Texas Agricultural Experiment Station
Texas Agricultural Extension Service
The Texas A&M University System

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Annual Winter Pasture Establishment, Management and Utilization

Winter pastures provide the highest quality forage that can be grown in the eastern half of Texas. They include small grains, annual ryegrass, and cool-season legumes such as clovers. Grazing of winter pastures can extend from November through early June depending on location, varieties used, planting method and planting date. The type and amount of winter pasture should be planned carefully because of the expense associated with land preparation, seed, and fertilizer. The class of animal (lactating dairy cows, stockers, replacement heifers, cows nursing calves, or dry cows) will determine which type of winter pasture will be the most profitable.

Site selection

Wet, cloudy weather during the winter months usually results in bogging problems when winter pasture is planted on a well prepared seedbed (disked 3 to 6 inches deep). This is a major problem in southeast Texas where the level soils have poor surface and internal drainage. The best drained pasture on the ranch should always be selected for winter pasture. Overseeding winter pasture on a summer grass sod (bermudagrass, bahiagrass, dallisgrass, etc.) will help provide firm footing for livestock. However, overseeded winter pasture is usually two to three months later than that planted in a well prepared seedbed. A combination of prepared seedbed and overseeded pasture is best. The prepared seedbed could be grazed first since it will provide earlier grazing.

Livestock could be moved to the overseeded pasture during wet periods when bogging is a problem on prepared seedbeds.

Species and variety selection

Oats, barley, wheat, rye, triticale, and annual ryegrass are the annual grasses used for winter pastures. Rye is the most cold tolerant followed by wheat, barley, ryegrass, and oats (Table 1). Rye is the earliest to mature followed by wheat, barley, oats, and ryegrass. Ryegrass will provide four to six weeks extra grazing in the spring due to its later maturity. Therefore, ryegrass is the most productive (Table 1). However, location, unusually cold temperatures, or dry conditions during different times of the growing season can alter the species ranking in production. Variety trial data are reported annually in *Forage Research in Texas*.

Forage legumes such as clovers and vetch are also used for winter pasture. The advantages of a legume are that it doesn't require nitrogen (N) fertilizer since it can remove N from the air and it is very high quality forage. The disadvantage of cool-season legumes is that 75 to 90 percent of the total forage production does not occur until spring. For this reason ryegrass or small grains are mixed with the clover to provide earlier forage production. Legume species, seeding rate, and areas of adaptation are reported in Table 2. A more detailed discussion of the grass species follows.

Oats. The advantages of oats include: early fall grazing, high average daily gains, excellent tillering, high forage quality, ability to germinate in limited moisture, and excellent hay. Disadvantages

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include: poor cold tolerance which limits winter forage production, poor drought tolerance after establishment, and susceptibility to leaf diseases. Oats are usually grown in a mixture with other small grains or ryegrass to reduce the risk of these problems. Oats seeded at a heavy rate will provide the earliest fall grazing of any of the small grains in southeast Texas. Excellent tillering ability promotes good production, even in poor stands. Oats maintain higher forage quality with maturity than other small grains and are also more palatable than other small grains. Oats are adapted to deep loams and sandy loam soils, but do not perform well under extreme wet or dry conditions. Oats are seldom planted in northeast Texas because of poor cold tolerance.

Table 1. Comparison of small grains and annual ryegrasses

Species	Maturity	Cold Tolerance	Overton[1] Yield	College Station[2] Yield
Rye	1	1	4600	6800
Wheat	2	2	3300	5200
Oats	3	4	5500	5800
Ryegrass	4	3	8300	7100

[1]Three year average, L. R. Nelson, Overton.
[2] Three to four year average, D. H. Bade, S. Simecek, and M. Hussey, College Station.

Wheat. Wheat can be used for both grazing and grain production in Texas. Advantages of wheat are good cold tolerance, drought tolerance, and autumn and winter production. Wheat is usually included in the small grains mixture when the price of rye or oats is high and wheat is cheap. Disadvantages are the least productive of the cool-season annual grasses (Table 1) and low disease tolerance. Wheat is adapted to soils ranging from deep loams to sandy loams.

Barley. Barley does not produce as high quality forage as wheat or oats. Its use, therefore, is restricted. It is more drought tolerant than wheat or oats, and more tolerant of saline (salty) soils than the other small grains. Barley's growth pattern is similar to oats. The normal awn of barley is barbed, and causes severe

Table 2. Winter legumes, seeding rates, and areas of adaptation in eastern Texas.

Species	Seeding rates (lbs/acre)	Comments
Arrowleaf	8 - 10	Does best on well-drained soils in northeast Texas, virus and insect problems are becoming more widespread.
Ball	2 - 3	Used on sandy soils in northeast Texas, poor early growth, but a good reseeder.
Berseem	12 - 16	Does well in river bottoms and soils with pH of 6.5 to 8.0; not recommended for the northern third of the state because of poor cold tolerance.
Crimson	16 - 20	Sandy soils, best early forage production; does well from I-10 north.
Hairy vetch	35 - 45	Good seedling vigor; adapted to wide range of soils; poor regrowth after defoliation.
Persian	6 - 8	Limited to river bottoms and poorly drained soils; high bloat potential.
Red	10 - 12	Late maturing; grows through June if moisture available; prefers loam and clay soils; poor early growth; no reseeding.
Rose	12 - 16	Adapted to clay, loam, and sandy soils that are well drained; poor early growth; good reseeder.
Subterranean	16 - 20	Sandy loam to clay soils with good moisture holding capacity; not adapted to deep sands; better earlier growth than crimson near I-10 and south; reseeding variable.
White	3 - 4	Best adapted to wet loam and clay soils in southeast Texas; limited to creek and river bottoms in northeast Texas.

irritation to animals when eaten. Only awnless, hooded, or smooth awn varieties should be planted for hay or grazing.

Rye. Cereal rye is the most drought resistant and cold tolerant cool-season annual grass. It has an extensive root system, makes rapid growth in the fall (Fig. 1) in northeast Texas, and provides the most winter forage production. The early maturity of rye in late February to early March limits total production for the season (Table 1). Rye becomes unpalatable at the boot stage. Rye prefers a well-drained loam to sandy soil and is used extensively in northeast Texas mixed with ryegrass. The grain of rye can become infested with ergot which is poisonous to livestock.

Ryegrass. Annual ryegrass is the most popular cool-season grass (with over 800,000 acres in Texas) because it is easy to establish. Ryegrass seed does not have to be planted in the soil as small grains do. Successful stands can usually be obtained by broadcasting the seed on a summer grass sod in mid to late October. Early and total forage production is greater if ryegrass is drilled in a prepared seedbed in late September. Overseeded ryegrass is a low cost winter pasture because land preparation is not necessary, seed cost is less than small grains, seed can be mixed and applied with the initial fertilizer application, and its later maturity extends the grazing season into May. However, grazing may not be available until January in souththeast Texas and February in northeast Texas.

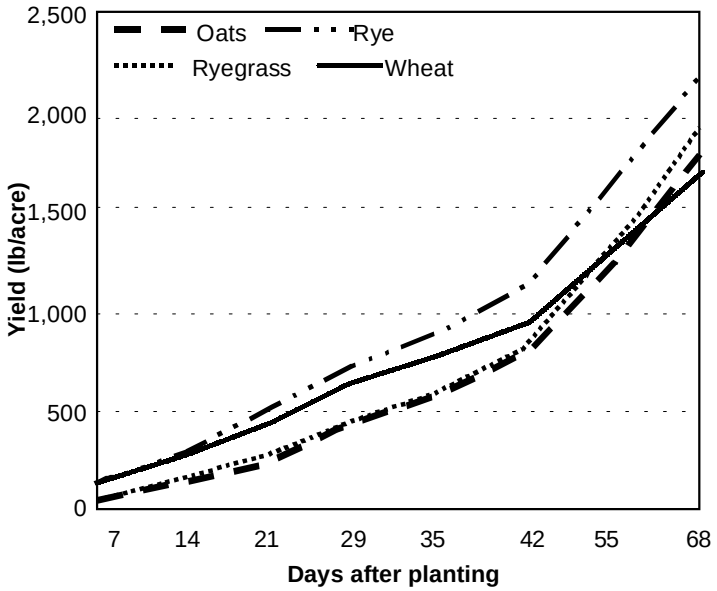

Figure 1. Comparison of rye, wheat, oat, and ryegrass autumn growth at Overton, Texas

Ryegrass is the only cool-season annual grass that is adapted to poorly drained sites. Disadvantages are poor winter production and competition to the warm-season grass in late spring due to its late maturity.

Triticales. Triticale is a cross between wheat and rye in an attempt to combine the good traits of both. Certain blends have performed well. Triticales cannot be planted in a dry seedbed; and yield is usually lower than that of oats, rye, or ryegrass.

Acres to plant

Estimating how many acres to establish is dependent on class of animal and local climate. Generally, a good small grain pasture can be stocked with 600 pounds of body weight per acre (1.5 - 400 lb. calves/acre, 1 - 600 lb. calf/acre). With good moisture and proper fertilization, the stocking rate can be increased. A stocking rate of about four pair per acre should be used in estimating number of acres for limit grazing of beef cows. If grazing full time, about 1.5 acres is needed per cow. Here again, the actual stocking rate might be higher or lower depending on weather and management.

A pasture should be stocked properly in the fall so there will be a carry-over of forage into the winter when forage production is limited by cold, short, cloudy days. Proper stocking for fall and winter will result in excess forage in the spring. A producer needs to use this extra forage wisely. Additional livestock can be added in the spring or the excess growth can be harvested for hay. In any case, excess spring growth on overseeded pastures should be utilized so the warm-season perennial grass is not crowded out.

Seed supply and rates

Seed quality and rates are an important part of having a successful winter pasture program. Good seed is always a good buy. Buying nonstated varieties has risks associated with it. When seed of a particular species is in short supply, varieties adapted to other areas of the U.S. may be shipped in. Seed that cannot be certified because of contamination by other varieties, species, or weeds is also sold as variety nonstated. Planting a name variety will help ensure that you plant the best adapted variety which will produce the most forage. Other valuable information on the seed tag is germination percentage, weed seed content, and date of germination test. The Texas State Seed law requires a germination test within nine months of sale date.

A producer should determine what kind of seed and how much he will need early so that prices can be compared from different sources. Usually one type of grass seed will be limited each year in supply and therefore, higher in price. Most retail forage seed dealers will not have more than two or three clover species in stock. However, they are able to obtain seed of most legumes if given sufficient time. Infection by the proper strain of rhizobia bacteria of the young legume seedling through the root hairs is essential for good legume growth and high N_2-fixation. When planting a pasture to a legume species for the first time, it is important to inoculate the legume seed with the appropriate bacterial strain. When purchasing legume seed, also buy or order the inoculant containing the specific rhizobia strain for that legume species.

Small grains are usually planted at 100 lbs./acre. In Central Texas, rates can be reduced to 75 lbs./acre because of less rainfall. Ryegrass should be planted at 20 lbs./acre when mixed with a small grain. It is critical to plant small grain ½ to ¾ inch deep for good stands. It is best to plant small grains with a grain drill in a prepared seedbed, with a sodseeder when overseeding, or disk the sod lightly. Broadcasting on a prepared seedbed and covering the seed with a harrow or some type of drag usually results in fair stands. Pure stands of ryegrass are seeded from 25 to 40 lbs./acre. Ryegrass is the predominant grass overseeded on summer pastures because seed burial is not necessary for establishment. Legume seeding rates are listed in Table 2. Inoculation of legume seed immediately before planting is recommended to maximize the amount of N fixation by the legume.

Establishment

Winter pasture should be planted from mid-September through October. Optimum planting date will vary with location and type of winter pasture. Planting can begin earlier in northeast Texas because temperatures decrease sooner in early autumn. Earlier plantings result in greater early forage production if moisture is available. However, the earlier the planting, the higher the risk that the stand could be lost to drought. September plantings should be in prepared seedbed to reduce weed and grass competition and provide good placement of seed in the soil to improve seedling survival. Summer pastures should be overseeded in October and early November depending on location. The warm-season grass should be mowed or grazed short (2 to 3 in.) to reduce competition to the overseeded forages.

Summer grass recovery

Management practices such as disking and short sod height enhances early forage production of overseeded winter forages. However, these same practices slow down the spring recovery of the warm-season perennial grass. A three-year study at the TAMU Agricultural Research and Extension Center at Overton has shown that the autumn sod treatments hindered Coastal bermudagrass recovery even if not overseeded (Table 3). Disking reduced bermudagrass yields by an average of 600 to 700 lbs./acre through mid to late June. The one-inch sod height reduced yields an average of 500 lbs./acre when overseeded with clover, and 250 lbs./acre when overseeded with ryegrass or not overseeded, compared to the four-inch sod height. Coastal bermudagrass not overseeded was overgrown with winter weeds.

Hay meadows that are managed for maximum hay harvests should

Table 3. Recovery of Coastal bermudagrass following fall sod treatments (1 vs. 4 in. sod, control vs. disking) and overseeding of arrowleaf clover, crimson clover, ryegrass, or not overseeding at Overton (3 year mean).

	Sod Height					
	1 in.	4 in.	Mean	1 in.	4 in.	Mean
	Coastal bermudagrass (lb.acre)					
	Arrowleaf overseeded			Crimson overseeded		
Control	1459	2069	1764*	1870	2492	2181
Disk	906	1263	1085	1466	1718	1592
Mean	1183	1666		1668	2105	
	Ryegrass overseeded			Not overseeded		
Control	1522	1778	1650	1989	2260	2125
Disk	887	1142	1015	1407	1602	1505
Mean	1205	1460		1698	1931	

*All means between treatment ssignificantly different at 0.05 level, P < 0.001.

not be overseeded because of the reduction in early forage production. If only two hay cuttings are normally required, there should no major problems with overseeding. Another option is to use other pastures besides hay meadows for overseeded winter pasture.

Fertilization

Fertilization of winter pasture should be based on a soil test to maximize forage production and prevent applying more fertilizer than is needed. Soil analysis will also provide the soil pH which is especially critical for East Texas. Ryegrass requires a minimum pH of 5.7 and clover a pH of 6.0 for good fertilizer utilization and forage production. Lime needs to be applied in the spring before winter pastures are planted to raise soil pH by fall.

Nitrogen fertilization of small grain and small grain-ryegrass mixtures is split in two to four equal applications during the growing season. Two applications are used in Central Texas with lower rainfall and heavier textured soils. Three to four applications are required on the sandy soils in East Texas because of low nutrient holding capacity and high rainfall. Phosphorus and potassium are applied at planting. If more than 75 to 80 lbs./acre of potassium are needed on sandy soils in East Texas, it is recommended to split it into a autumn and late winter application because of leaching.

Nitrogen fertilization of overseeded ryegrass is usually split in two to three applications. Phosphorus and potassium, if needed, can be applied at planting. The initial N application should be delayed until after the ryegrass is established to reduce N utilization by the warm season grass and possible leaching in sandy soils. Additional N is applied in mid winter and early spring.

Overseeded clover-ryegrass may not receive any N or up to two applications, depending on the amount of early forage needed. Without N, sufficient forage for grazing is not available until February or early March, depending on location. The most economical fertilization program is a single N application in December to enhance ryegrass production during the winter when there is very little clover growth. Grazing can begin in January or February. Maximum forage production is obtained with two applications of N, one after the ryegrass and clover are up and a second in midwinter. Ryegrass should not be allowed to get taller than 6 to 7 inches in the spring or the clover will be shaded out. Nitrogen should not be applied in the spring

if there is a good clover stand. The increased ryegrass production will just replace clover production. Phosphorus and potassium can be applied at planting or shortly after planting.

Utilization

Small grain or small grain-ryegrass mixtures provide the earliest and most forage but are the most expensive. They should be used wisely to justify the high cost. Most efficient utilization is by stocker calves, replacement heifers, lactating dairy cattle, or limit grazing by beef cows with calves. Overseeded ryegrass and ryegrass-clover pastures are later and are best utilized by beef cows calving in winter.

Summary

Winter pastures can be a profitable component of pasture systems in the eastern half of Texas. Their greatest attribute is the production of a high quality forage that is superior to warm-season forages. To be profitable, attention must be paid to variety selection, planting dates, seeding rates, efficient use of fertilizer nutrients, and proper utilization. Winter pastures can reduce the amount of hay and supplements needed during the winter feeding period and provide spring weed control.

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