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Stockpiling Tall Fescue for Winter Grazing

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One of the greatest expenses for beef and sheep producers is winter feed costs. Brood animal profitability is dependent on low feed costs. One way to lower these costs is to field stockpile forages for fall and winter grazing.

Tall fescue for grazing livestock is commonly considered versatile and persistent perennial forage. It is the most desirable grass to stockpile for late fall and winter grazing. During the fall, this grass produces higher yields of stockpiled forage of superior quality compared to most other temperate grasses. The fall-saved forage is very palatable and high in digestibility (high in soluble sugars). Forage quality losses from leaf deterioration after frost are lower for tall fescue compared to most other forages. In southern Ohio, tall fescue will stay green and may even grow a little during warm winter days. Tall fescue forms a strong sod that is tolerant of trampling damage, which is common on wet pasture soils during the winter. Winter grazing has minimal influence on yield or quality of this grass the following season.

Tall fescue has a bad reputation among many Ohio producers because animals do not graze it readily during the summer months. Some of this reduced summer palatability is associated with the presence of an endophyte fungus *Neotyphodium coenophialum* in the plant. The fungal endophyte produces alkaloids that are toxic to animals and cause various animal health problems. Many existing fescue stands are endophyte-infected, but the level of infection varies considerably. Animal health problems associated with endophyte-infected stands occur primarily in the summer when animals are under heat stress. Adverse health effects are less common on infected fescue pastures in the fall and winter. The toxin produced by the fungal endophyte is less concentrated in leaf tissue than in the seedheads and stems, so the amount of toxin consumed in the fall is less than in the spring and early summer. The cooler temperatures in the fall and winter reduce the heat stress problems associated with endophyte-infected fescue.

Endophyte-free cultivars are available which are equal or superior to endophyte-infected in yield, quality, animal preference and stockpiling. Persistence can be maintained with a high level of management. New cultivars that have a *novel endophyte*, which can be as aggressive as infected-fescue, but without the alkaloid ergovaline that causes livestock problems are being tested in Ohio and may provide an attractive option in the future.

Considerations for Stockpiling

Two components to consider when planning to stockpile tall fescue are the desired level of forage quality and yield. Each producer should consider feed requirements and determine whether there is a need for high quality forage for young animals, stockers, and lactating animals or maximum yield to stretch limited stored feed supplies. Important management factors affecting the balance between yield and quality of stockpiled fescue are: 1) date of the last summer harvest or clipping (when to begin stockpiling), 2) nitrogen application date, 3) nitrogen application rate, and 4) amount of legume in the pasture.

When to Begin Stockpiling

The last summer harvest or clipping should be timed so that stockpiled tall fescue growth can begin by mid-July in northern Ohio and August 1 in southern Ohio. These dates provide the best compromise between yield and quality of stockpiled forage for fall and winter grazing. If higher quality forage is desired, make the last clipping or harvest about two weeks later-early August in northern Ohio and mid-August in southern Ohio. If maximum yields are desired and the forage will be grazed in November or December, then make the last harvest or clipping earlier in the summer-July 1 in northern Ohio and July 15 in southern Ohio. The effect of final summer clipping date on yield and quality of stockpiled tall fescue is illustrated in results from research in southeast Ohio (Table 1). Clipping the fescue in early July compared to mid-August increased yields for November grazing, but resulted in slightly lower crude protein levels.

Table 1. Effect of final clipping date on dry matter yield and crude protein (CP) concentration in stockpiled tall fescue forage in SE Ohio.

	Yield (lbs/acre)	% CP		
Final Clipping Date	11/3	11/3	12/20	2/11
7/1	3761	13.9	10.1	9.6
8/16	3194	15.2	11.0	10.9

Nitrogen Application

Date

The date of nitrogen fertilizer application can influence yield and quality of the stockpiled fescue. In general, nitrogen should be applied when the stockpiling period is initiated (soon after the last summer harvest). If nitrogen is applied during early August compared with late September, yields can potentially be higher (Figure 1), but forage quality will be slightly lower (Table 2). If

nitrogen is applied after mid-August in northern Ohio and late August in southern Ohio, less yield response can be expected in most years because of the shorter growing period (Figure 1). Forage yield and quality response to late nitrogen applications will depend on growing conditions during the fall.

Figure 1. Effect of nitrogen application rate and date on dry matter forage yield of stockpiled tall fescue in SE Ohio.

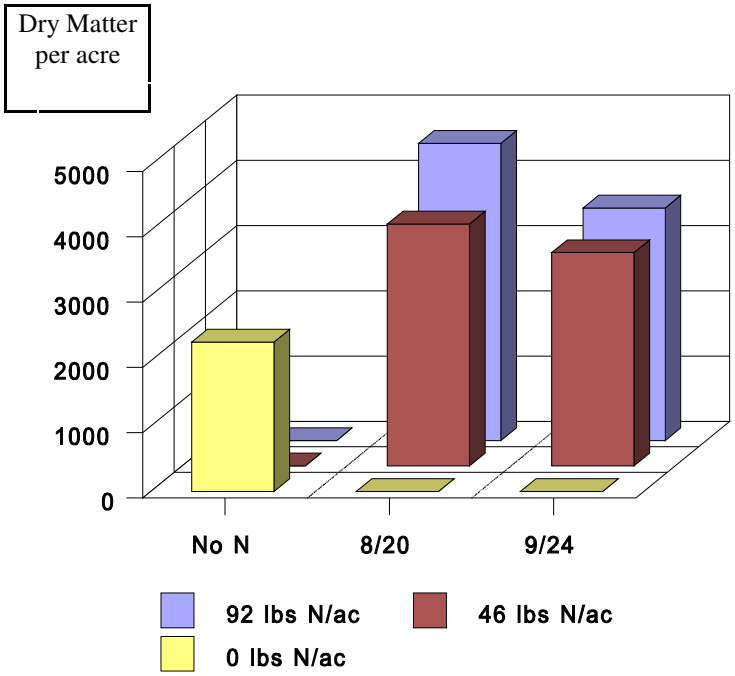

Table 2. Effect of nitrogen application date on crude protein (CP) and acid detergent fiber (ADF) concentrations in stockpiled tall fescue forage in SE Ohio.

	% CP			% ADF		
Application Date	11/3	12/20	2/11	11/3	12/20	2/11
8/20	14.4	10.9	10.2	33.1	36.5	40.3
9/24	17.3	11.3	11.8	30.0	34.6	38.9

Nitrogen Rate

Stockpiled fescue yield and quality are also influenced by the rate of nitrogen applied. In southeastern Ohio, nitrogen application improved forage yield (Figure 1) and quality (Table 3) compared with no nitrogen. Highest forage yields were obtained at 92 lbs/acre of N (200 lbs/acre of urea); however, the additional yield improvement with applications above 50 lbs of actual N per acre is usually not great enough to warrant the additional expense.

Table 3. Effect of nitrogen application rate on crude protein (CP) and acid detergent fiber (ADF) concentrations in stockpiled fescue forage in SE Ohio.

	% CP			%ADF		
Nitrogen Rate (lbs/ac)	11/3	12/20	2/11	11/3	12/20	2/11
0	9.4	8.4	7.2	35.6	36.2	44.6
46	14.0	10.3	10.5	32.4	36.9	39.8
92	17.7	12.0	11.5	30.7	34.2	39.4

If fescue pastures are high in summer annual grasses, such as crabgrass or foxtail, nitrogen efficiency for tall fescue growth will be low. The summer annual grasses that are growing vigorously in August have the potential to utilize the available nitrogen, leaving little for the fescue. The summer annuals die with the first killing frost, leaving very poor quality feed while the nitrogen is immobilized (unavailable) in the slowly decaying weeds. Therefore, nitrogen fertilization for stockpiling should be limited to pastures with a vigorous fescue sod that are relatively free of summer annual grassy weeds. Aspect also plays a role in choosing the field to stockpile. Choose a south/southeasterly slope which receives adequate warmth and sunlight during the winter months.

When applying nitrogen in the summer, keep in mind that some forms are subject to surface volatilization resulting in loss of available nitrogen to the plants. Ammonium nitrate is an excellent form to use because surface volatilization losses are minimized. Urea is a cheaper source of nitrogen, but the nitrogen can be completely lost under conditions favoring volatilization. Liquid nitrogen solution (28%) is usually made up of urea and ammonium nitrate, so the urea portion is subject to volatilization losses. Volatilization losses from urea-based fertilizers are reduced by application to a dry surface (evaporating water increases loss of ammonia). It is best to apply urea fertilizers just before a minimum of 0.5 inch rainfall so the nitrogen is washed into the soil. Do not use urea if the pasture has been surface limed within the past three months. For more information on nitrogen forms and volatilization losses refer to Agronomy Facts AGF-205, available through county Extension offices.

Pasture Legume Density

The need for late-summer nitrogen application on fescue clover pastures should be evaluated in terms of the forage needs of each specific operation. Forage legumes can be used to economically improve forage yield and quality of tall fescue pastures. Red clover is an excellent legume species to frost seed or no-till seed every two years into existing tall fescue stands. Annual lespedeza is also an option in southern Ohio. Introducing legumes into tall fescue can reduce the need for nitrogen fertilizer, improve forage quality, and dilute the toxic effects of endophyte-infected tall fescue. Research in Maryland has demonstrated greater animal gains on fescue-clover pastures in the fall compared with pure tall fescue fertilized with nitrogen. But nutritive value of a legume-dominant sward will deteriorate more rapidly with freezing temperatures than a fescue dominant sward; therefore, stockpiled tall fescue-clover stands should be grazed earlier than pure tall fescue. Late-summer nitrogen applications on fescue-clover pastures can be used to increase carrying capacity by stimulating more tall fescue growth that will be available for grazing well into the winter months. Missouri research demonstrates that red clover persists well in fescue pastures receiving late summer nitrogen applications, provided nitrogen is not applied in the spring. In addition, Missouri's research has indicated that a pasture composed of 50 percent legume dry weight responded the same as applying 60 units of nitrogen to stockpiled pastures.

Grazing Management

Grazing management is critical to efficient utilization of the forage. Managed grazing of stockpiled tall fescue in the winter will provide a good economic return because winter is the highest feed cost time of the year. Livestock turned into a large pasture area will waste 60 to 70 percent of the forage due to trampling and manuring of uneaten forage. Restricting access to a three day supply of forage will likely double the number of grazing days. The following example will demonstrate how to calculate grazing days per acre for a field with 4000 pounds of dry matter stockpiled. A 1200 pound dry beef cow will need approximately three percent of its body weight per day or 36 pounds per day. If grazing management is poor, approximately 35 percent of 4000 pounds or 1400 pounds is available for feed. This provides grazing for 39 days. If grazing is managed to achieve 70 percent utilization, then 2800 pounds of dry matter will be available, or 78 grazing days.

Forage yield and quality of the stockpiled fescue will decrease as the winter progresses. In late fall and early winter, nutritive value may be adequate to support good growth rates of weaned calves or stockers, but it rapidly becomes more appropriate as a dry cow feed. Crude protein levels may not decrease greatly, but total energy will decrease significantly from November to March. If there is a difference in length of stockpiling period among pastures, begin grazing the oldest material first before it becomes too deteriorated. If some areas have a significant amount of red clover, graze them early as well because red clover deteriorates more rapidly after frost than tall fescue.

Supplementation

Stockpiled tall fescue forage is likely to become deficient in some nutrients as the winter progresses. It may be necessary to provide supplemental energy and protein in late winter and

early spring for animals with higher nutrient requirements. Mineral supplementation is normally recommended for animals grazing dormant forages. Monitor animal body condition and forage analysis of stockpiled pasture and any hay being fed to determine the need for additional supplementation.

The Cost of Fertilizing Pastures

The cost of commercial fertilizers has risen dramatically since last year. Many forage producers are asking how much can I invest in my fertility program?

Locally we are currently paying:

Urea 46-0-0	$250/ton/bulk
Ammonium Nitrate 34-0-0	$285/ton/bag

The question becomes, with these prices can I afford to apply N when stockpiling a grass/legume stand? To put on 50 units of nitrogen at these prices it would cost:

Urea 108 lbs./ acre
18.51 acres/ton
$13.50/ acre
$6/ton spreading ÷ 18.51 = .324 spreading cost/A
total cost $13.82/acre

Ammonium Nitrate 147 lbs./ acre
13.6 acres/ ton
$20.95/ acre
$6/ton spreading ÷ 13.6 = .44 spreading cost/A
total cost $21.39/ acre

Can you recoup this cost when stockpiling? The answer to this question depends on what value you put the extra forage generated by stockpiling.

If hay is worth $30/ton then you would need to generate the following amounts of forage for the above-mentioned nitrogen sources.

Urea
$13.82 cost/ Acre
$30 ton value
= .46 tons or 921 lbs./ Acre

Ammonium Nitrate
$21.39 cost/ Acre
$30 ton value
= .7 tons or 1400 lbs./ Acre

In grazing or feeding forage a percentage of the roughage is wasted. We have not accounted for these losses. The more intensely you graze the more efficient you are at harvesting available forage. In addition, stockpiled forage (fescue and orchardgrass) has a higher relative feed value than the same unfertilized grass. Finally, can we produce this amount of forage with these nitrogen sources?

Stockpiling typically results in an additional 1000-2000 lbs. of dry matter/ acre. Since we're not adjusting for dry matter we'll be conservative and say we expect an additional 1200 lbs. dry forage per/acre. If it costs $20/acre to obtain this level of production then:

$$\frac{\$20 \text{ cost}}{.6 \text{ tons of forage}} = \$33/\text{ton is the breakeven}$$

If we value this extra forage at $33/ton then the practice will pay off. If we can purchase comparable forage significantly cheaper then stockpiling becomes uneconomical. Again we have not adjusted for improved forage quality or labor, however, N application for stockpiling appears to be economical.

Let's look at the cost of applying fertilizer to build up fescue. Consider a fall price for urea was $234.83 per ton. To rent a buggy spreader, it will cost you an additional $5 per ton. If we decide to build up 20 acres of fescue at 50 lbs. N/A, what would the cost be?

109 lbs of urea x .46 (% nitrogen in urea) = 50 lbs.
20 acres x 109 lbs. of fertilizer per acre = 2180 lbs. of urea

2180 lbs. of urea costs us approximately $256. The cost per acre would be $12.80. At this cost, you have forgone the expense of labor, fuel, etc. Spreading cost is approximately $5. per ton.

In southeastern Ohio, fall stockpiled fescue has produced more than a ton of additional forage per acre when compared to no fertilization. Therefore, if we are able to produce an extra ton of forage per acre worth approximately $70 per ton:

20 acres x $70 per ton of additional forage = $1400 worth of forage

Total costs: $1400 worth of forage
-261 cost of fertilizer & buggy
$1139 approximate value of forage

If we assume 70% utilization of the forage, then our net value is $797.30.

Management of stockpiled tall fescue is a key to cutting feed costs. Restrict access to a three day supply of forage for November grazing. In early fall the nutritive value of stockpiled fescue will most likely support weaned calves and stockers, but as winter progresses it becomes more suitable for dry cows. Mineral supplement is recommended for all animals grazing dormant forages.

On September 4, 1997 two plots of tall fescue were selected to study at the Eastern Ohio Resource and Development Center the effects of stockpiling on forage quality. Each plot measured twenty by twenty feet. The last harvest of hay on the plots was July 31, 1997. Treatment of 50 lbs. per acre actual nitrogen was applied to a plot selected at random and the other plot received no fertilization. The fescue plot was fertilized Sept. 4.

January 7, 1998, each plot was forage tested at the Ohio State University Research Extension Analytical Laboratory. The fertilized pasture plot crude protein content was 10.5% on a 100% dry matter basis and the unfertilized plot tested 8.2% crude protein.

Stockpiling tall fescue not only provides for additional forage, but may also result in a forage of higher nutritional quality. Let's consider the nutritional needs of a 900 lb. two-year-old heifer nursing calves – first 3 to 4 month postpartum; 10 lb. milk per day. Daily requirements are (as a percent of DM):

Dry matter intake	19.2 lbs.
Crude protein	10.4%
TDN (total digestible nutrients)	68.5%

To meet the crude protein requirements of this heifer on our unfertilized pasture (8.2% CP), we would need to feed approximately 1.054 lbs. soybean meal (SBM), 50% crude protein (CP) per day. If we feed this heifer for the next 60 days an extra 1.054 lbs. SBM per day, we would have fed 63.24 lbs. SBM. One hundred heifers on this program will need 6324 lbs. of SBM. If SBM costs $236 per ton, then we would spend $746.23. For the same animal on our stockpiled fertilized pasture (10.5% CP), we would not need supplemental soybean meal. However, each diet would need to be supplemented to meet the TDN requirements.

Scenario:

	Crude Protein Supplement Cost of Unfertilized Fescue			
	CP in forage	CP in ration	¢/heifer day	$/100 heifer 60 days
Stockpiled fescue	10.5	10.4	0	0
Unfertilized fescue	8.2	10.4	.124	$746.23

Summary

Stockpiled tall fescue is an economical source of feed for beef cow herds and sheep in late fall and winter. Fields used for stockpiling should be well-drained to decrease the problems with mud during the winter grazing period. Where possible, use stands that are endophyte free. Improved varieties of endophyte free tall fescue stockpile as well as older endophyte- infected stands. Also choose areas that provide good shelter, preferably with a southeast exposure. Hay or other stored feed should be available, especially during periods of extreme cold, heavy snow, and ice storms.

Winter-grazing provides savings in feed and labor costs in caring for animals when good management practices are followed. Selecting the right combination of date of last summer harvest, nitrogen rate, and nitrogen application date helps the producer tailor tall fescue yield and quality to the animals' nutritional requirements.