similar fall-winter productivity to tall fescue and was considered a top choice for stockpiling.

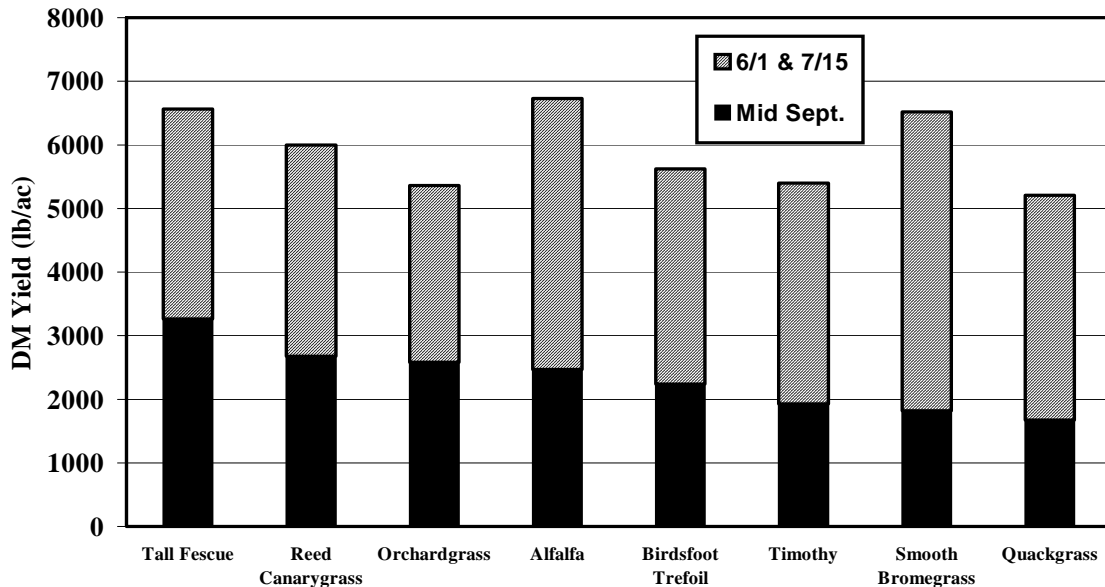


Figure 1. Mid-September and total season yields of forages stockpiled beginning July 15 at Morris, MN (2 yr avg.)

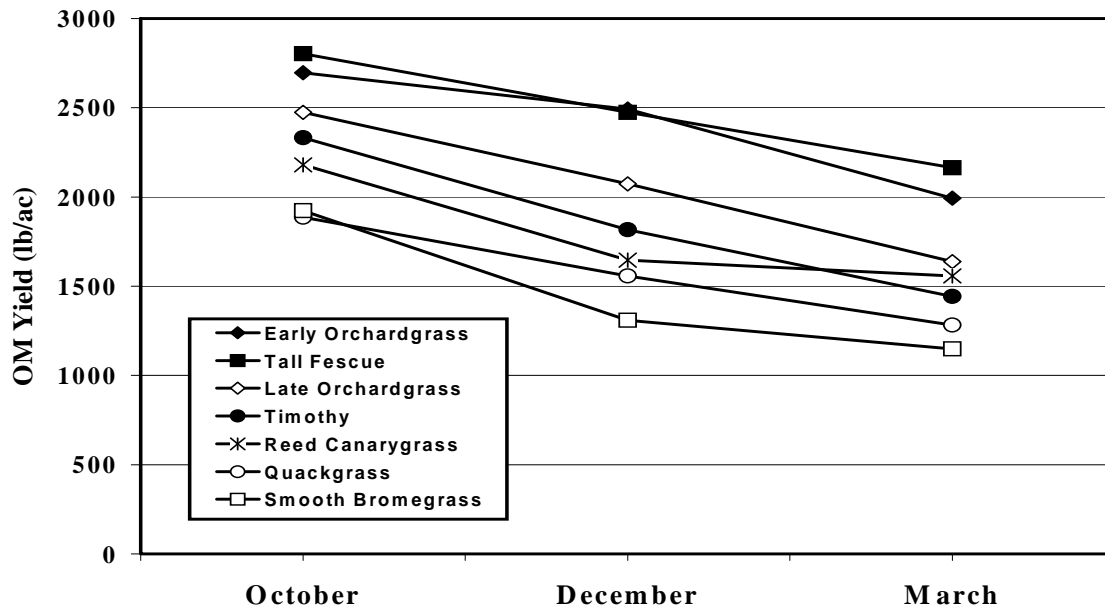


Figure 2. Decline in yield of stockpiled forages during fall and winter in Wisconsin (3 location, 2 yr avg.)

Smooth brome grass and quack grass can be stockpiled for fall grazing as well, however, they have lower fall productivity and thus animal carrying capacity than the aforementioned species. For example, even though smooth brome grass had similar total season yield to tall fescue, it produced about 1400 lb/ac less (45% less) fall forage than tall fescue at Morris, MN. Wisconsin researchers went so far as to conclude that smooth brome grass and quack grass are not suitable grasses for stockpiling. Nevertheless, given its excellent adaptation and winterhardiness and thus predominance throughout much of Minnesota, it makes sense to use smooth brome grass for stockpiling on many farms.

Stockpiled legumes can provide good yields of good quality forage until the first hard frost, after which both yield and quality decline very rapidly. One management strategy might be to use stockpiled fields with the highest legume content in early fall, and fields with greater tall fescue and orchard grass (and smooth brome grass in western MN) content later in the fall.

Stockpile Management

Mid-summer is generally the time to initiate the stockpiling process. The appropriate time to start stockpiling should be determined by:

- 1) the availability of pastures and/or hayfields for deferred use,
- 2) the nutritional needs of the cattle that will consume the stockpiled forage,
- 3) the intended date of use, and
- 4) the average first frost date.

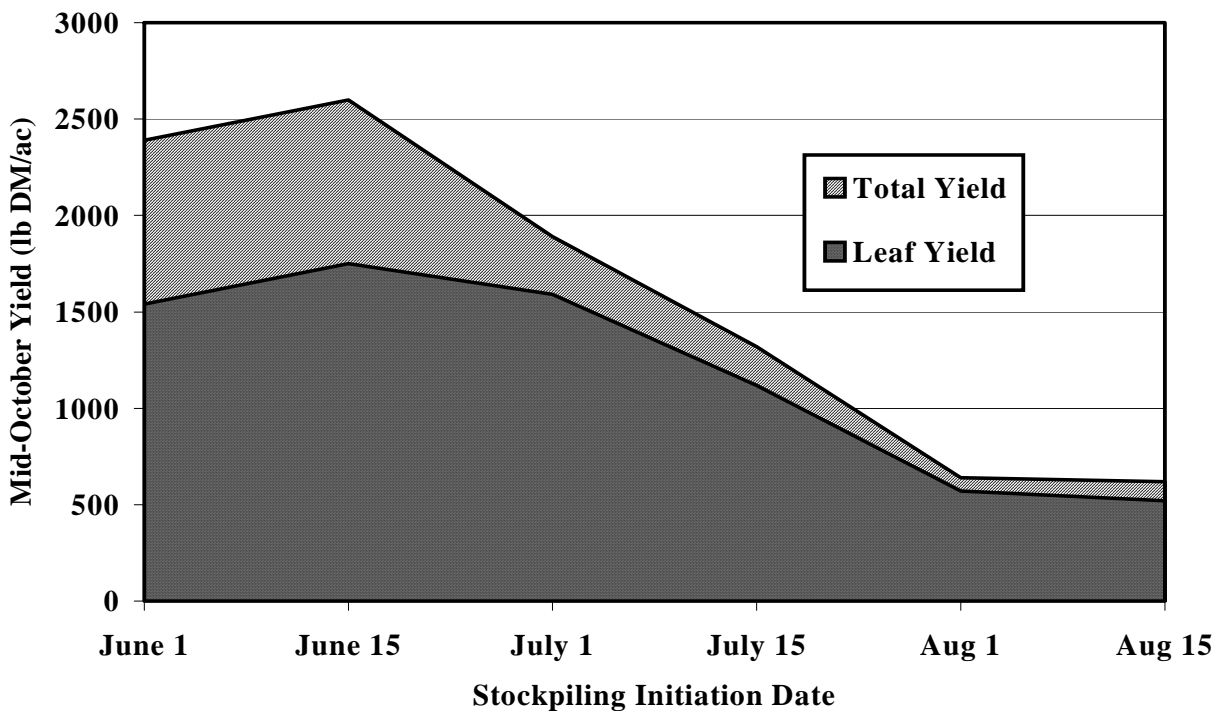


Figure 3. Stockpiling initiation date affected smooth brome grass stockpile yield at Morris, MN (2 yr avg.)

Earlier stockpile initiation (June to early July) will produce relatively more yield of lower quality forage (Figure 3). Later stockpile initiation (late July to August) will produce relatively less yield of higher quality forage.

Application of 50-75 lb N/ac at the initiation of stockpiling is essential. Figure 4 shows the response of smooth brome grass to N applied at the initiation of stockpiling in July at Morris, MN. Since leaf yield did not increase significantly as N rate was increased from 50 to 100 lb/ac, 50 lb N/ac is probably adequate to initiate stockpiling of smooth brome grass. Wisconsin reported that 60 lb N/ac at the initiation of stockpiling increased yield of stockpiled grasses by an average of 75%.



Figure 4. Nitrogen fertilization rate affected yield of stockpiled smooth brome grass at Morris, MN (2 yr avg.)

Stockpile Use

Yield of stockpiled forage will generally increase until the first hard frost. After this, both yield and quality of the forage will decline. The energy level of the forage will deteriorate more than its protein level, so supplementation should be most often be geared first toward meeting energy needs. In the Wisconsin research mentioned earlier, digestibility of stockpiled grasses declined from about 74% in October, to 71% in December, and about 65% the following March. However, these values probably suggest higher digestibility than should typically be expected based on research from more southern locations. Over the same period, CP% declined only one percentage unit, from about 12 to about 11%. In addition, as mentioned earlier, forage

quality of the stockpiled feed will decline least rapidly with tall fescue, and most rapidly with legumes.

Carrying capacity of stockpiled forage is improved by allocating only enough forage to provide at most a week of feed. This can be accomplished by strip-grazing using portable electrified fencing systems to allocate the desired amount of pasture. Strip-grazing reduces trampling and thereby improves utilization of the stockpile with improving manure and urine distribution and thus nutrient recycling on the pasture. Efficiency of the use of the stockpiled forage can be improved even further by using a leader-follower grazing system. This allows animals with a higher nutrient requirement (eg. weaned calves) to graze the nutrient-rich top portion of the standing stockpile. These animals are then moved to new pasture, and the remainder of the forage, which is more stemmy and thus less nutritious, is consumed by animals with a lower nutrient requirement (eg. dry cows).

Current MN Research Effort

We have initiated a multi-location project to look at the potential of a number of tall fescue and perennial ryegrass varieties for Minnesota. The project is funded by the Minnesota Department of Agriculture Sustainable Agriculture Program. Our hope is that we might identify varieties of these species that complement existing adapted pasture grasses by providing extended grazing on a portion of the beef operation's acreage.

Perennial ryegrass is the dominant cool-season perennial grass in much of Europe, Australia, and New Zealand. It has among the highest palatability and forage quality of all perennial grasses. Like tall fescue, it has good growth potential in cool temperatures and thus produces well in early spring and fall. And also like tall fescue, it has not been recommended for Minnesota due to concerns about its winter survival. However, there are a number of new varieties on the market that have improved winter survival. Perennial ryegrasses may be more apt to provide extended grazing by rotational grazing through summer and fall rather than by stockpiling. Varieties of a new hybrid between ryegrass and meadow fescue called festulolium are being tested as well.

Three farmer collaborators are participating in the project: Chuck Henry, an Olmsted County dairy producer; Todd and Brian Johnson, Clearwater County beef producers; and Dan Miller, a Fillmore County beef producer. Additional collaborators include a number of University of Minnesota personnel including Terrance Nennich, Doug Swanson, Mike Reese, and Duane Schriever.

Four to six varieties of tall fescue were seeded in replicated strips in a 5-acre paddock on each farm in spring 2001. Varieties include Barolex (Barenbrug), Martin 2 (Cebeco International), Courtenay (Dawson, Canada), Kokanee (Parsons, Canada), Montebello (Dawson, Canada), and Hykor festulolium (DLF). About one-half of each paddock was seeded together with red clover. An oat companion crop was used at the Miller farm.

In another 5-acre paddock on each farm, four perennial ryegrass varieties were seeded in replicated plots, also in spring 2001. Varieties include BG-34 and BG-23 (Barenbrug), Respect

(Cebeco International), and Spring Green festulolium (Olds Seed). About one-half of each paddock was seeded together with 'Alice' white clover, and an oat companion crop was again included over the entire paddock at the Miller farm.

Small plot experiments including these and other ryegrass and tall fescue entries in addition to smooth brome grass and orchardgrass check plots were seeded at the Research and Outreach Centers at Morris and Grand Rapids, MN, in August 2000. Dry late summer and fall combined with harsh winter conditions resulted in the failure of the Morris seeding; thus, that site was re-seeded in August 2001. However, the first attempt did provide some useful information. Initial stands of tall fescue entries in fall 2000 averaged only about 55%, and declined to about 25% over their first winter. However, the Canadian varieties were not included in this seeding. Initial stands of perennial ryegrass were considerably better, averaging about 90%. However, these, too, experienced significant but variable winterkill during their first winter, with a Minnesota experimental (WHxTQ) displaying greatest spring 2001 stands (60%), BG-34 at 45%, and Respect, Barfort, and GrandDaddy at about 25%. In contrast, spring 2001 stands of well-adapted 'Alpha' smooth brome grass were 90%. The first seeding attempt at Morris suggests potentially marginal adaptation of the tested varieties to harsh conditions that can occur with regularity in that area. The new Morris seeding included the Canadian tall fescue varieties.

At Grand Rapids, establishment and over-wintering success were much better. Spring 2001 stands of tall fescue and perennial ryegrass averaged about 65 and 85%, respectively. The Canadian tall fescue varieties were added to the trial in spring 2001 and all existing fescue plots were overseeded to attempt to thicken stands. A similar study was seeded at St. Paul in August 2001. Each of these experiment station plots is/will be periodically grazed by beef cattle (Grand Rapids), dairy cattle (Morris), or sheep (St. Paul) to simulate defoliation via rotational grazing. Yield, quality, persistence, and palatability are being measured. The Grand Rapids site was grazed three times in 2001 as of late August.

These studies will be continued for the next several years. Again, our goal is to identify some varieties that might be seeded in a portion of the pasture acreage on a farm to complement existing pastures by providing additional grazing days in the fall and perhaps spring.

References

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