Forage News
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Developing a Forage Management Strategy to Maximize Fall and Winter Grazing

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As the fall approaches, many Mississippi cattlemen are gearing up for winter and the additional feeding that is needed. The winter feeding period in Mississippi may be as long as 100 to 120 days and may account for more of the actual feed costs than grazing the rest of season. Some producers may extend the grazing season by using stockpiled perennial forage (tall fescue, bermudagrass, and bahiagrass) while others depend heavily on winter annual forages such as annual ryegrass and small grains (oats, rye, and wheat). These forages have the potential to decrease the number of days that hay has to be fed, hopefully reducing winter feeding costs. Using winter annuals could reduce production and labor cost during the winter period by up to 30% when compared with conventional winter hay feeding programs for beef cows. In a grazing environment, rotational grazing might require about three hours/acre/year versus hay production which requires seven hours/acre/year. Producers who graze livestock during the winter need to understand techniques that may provide for the optimization of their resources, provide consistent, high-quality forage, and provide soil conservation.

Assessing Soil Resources

Soil nutrient management is an important part of pasture management. The first step is to assess the soil's nutritional status and this involves determination of soil fertility (level of nutrients) and soil pH (acidity). Fertilization and/or lime applications may be needed. Low fertility and pH will reduce the persistence of legumes. It is recommended that soils be tested about six months before planting winter annuals. Matching the soil's fertility and drainage is critical to a successful pasture system for the winter. Phosphorous levels should be maintained at 70 lbs P/ac and potassium levels should be maintained at or above 150 lbs K/ac (K application will depend on soil cation exchange capacity). Be aware that high levels of potash in combination with low levels of magnesium can cause grass tetany in the spring.

The date and rate of nitrogen fertilizer application can influence yield and quality of the winter annuals. An annual ryegrass study at University of Missouri with different nitrogen application dates (autumn, spring, or both) and rates (0, 50, 100, 150 lb N/ac), indicated that while the highest N rates provided the greatest yields, the application of 50 lb N/acre in autumn followed by 50 lb N/acre in early spring produced an even distribution of yield, and gave the best economic response (Kallenbacht al., 2007).

Fertilizer comprises the largest percentage of planting winter annuals ranging from 74 to 88% of the total variable expenses. The common nitrogen (N) fertilizers are anhydrous urea (46% N), solutions of ammonium nitrates and urea (32% N), ammonium sulfate (21% N) and urea ammonium sulfate (33-0-0-S) (33% N). Diammonium phosphate (DAP) (18-46-0) is typically an inexpensive source of nitrogen if you need the associated phosphorus. Winter grazing has become more expensive because of fertilizer prices and carefully determining the fertilizer source has become very important. Blended mixtures are not always the most economical sources of nitrogen and they should not be used unless they are meeting the soil nutrient recommendations for P and K (**Table 1**). Producers should consider soil testing as an essential management tool and avoid blanket applications.

Many producers are reluctant to apply nitrogen, believing that the percentage of legumes will be reduced the next season. While this is true for spring-applied nitrogen, it is not true for fall nitrogen applications. Already established perennial clovers such as white clover contributes some nitrogen

during the fall to annual cool-season grasses that are sod-seeded, but their growth and nitrogen production slows down during summer time, and is not a good source of nitrogen at the establishment time of winter annuals. Small nitrogen rates (25 to 30 lb/ac) will help to establish the winter annuals. Apply nitrogen even when you have up to 30% of the stand composed of legumes. If the stand is over 30% legumes, nitrogen should be used during the fall rather than saved for winter. A balanced fertility program can provide a balanced diet to the grazing animals. Contact your local County Extension office for details on how to collect a soil sample.

Table 1. Economic analysis of using different fertilizer combinations. It assumes a medium soil test level for P and K with a pH of 6.0 and a fertilization recommendation of 60-30-30.

Fertilizer Strategy[1]	Price ($/ton)[2]	Lbs of Product/acre	Price ($/acre)
Blended Fertilizer[3]			
13-13-13	$385.00	462	**$88.94**
17-17-17	$480.00	353	**$84.72**
Mixed Fertilizer			
Urea (46-0-0)	$340.00	104	$17.68
DAP (18-46-0)	$440.00	65	$14.30
Potash (0-0-60)	$690.00	50	$17.25
Total		**219**	**$49.23**
Poultry Litter[4]			
3-3-2	$40.00	2500	**$50.00**

[1]**NOTE:** The fertilizer types and names mentioned in this publication are for management purposes only. No direct endorsement of these products is intended. Other products containing similar nutrient composition may provide similar levels of plant available nutrients based on soil test recommendations.
[2]Always check with your fertilizer dealer or local coop for up-to-date fertilizer prices.
[3]Applications are based on N requirements.
[4]Assumes 80% DM of the poultry litter. Keep in mind that approximately 50% of the total N will be available the first year of application. A nutrient analysis is recommended to determine proper nutrient distribution in the poultry litter.

Determine Limiting Forage Factors

If your forages are unproductive soil fertility, pH, or topography may be limiting factors. It also is important to do a forage inventory to maintain the number of animals for the winter grazing. A forage resource inventory includes total acreage, field locations, and the forage production in those fields. Land that is steep, frequently wet, or frequently dry may not support a wide range of forage species. Planting persistence species will be a more important factor for these areas (**Table 2**). Establishment is best achieved by the use of a grain drill equipped with packer wheels, set to a one-inch planting depth. Another satisfactory method is to broadcast the seed followed by a shallow disking or harrowing and cultipacking.

Forage quality would be an important factor on grazing management. This is a good opportunity to add a clover to your winter annuals. White, red, arrowleaf, crimson, subterranean, berseem, and ball clovers are all adapted to certain areas of Mississippi and add quality to permanent pastures. Clovers increase pasture quality and reduce the amount of commercial nitrogen needed by the grass, particularly in the late winter and spring. When selecting an annual cool-season grass, keep in mind when it will be more needed—early fall grazing or winter grazing. Also, if sod-seeding, it is important to plant early maturing varieties of winter annual grasses to reduce competition with warm-season grasses in late spring.

Match the Cattle to the Forage: Assessing Animal Factors

The animal's current nutrient requirements must match the type and stage of production of your forage. You should be able to match stocking rates with current forage dry-matter production. Forage nutrient levels need to be evaluated in terms of the animal's nutrient requirements and the stage of production. It may be cheaper to use hay with proper supplementation for older cows, while weaned calves and growing heifers might use the high quality grazing most efficiently.

Table 2. Characteristics of winter annuals and clovers.

Forage	Tolerance to[1]			
Winter Annual Grasses	**Soil Acidity**	**Poor Drainage**	**Drought**	**Grazing**
Annual ryegrass	G	E	F	E
Oats	F	F	F	G
Rye	G	F	F	G
Wheat	P	P	F	G
Legumes				
Arrowleaf clover	F	P	F	G
Ball clover	G	F	F	G
Berseem clover	P	G	G	F
Crimson clover	G	P	F	F
Red clover	F	F	F	F
White Clover	F	G	P	E

[1]E = Excellent; G = good; F = Fair; P = Poor.
Source: Ball et al., 2002.

Basic Principles for Winter Grazing

Grazing livestock are very selective. When animals are provided with an entire field of stockpiled forage or winter annuals, they eat the best first and trample and waste much of the rest, contributing to a very low-quality diet during the later days or weeks of the grazing period. The percentage of wasted stockpiled forage can be as high as 70% when cows are given large areas at a time, similar to giving them free access to your whole hay supply. To improve the efficiency of fall and winter forage (stockpiled or winter annuals), use temporary fencing to divide fields into smaller units, subpastures, or narrow strips. Most forages respond best in regrowth potential to a relatively short grazing period followed by a longer rest or regrowth period. Grazing periods of 1 day to 1 week, followed by a rest period of 3–4 weeks work well for many species. This strategy stretches the forage supply over a longer period and provides more uniform forage quality.

Before starting a grazing management strategy take into consideration the following practices:

1. Select areas to be grazed based upon soil and weather conditions.
    a. Move to another area if the grass gets muddy and remain there until more dry conditions occur or use hay to supplement.
2. Give non-lactating, gestating beef cows a three- to four-day allocation of grass.
    a. This is the best balance between your labor and forage utilization.
    b. Growing or lactating cattle should be fed (move or rotated) more often.
3. Remove animals that do not adjust to this system.
    a. Animals with sore feet or animals that appear thin are culling candidates.
4. Practice rotational grazing if possible.
    a. Strip grazing might be a good strategy: Confining animals to an area of grazing land to be grazed in a relatively short period of time, where the paddock size is varied to

allow access to a specific land. Strip grazing may or may not be a form of rotational stocking, depending on whether or not specific paddocks are utilized for recurring periods of grazing and rest.

b. More uniform grazing, better utilization of available forage, less overall trampling, and more uniform distribution of animal waste.
c. If some form of rotational grazing cannot be practiced, grazing management and pasture condition should be closely monitored to prevent over-grazing, and thus less re-growth for additional grazing.
d. Creep graze calves if calf performance may justify using high quality forage for creep grazing.

5. Management for reseeding in mid-spring if annual clovers are being utilized.
    a. Grazing management may need to be adjusted to allow seed to mature for a volunteer stand the following year.
    b. Even if seed production appears to be adequate, it is a form of cheap insurance to plant at about ¼ to ½ of the normal seeding rate the following year to ensure adequate stands for maximum forage production.

Fall and spring grazing of annual ryegrass and small grains should begin when sufficient growth is available to support livestock. Fall graze only early-seeded species in a prepared seed bed. Begin grazing when six inches of growth is available and leave three inches of stubble after grazing. Heavy fall grazing increases the risk of winter kill, unless excessive fall growth is present. In the spring, graze only when fields are firm. Consider heavy, late-spring grazing when the plants are actively growing.

Table 3. Example of strip grazing program for a 30 head of 1,100 lb cows[1] on 15 acres of annual ryegrass from February 15 to May 15 (120 days)[2].

Inputs:	One ton of urea (46-0-0) fertilizer at $480/ton Apply 130 lbs/acre of fertilizer to 15 acres (60 lbs/acre of nitrogen) Fertilizer cost per acre: $67.80
Forage Production:	Assumes that after weeks of growth ryegrass is 12 inches tall (12 in x 200 lbs of dry matter per in. = 2400 lbs DM[3]) Utilization rate is 70% (2400 x 0.70 = 1680 lbs DM in 15 acres) (1680 X 15 acres = 25,200 lbs DM in 15 acres)
Estimated Number of Grazing Days:	Cattle consuming 3% of body weight per day of dry matter (1100 lb cow x 0.03 = 33 lbs of dry matter per day) (33 lbs x 30 cows = 990 lb of dry matter consumed per day 25,200/990 = 25.5 days of grazing or 5 days per acre

[1]Assumes that cows calve in the fall.
[2]Keep in mind that stocking rates might need adjustment in the spring to keep up with the rapid forage growth.
[3]DM = Dry Matter.

Adjusting Stocking Rate

Well-fertilized winter annuals can carry 600 pounds of beef per acre. This means they can carry two calves weighing about 300 pounds each or one and one-half calves weighing 400 pounds each per acre. During good spring growth, 1 acre can often carry one dairy cow. When pastures are first stocked, there may appear to be a surplus of forage, but a reserve is necessary for the cold months when plant growth is slow. Do not graze sod-seeded areas until they are well established, preferably 6 to 8 inches tall. Sod-seeded pastures provide late winter and early spring grazing. Stock them heavily in late March, April, and May to graze out the ryegrass so that it will not set back the perennial warm-season sod. If close grazing is not possible, harvest the excess forage as hay or baleage. It is important that a producer estimates forage productivity to determine carrying capacity and grazing days (**Table 3**).

Summary

Winter annuals alone or in combination with legumes are a key component to winter feeding in Mississippi. Producers should consider incorporating legumes into their winter annual pastures as ways to reduce fertilizer costs, but at the same time as an avenue to improve forage quality and reduce their dependence on hay or commodities. Remember that knowing the soil nutrient status and matching it to the forage nutrient requirement is a cost saving step in grazing systems.