Forages

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Annual Winter Pastures for East Texas

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Warm-season perennial grasses dominate most of the pastures in East Texas, but climatic conditions allow for use of cool-season annual grasses and legumes, either overseeded or in prepared seedbeds, in the fall for winter and spring grazing. Reasons for use of cool-season annual forages include extending the grazing period and improved animal performance due to their high nutritive value. Although cool-season annual forages can be expensive to plant and grow, they can be a less costly substitute for energy and protein supplements purchased off the ranch.

Species, Varieties and Seeding Rates

Ryegrass

Annual ryegrass, a high-yielding, nutritious grass, is the most widely grown cool-season annual forage in the southern and southeastern USA. It is adapted to most soils and tolerant of wet, poorly drained soils. Ryegrass is very responsive to N fertilization with the peak growth occurring during the spring. Ryegrass produces forage that is high in nutritive value, and thus, provides excellent animal performance. Ryegrass also tolerates close grazing, although if repeatedly grazed too closely, growing animal performance will be reduced. When overseeded on warm-season grasses, producers must be prepared to utilize the rapid spring growth, otherwise it will significantly delay the subsequent warm-season grass growth.

Pure stands of ryegrass should be seeded from 25 to 30 lb/acre. There are several varieties of ryegrass adapted to East Texas. The 3-year average forage yield results of the ryegrass variety trial conducted at the Texas A&M Agricultural Research and Extension Center-Overton TX are shown in Table 1.

Table 1. Three-year average (2001-02 to 2004-05) dry matter yield of annual ryegrass at Overton, TX (Nelson and Crowder, personal communication)

Variety	Yield (lb./ac)
Jumbo	7474
Prine	7358
Marshall	7126
Ed	7067
Jackson	6744
Brigadier	6570
TAM 90	6556
Passeral Plus	6552
Gulf*	6375
WD-40	6256
Ribeye	6200

Annual fertilization 244 lbs./ac. of N, 131 lbs./ac. of P_2O_5 and 131 lbs. ac of K_2O.
* 2 year average 2001-02 and 2002-03

Small grains

Small grains are usually mixed with annual ryegrass to improve late autumn and winter forage production. Small grains are more productive from late autumn to mid-February than annual ryegrass. Small grains are high in nutritive value and provide good animal performance over their growing

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season when grazing is managed to keep the small grains in the vegetative stage of growth. When mixed with annual ryegrass, the mixture provides the longest grazing season and the highest level of forage production. Small grains provide the majority of the forage production from November to February and ryegrass will predominate from March to late May. Small grain seeding rates used in East Texas ranges from 90 to 100 lb/acre when planted in pure stands or mixed with annual ryegrass.

Rye (cereal rye; *Secale cereale* L.) is the most winter hardy of the small grains and is well adapted to sandy soils. Rye produces grazable forage earlier after seeding; however, it is also the earliest maturing. The most widely planted rye varieties in East Texas are Maton, Oklon, Elbon, and Bates.

Wheat is similar to rye in forage yield but somewhat less cold hardy and several weeks later in maturity. Wheat is more adapted to loam-clay soils and is used in the northwest and north-central part of the State. In addition, wheat is commonly used as a dual purpose crop for both forage and grain. Among the varieties planted in East Texas are Sisson, Roane, Pioneer 25R57, and Pioneer 25R78.

Although oat will provide earlier fall grazing and more forage in warm weather than rye and wheat, it is the least cold hardy of the small grains, and in some years stand loss from severe cold greatly reduces forage availability. Oat matures several weeks later than wheat. The primary growing area is central Texas and south Texas. The most planted varieties are Dallas, Chapman, and Heavy Grazer 76-30.

Clovers

Cool-season legumes make most of their growth in the spring when temperature and rainfall are favorable. Most of the legumes adapted to East Texas are annual legumes and should be reestablished from seed each fall. Some clovers such as arrowleaf, ball, rose, and white clover (a true perennial that acts like an annual in much of Texas) produce a high percentage of hard seed which allows them to reseed if managed properly. Cool-season legumes are high in nutritive value and when grazed by beef cattle provide excellent animal performance. Cool-season legumes can be grown in mixtures with annual ryegrass. The ryegrass provides earlier grazing and decreases potential bloat caused by legumes. Mixtures of clovers and small grains are not usually recommended because the faster autumn growth of small grains shades the clover seedlings and decreases clover stands and production.

Clovers are an attractive option to decrease the production cost associated with N fertilization because legumes have the ability to fix atmospheric N. Annual clovers can contribute about 75-100 lbs N/acre for the subsequent grass crop. They are, however, only able to fix N from the air if specific strains of *Rhizobia* bacteria are present in nodules on their roots. To ensure that the best strain of *Rhizobia* is present for each clover species, the seed must be inoculated with the proper *Rhizobia* strain before planting. Pre-inoculated seed of most legume species is available. The majority of N in legumes is transferred to the soil by unused plant material that is returned to the soil and by grazing livestock that return over 90% of the consumed nutrients to the soil through the feces and urine. If the clover crop is removed from the pasture as hay, haylage, or silage, the legume N contribution is reduced.

Because cool-season legumes are more site-specific than grasses, producers must know their soil type and select the best adapted legume species. Clover species grown in East Texas, their preferred soil requirements, plants characteristics, and recommended seeding rates are shown in Table 2.

Planting Date and Establishment

The general recommendation is to overseed cool-season annual forages from 4 to 6 weeks before the average first killing frost. Cool-season grasses are planted in East Texas from mid-September through October. Optimum planting date is early October but will vary with location and type of winter pastures. Correct timing for cool-season annual forage establishment cannot be over-emphasized. If planted too early, warm temperatures and the competitive nature of the warm-season perennial grass sod can result in stand failure; if seeded late, cool temperatures retard autumn yield.

Table 2. Preferred soil characteristics and plant characteristics and seed rates for different clover species in East Texas

Clover Species	Preferred Soil Characteristics			Plant Characteristics				Seeding rate (lb/ac)
	pH	Texture	Drainage	Maturity	Bloat Potential	Reseeding Potential	Cold Tolerance	
Arrowleaf	6.5-7.0	sandy, loam	good	late	low	high	good	8-10
Ball	6.0-7.5	loam, clay	fair	medium	high	high	good	2-3
Berseem	6.5-8.5	loam, clay	poor	medium	low	low	poor	12-16
Crimson	6.0-7.0	sandy, loam, clay	good	early	medium	low	good	16-20
Persian	6.0-8.0	loam, clay	poor	medium	high	medium	fair	6-8
Red	6.5-8.0	loam, clay	good	late	low	low	good	10-12
Rose	6.0-8.0	sand, loam, clay	good	early-medium	low	high	good	12-16
White	6.0-7.5	loam, clay	poor	late	high	high	good	3-4

Adapted from Evers (2005)

Overseeding cool-season forages on a warm-season perennial grass sod has been an attractive option for cow-calf producers in East Texas. Overseeding cool-season forages on warm-season grass sods (bermudagrass, bahiagrass, dallisgrass, etc.) provide firm footing for livestock during wet conditions and helps optimize the use of warm-season perennial grass pastures. Grazing of winter forages overseeded on grass sods starts usually two to three months later than that planted in a well prepared seedbed. The warm-season grasses should be grazed short or removed as hay before overseeding. Beginning with a short sod in the establishment phase helps to minimize warm-season perennial grass competition and allows seed to more readily come in contact with bare soil. It is, however, generally not a good strategy to overseed hay meadows if a first harvest of spring grass hay is of economic importance because winter forages will retard warm-season grass growth. Another practice to reduce the warm-season grass competition and provide earlier grazing is a light disking about 1 to 2 inches deep on sandy soils. This practice provides some bare soil that enhances seed-soil contact and sets the warm-season grass back, decreasing the warm-season grass competition; however, spring recovery will be slower than if the warm-season grass was not disked.

Planting cool-season forages with a drill is usually better than broadcasting. More of the seed is placed at the proper depth. When broadcasted, the seeding rates should be increased 25 to 30% to compensate for fewer seed becoming established plants. Small grains should be planted from 1 to 1.5 inches deep, and ryegrass and clovers should be planted approximately 1/8 to 1/4 inch deep. Ball and white clover have very small seed and should be broadcast on the soil surface and rolled.

When using a drill, small grains and ryegrass should be placed in different seed boxes, if possible, to allow placing the seed at appropriate depths. If small grains are broadcasted on a disked sod, the area should be lightly disked again to cover the seed with approximately 1 to 1.5 inches of soil. Ryegrass and most of the small-seeded clovers can be broadcasted on the soil surface followed by some type of drag to increase the contact between seed and soil. Rolling a disked seedbed after planting is a recommended practice because it increases the seed-soil contact and moisture retention in the soil, resulting in better seedling establishment.

Fertilization

The selection of planting site, soil test, and liming should be done in the spring before planting winter pastures in the fall. Small grains and ryegrass grow well on soils with pH from 6.0 to 6.5 but clovers species differ in soil pH requirements (Table 2). Phosphorus and potash fertilization for cool-season forages should be based on soil test recommendation and fertilizer should be applied at planting or after emergence, except for phosphorus, which should be applied several weeks ahead of the anticipated planting date.

Nitrogen fertilization of overseeded small grain-ryegrass is usually split in three to four applications of 50 to 60 lbs/acre each. The initial N application should be delayed until after the small grain-ryegrass is established and cool temperatures have reduced warm-season grass growth, thus reducing N utilization by warm-season grasses. Additional N is applied about every 6 weeks.

Clovers and clover-ryegrass mixtures should not receive any N or only one N application to enhance ryegrass production after the first frost. If N is applied to a clover-ryegrass mixture, research from the Overton Center suggests that only 50-60 lbs of N should be applied in late December or early January. If additional N fertilizer is applied, the amount of N fixed from the air is decreased and competition from ryegrass and/or weeds with the clover increased.

Ammonium nitrate is the preferred source of N fertilizer over urea and ammonium sulfate in East Texas. Although urea is usually the most economical fertilizer per pound of N, there is greater N loss by volatilization when applied to the soil surface. Ammonium sulfate is the least desirable source of N fertilizer for East Texas because it increases soil acidity two to three times that of ammonium nitrate or urea.

Grazing

In general, cool-season annual forages have high nutritive value averaging 70-80% TDN and 20-25% CP, thereby meeting or exceeding the nutrient requirements of all classes of beef cattle. Although winter pastures provides forage that is high in nutritive value, establishment and maintenance costs are relatively high. Therefore, winter pastures containing small grains should be carefully used to maximize the return on the investment. While spring-calving cows may only require the use of ryegrass or clover systems, small grain winter pastures should probably only be used in the case of fall-calving cows or winter stocker cattle programs. Also note that winter forage production with small grains-ryegrass pastures is about a third of the spring production; therefore, stocking rates will likely have to be adjusted according to forage availability.

Research done by TAMU-Overton TX has shown that steers grazing rye-ryegrass pastures at stocking rates of 650 to 800 lbs liveweight/acre during the fall-winter and 1500-2000 lbs liveweight/acre during the spring, gained 2.5 lb/d. Most winter pastures in East Texas are primarily used by cow-calf operations. A 7-year average of clover-ryegrass and cow-calf responses to multiple stocking rates at TAMU-Overton TX showed suckling, fall-born calves average daily gain of 1.94, 2.75, and 3.2 lbs/day respectively at stocking rates of 2.13, 1.31, and 0.82 cow-calf pairs (1500 lbs liveweight) per acre.

Cool-season annual pastures can be used as a source of protein for beef cows. During the winter, cows can limit-graze winter forages for 2 hours/day or 4 hours every other day and the remaining portion of the diet should consist of hay. The grazing time can be increased as forage growth increases and nutritive value decreases in the spring. Supplementation of cool-season forages with protein concentrates is not recommended because of the high crude protein concentration of most cool-season species. Energy supplementation of stocker calves usually results in increased stocking rates with a small increase in animal performance.

Budgeting for Winter Pasture Establishment

An important part of the planning for any agricultural enterprise is to estimate costs of production. Listing some major inputs should help show a budget's value in winter pasture planning. The major items involved in winter pastures cost are listed in Table 3. In general, N fertilizer accounts for 45% of the

small grains-ryegrass production cost. On clover-ryegrass pastures, no N or a single application of about 60 lb/ac applied in December results in lower input costs. The clover-ryegrass system, however, has a shorter grazing season and is less productive than a small grain-ryegrass system but should be less costly to fertilize.

Table 3. Estimated production costs breakdown for small grain ryegrass pastures establishment

Item	Cost Participation (%)
Cash expenses*	
Lime	5%
N	45%
Phosphorus	5%
Potash	5%
Seed	15%
Custom planting	10%
Hired labor	5%
Total cash expenses	**85%**
Interest on cash	
Interest	10%
Fixed Costs	
Fences, Water tubs, etc	5%
Total interest and FC	**15%**

*The rates of lime, phosphorus, and potash should follow soil test recommendation

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