# Stockpiling Pasture

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The concept of stockpiling is simple. Rather than cutting, drying, and storing hay to feed during winter, pasture forage is grown until frost so animals can harvest their own feed as late into winter as weather allows. Most livestock can graze through as much as 8" of snow and are comfortable in much colder temperatures than people imagine.However, stockpiling is more complicated in practice. Successful stockpiling requires planning, timing, and luck. Why stockpile? First, it replaces mechanically harvested, stored feed with the cheapest feed produced – pasture. Second, 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.' The most common way to deal with over-abundance is to make hay from some of the acres. Winter grazing of some paddocks can help stage paddocks to accumulate forage at different rates in spring.

**Successful stockpiling.** There are three primary factors in stockpiling success: fall moisture, fall nitrogen availability, and winter weather conditions. Clearly, there is some risk involved, since two of the three factors are out of one's control. In comparison, when a producer makes hay for winter feeding, there is greater cost incurred (mechanical harvest) but somewhat less weather risk, especially if the hay can be stored under cover. The right amounts of N and moisture will maximize the amount and quality of stockpiled forage going into winter. A mid-August application of 50 lbs of N/ac will satisfy the N requirement, but timely rainfall is equally important. Under typical Wisconsin conditions, an acre of stockpiled pasture will yield between a half and one ton of forage after frost. Once the forage has been stockpiled, its availability and quality depend on snow cover and temperature throughout the winter. The longer in the field, the more quality and quantity will decline. Stockpiling for spring is more questionable than for fall.

Beyond these general principles, what else should producers know? A comprehensive study was conducted in 1996 and 1997 in Wisconsin at Arlington, Lancaster, and Marshfield. The study looked at seven grass species, three harvest dates, and four N treatments at three sites. The grass species were late orchardgrass, early orchardgrass, quackgrass, reed canarygrass, smooth bromegrass, tall fescue, and timothy. First harvest was just after the first killing frost (October), second harvest was in early winter (December), and third harvest was in early spring prior to greenup (March). The first two N treatments were either 0 or 60 lbs N/ac applied on August 1. The third treatment was 90 lbs N/ac applied after first spring cut and 60 lbs N/ac applied on August 1. The fourth was 40 lbs N/ac applied before spring cut, 50 lbs N/ac applied after spring cut, and 60 lbs N/ac applied on August 1.

**Harvest date effects**.The first set of plots were harvested after the first killing frost in October. Across all sites and all species, N-fertilized stockpiled pasture yielded 1.24 tons DM/ac. Non-fertilized plots averaged a yield of 0.72 tons/ac. Averaged across all sites, grass species, and nitrogen treatments, yields from stockpiled plots harvested in December (0.95 tons/ac) and March (0.80 tons/ac) were lower than in October. Between October and March, there was ~50% DM loss through decomposition and carbohydrate leaching.

**Nitrogen effects**. Sixty pounds N/ac applied on August 1 increased fall yield of stockpiled forage by nearly 75% over unfertilized plots at all sites, averaged across harvest dates and grass species. Spring and summer N applications affected summer yields, but had no beneficial effect on fall regrowth. N applied in August is essential for good fall forage growth.

**Species response to stockpiling**. Across all harvest sites and dates, species rankings were generally the same. Either tall fescue or early-maturing orchardgrass were highest in yield at each harvest date and site. The late-maturing orchardgrass usually ranked third. Yields (tons/ac) 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 bromegrass, 0.96; and quackgrass, 0.95. These are yields cut at grazing height (3-4 in). Actual animal intake, of course, varies with management, livestock type, and pasture composition.

**Forage quality**. Forage quality levels were significantly lower than those observed by producers who routinely stockpile pasture. N application resulted in an average crude protein (CP) increase of 1% across all grass species, but did not significantly affect digestibility (DG). October forage quality with added N averaged 11.6% CP and 73% DG. Crude protein levels declined up to 2% between October and December, but did not decline consistently between December and March. Digestibility values declined an average of 3% between October and December, and another 5% between December and March.

Several graziers who have tested stockpiled forage report quality levels similar to what was observed in spring and early summer, with protein levels in the upper teens and low twenties and reasonably good Relative Forage Quality

(RFQ) values. It is unclear why the study values were so much lower, although it can be speculated that management or weather conditions may have contributed.

**Best species**. Tall fescue performed best for stockpiling. It 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. Early orchardgrass was the next highest in yield, and was higher in CP and similar in DG to tall fescue. The late orchardgrass usually ranked third. Timothy and reed canarygrass both had average yields and average levels of CP. However, the digestibility of timothy was among the highest, while reed canarygrass had among the lowest. Smooth bromegrass and quackgrass had the lowest yields and higher than average protein levels. Digestibility of smooth bromegrass 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 spring greenup and growth. Because the forage is grazed after growth has stopped in the fall, root reserves should remain intact the following spring contributing to more vigorous growth. Non-stockpiled paddocks should green up more slowly because they have gone into the winter with no root reserves. This makes intuitive sense and it may occur under some circumstances, but this study did not provide evidence to support these assumptions. At the Arlington site, the stockpiled pastures did not accumulate more forage in early spring compared to non-stockpiled pastures. Early spring yields were similar between stockpiled/winter-grazed and fall-grazed/non-stockpiled pastures. At Lancaster, the stockpiled/wintergrazed forage had lower early-spring yields than the fallgrazed/non-stockpiled plots. Treading during winter grazing might have damaged crowns and negatively impacted spring regrowth. In this case, the stockpiled/winter-grazed paddocks greened up more slowly than the fall-grazed/non-stockpiled paddocks. So, while the order of greenup was different, the desired result was still achieved – staggered spring growth of paddocks to improve pasture utilization.

**Putting it all together.**. With a small amount of N and little additional cost, producers can get one extra fall grazing by stockpiling paddocks. While stockpiled forage in this study was of relatively low quality compared to fresh pasture, many experienced graziers have been able to obtain higher quality levels with a combination of N fertilizer, good management, and a little bit of luck. For many graziers, especially seasonal dairymen, extending the season into December is quite feasible and very practical. Due to DM decline and quality and logistical challenges of grazing through snow and ice, it is questionable whether producers should pursue stockpiling as the primary forage source for lactating dairy cows beyond early-winter. Stockpiling is one of several tools available 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 = 1,000 lbs animal). How many additional acres are needed? A 1,000 pound animal will need approximately 30 lbs of DM/day (3% of body weight) or ~900 lbs/month. For each additional month of grazing after frost, about 0.4 ac/animal are needed (1.2 tons/ac x 2,000 lbs = 2,400 lbs; 900 lbs/month ÷ 2,400 = 0.375 ac). For a herd of 100 dry dairy cows, about 50 additional acres are needed. As producers learn what works with their system, on their soils, and with their climate, they can slowly expand their program. Is stockpiling a good option? There is one way to find out!

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