

Stockpiling Pasture

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The concept of stockpiling is simple. Rather than cutting, drying, and storing hay to feed in winter, you grow the forage till frost and let the animals harvest their own feed as long as weather conditions allow. Most classes of livestock can graze through up to 8" of snow and are comfortable in much colder temperatures than many people imagine. However, like everything in pasture management, it's more complicated in practice. Successful stockpiling is a result of planning, timing, and luck. Now is the time to start setting aside pasture to graze in late fall and winter.

Two main reasons are given for stockpiling. The first and most obvious one is that it replaces mechanically harvested, stored feed with the cheapest feed we can produce—pasture. It should save money.

The other reason often given is that it can improve pasture utilization the following season by staggering spring and early summer grass growth. Fifty percent or more of pasture growth occurs during the 'spring flush'. Making hay off some acres is the most common way to deal with this overabundance. The idea behind stockpiling is that winter grazing of some paddocks can help stage paddocks to accumulate forage at different rates in spring.

Risky business?

There are three primary factors in stockpiling success: fall moisture, fall nitrogen availability, and winter weather conditions. Clearly, there is some risk involved here, since we have no control over two of the three factors. In comparison, when you make hay for winter feeding, you have the greater cost of mechanical harvest, but somewhat less weather risk, especially if you can store the hay under cover.

The right amounts of nitrogen and moisture will maximize the amount and quality of stockpiled forage going into winter. A mid-August application of 50 lb/a actual N will satisfy the nitrogen requirement, but timely rainfall is equally important. Once the forage has been stockpiled, its availability and quality depend on snow cover and temperature conditions throughout the winter. The longer it is out there in the field, the more quality and quantity will decline. Stockpiling for spring is a much more questionable proposition than for fall.

What does the research tell us?

Beyond these general principles, what else should we know? Luckily, we have a very comprehensive study conducted in 1996 and 1997 by Janet Hedtcke who was then a graduate student with Drs. Dan Undersander, Mike Casler, and Dave Combs at UW Madison. Janet looked at seven grass species, three harvest dates, and four nitrogen treatments at three sites in Wisconsin (that's over 1000 study plots!). Her work allows us to take a closer look at how well stockpiling works in the Upper Midwest.

Yield.

In Janet's study, nitrogen application increased fall yield an average of 79% over unfertilized plots. Among the three nitrogen treatments, fall application was clearly the most important to fall yield. Treatments which included spring and summer N applications affected summer yields but not fall yields. The bottom line: if you're going to stockpile grass, nitrogen is essential for good fall growth.

The first set of plots were harvested after the first killing frost in October. Looking only at N-fertilized plots, stockpiled pasture netted approximately 1.2 tons of dry matter per acre (t/a) averaged across sites at Arlington, Lancaster and Marshfield. Yields (t/a) ranged across the species as follows: tall fescue, 1.41; early orchardgrass, 1.35; late orchardgrass, 1.24; timothy, 1.17; reed canarygrass, 1.09; smooth brome, 0.96; and quackgrass, 0.95. These are yields cut at grazing height (3 to 4 inches). Actual animal intake, of course, will vary with management, livestock type, and pasture composition.

Yields from stockpiled plots harvested in December and March were lower and beyond December, there was an approximate 50% loss in dry matter through decomposition and leaching of carbohydrates.

Forage quality.

Nitrogen application resulted in an average crude protein (CP) increase of 1% across all grass species, but did not affect digestibility (DG) of the forage significantly. October forage quality with added N averaged 11.6% CP and 73% DG. Crude protein levels declined up to 2 percentage points between October and December, but did not decline consistently between December and March. Digestibility values declined an average of 3 percentage points between October and December, and another 5 percentage points between December and March.

Best species.

Which species performed best for stockpiling? I always thought that those early stockpiling studies featured tall fescue because that's all they had down in Kentucky and Missouri where the work was done. In reality, tall fescue is remarkably well adapted for stockpiling because of its more uniform distribution of growth over the season. It accumulates biomass well in late summer and fall, and its stiff, waxy leaves seem to hold up better than average over the winter. Orchardgrass was next highest in yield and was higher in CP and similar in DG to tall fescue. The early orchardgrass had consistently higher yields across all sites than the late orchardgrass.

Timothy and reed canarygrass both had average yields and average levels of CP, however digestibility of timothy was among the highest, while reed canarygrass had among the lowest digestibility levels.

Smooth brome and quackgrass had the lowest yields and higher than average protein levels. Digestibility of smooth brome was relatively high; while quackgrass DG was uniformly low.

Staggering spring growth?

Many people talk about the role of stockpiling in managing the spring flush. The theory is that stockpiling rather than grazing in the fall allows the plants to store root reserves which will then contribute to faster greenup and growth in spring. Because the forage is grazed after growth has stopped in fall, root reserves should remain intact the following spring to contribute to more vigorous growth. Non-stockpiled paddocks should green up more slowly because they've gone into the winter with no root reserves. This makes intuitive sense and it may actually occur under some circumstances, but Janet's study does not support these assumptions.

At the Arlington site, the stockpiled pastures did not begin growth any earlier than the non-stockpiled pastures. Early spring yields were similar between stockpiled/winter-grazed and fall-grazed/non-stockpiled pastures. At Lancaster, Janet actually documented lower early spring yields in the stockpiled/winter-grazed forage than in the fall-grazed/non-stockpiled plots. What this tells us is that treading injury during winter grazing can have a greater impact on spring regrowth than root reserves. In this case, the stockpiled/winter-grazed paddocks green up more slowly than the fall-grazed/non-stockpiled paddocks. So, while the mechanism is different, we've still achieved the desired result--staggered spring growth of paddocks to improve pasture utilization.

Putting it all together.

With a little bit of nitrogen and little additional cost, you can get at least an additional fall grazing by

stockpiling some of your paddocks. Stockpiled forage is of relatively low quality compared to fresh pasture, but stacks up well against the average quality hay we can make off pasture (probably lower in protein but higher in digestibility). It is of appropriate quality for beef, sheep, or dry dairy cows, but is not of high enough quality to sustain milk production in lactating dairy cows. For many graziers, especially seasonal dairymen, extending the season into December is quite feasible and very practical. Because of the continuing decline in dry matter and quality and the logistical challenges of grazing through snow and ice, it is questionable whether we should pursue stockpiling for feeding beyond early winter.

Stockpiling is one of several tools we have to help manage the grass farm's resource base. It is used most effectively on farms with more than one acre of pasture per animal unit (1 AU = 1000 lb of animal). How many additional acres do you need? A 1000 pound animal will need approximately 30 pounds of dry matter per day (3% of body weight) or about 900 lb/month. For each additional month of grazing after frost, you'll need about 0.4 acres for that animal ($1.2 \text{ t/a} \times 2000 \text{ lb} = 2400 \text{ lb}$; $900 \text{ lb/month} \div 2400 = 0.375 \text{ acres}$). For a herd of 100 dry dairy cows, you'll need about 50 additional acres. But, start small. As you learn what works with your system, on your soils, with your climate, you can expand your program. Would stockpiling work for you? There's one way to find out!