



Seeding Warm-Season Perennial Grasses

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Warm-season perennial grasses are the basis of pasture systems and hay production in Mississippi. They account for approximately 58 % of the pasture production in the state (Fig. 1). They are normally used for permanent pastures or hay production. The predominant warm-season perennial grass forage species are bermudagrass, bahiagrass, and dallisgrass (Table 1). Bahiagrass is well adapted to the central and southern part of the state, while most seeded bermudagrass varieties are well adapted across the entire state. Dallisgrass is more adapted to the northern and central part of the state.

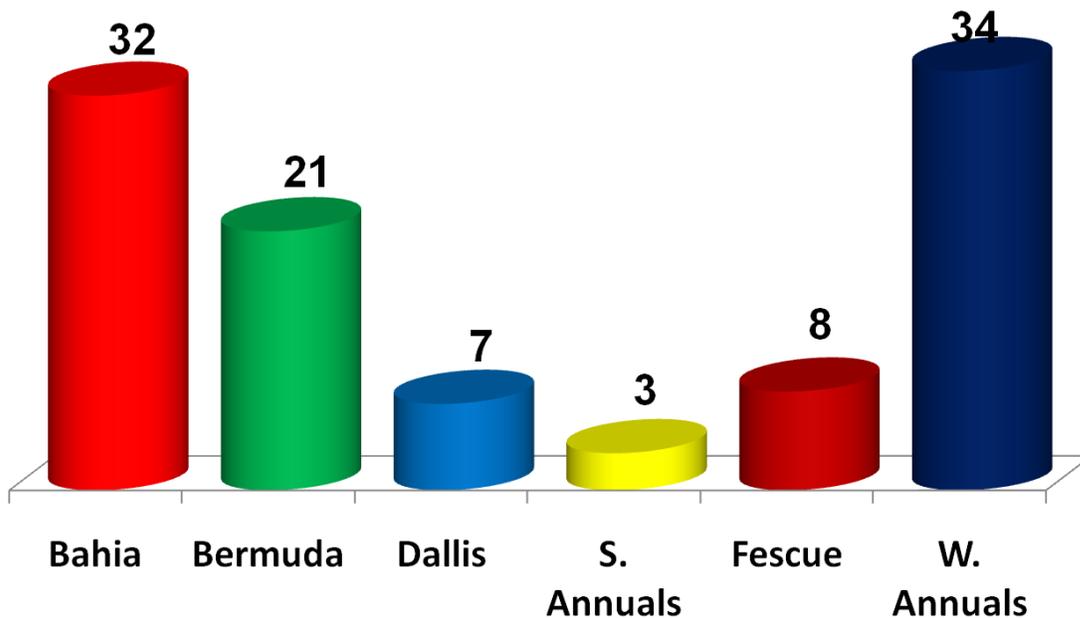


Figure 1. Distribution of forage grasses used in Mississippi.

Establishment and Management:

When to Plant: Planting warm-season perennial grasses should be done when seedlings will have the longest possible period of good growing conditions for establishment. Warm-season grasses can be seeded from mid-March to late May. The exact date depends on the local precipitation pattern, the species and the method of planting used, and the period of weed growth. Earlier seeding provides more time for these grasses to become well established before winter.

Seedbed Preparation: Seed bed preparation is the most important practice in establishing warm-season perennial grasses. This practice is the single most important and overlooked practice of most ranchers today. An ideal seedbed is firm below seeding depth and



free of weeds. A major purpose of seedbed preparation is to reduce existing plant competition. Keep seedbed clean until planting, this may include additional shallow cultivation to remove germinating weed seedling.

Planting Methods: The two most common methods of seeding perennial warm season grasses are drill planting (row) and broadcast applications. Drilling is a superior method because the seed is placed in the soil at a controlled planting depth, thus improving the probability of stand establishment. Drilling the seeds about 1/2-inch deep with packing over the row is best. Broadcast seeding usually slow down germination due to poor seed to soil contact and higher planting rates are required to ensure proper germination rates.

Table 1. General characteristics of seeded warm-season perennial grasses.

Species	Planting Rate (PLS)	Planting Depth	Planting Date	Comments
	(lb/ac)	(inches)	(months)	
Bahiagrass	15 – 20	¼ - ½	March - April	Can resist close grazing.
Bermudagrass	5 – 10	¼ - ½	March - May	Extremely drought tolerant. Poor K fertilization causes stand loss.
Dallisgrass	10 – 15	¼ - ½	March - May	Good drought tolerance. Persistent, deep-rooted perennial bunchgrass.

Seeding Rates: When seeding these grasses, it is important to use seed of known quality. Know the germination and purity of the seed, since seeding rates are based on pure live seed (PLS). PLS is the percentage of the bulk seed material that is live seed. This is determined by multiplying percentage germination by percentage purity of the lot of seed. When hard seed are involved, PLS = (percent germination + percent hard seed) x percent purity. Seeding rates depend upon the species, method of seeding and potential site productivity. As a rule, grass seed should be planted ¼ to ½ inches deep.

Pre- and Post-emergence Weed Control: Warm-season grasses often establish slowly and compete poorly with weeds. Weeds compete for moisture, light, space and nutrients. Weed control begins during the fall before the initial spring planting, during seedbed preparation. Early seedbed preparation consists of deep disking in mid-November or December. Removal of all existing forage or ground cover is recommended. At this time apply and incorporate all phosphorus, potassium, and lime as required by a soil test. Do not apply any nitrogen. Level seed bed and allow fall and winter rains to firm seedbed and build up subsoil moisture. As weed seed began to germinate, cultivate field very shallow, to remove newly sprouted weeds. This may be done several times before planting if necessary, but be aware of potential soil erosion. Another approach in reducing weed competition during the winter and early spring could be utilizing a cover crop such as annual legumes that could be incorporated into the ground before planting.

When established under heavy weed infestations, plants grow very slowly and may require a full season before the stand is ready to graze. During the seeding year, weed competition in perennial warm-season grasses is best managed by mowing. Mowing at a height of 3 to 4 inches can be done early in the season. At this time, the grass plants are small and will not be clipped off. During June and July, clip to at least 6 inches high. If much of the grass plant is clipped off, vigor will be markedly reduced. Avoid all clipping after September 1. Herbicide



applications can injure or weakened grass seedling. If broadleaved weeds are a serious problem, consider spraying with 2,4-D and spray after seedling grass plants have reached the three to four leaf stage. Consult the Mississippi State [Weed Control Guide](#) for more information on weed control practices and current labeled forage herbicides.

Fertilization: A soil test is recommended when fertilizing a newly established perennial warm season grass. Many producers attempt to estimate on what the crop needs, however they are normally unaware of how pH will affect nutrient availability and plant uptake. During early season land preparation, apply and incorporate the phosphate (P_2O_5), potash (K_2O), and lime as recommended by soil test. Incorporating these elements by deep disking will ensure that adequate nutrients are in the root zone area (6 – 8 inches below soil surface), reducing losses due to leaching and washing especially if manure applications are used. No nitrogen fertilizer should be applied until the new seedlings are 6" in height. At this point, a top dress application of nitrogen may be applied to stimulate top growth and yield. Applying nitrogen fertilizer, before or at planting will create excessive weed competition, and will not be adequately utilized by desired grass seedlings. The application of excessive nitrogen at early stage of growth (5 – 6 leaf stage) will only increase cost of establishment, not only in fertilizer cost, but weed control cost as well.

Management During and After Establishment: Protect a newly seeded area from grazing until plants are established. It is usually best not to graze warm-season grasses during the year of seeding. Plants should be well rooted before grazing to prevent pulling up the seedlings. Length of deferment from grazing varies depends on planting date and species. Grazing young, immature plants is especially harmful. However, if a vigorous stand is obtained and the plants reach 16-20 inches or more in height some grazing is possible, but should be stopped at 6 to 8 inches in height. Most warm-season pastures during the year of establishment should be grazed after dormancy in late-September or in October. Grazing during dormant periods may help improve the stand by scattering and trampling seed into the soil. As a rule of thumb, it is best to keep livestock off newly seeded pastures until seed heads appear.

Species Description, Varieties, and Adaptation

Varieties selected for seeding should depend on management objectives. Many grasses are better suited for grazing and others are more suited for hay production or intense management. A pure stand of a single variety is more desirable and should be planted under special conditions such as low palatability requiring intensive management. Many varieties of a single species of warm-season grasses, such as bermudagrass, are usually seeded in mixtures because pastures have variations in soil, moisture and slope, and each species in the mixture is adapted better than other species to certain site characteristics. Also, the mixture usually extends the grazing season because each species varies slightly in its period of lush growth and dormancy. Finally, a mixture provides a varied diet that is more desirable to animals.

Bahiagrass: Bahiagrass is established from March to April at a rate of 15 – 20 lb/ac. Bahiagrass forms a very dense sod that is tolerant of close, continuous grazing. It also tends to tolerate a wider range of soil types, greens up earlier in the spring and stays greener longer in the fall than bermudagrass. Bahia requires between 80 and 100 pounds of nitrogen per acre per year for the best production. It is very tolerant to drought and poor drainage conditions. At low fertility levels, it can become a very serious weed in bermudagrass. There are several



commercial varieties available such as common, Tifton 9, Argentine, Paraguay 22, Pensacola, San Mountain, Tifquick, and UF-Riata (commercially available in fall of 2009). Pensacola is a winter-hardy variety and is the most common variety of bahiagrass at the present time. Sand Mountain was selected to have more winter hardiness than the varieties Pensacola or Argentine, but with agronomic characteristics similar to Pensacola. UF-RIATA is a novel diploid bahiagrass developed at University of Florida. UR-Riata has lower photoperiod sensitivity, improved leaf tissue cold tolerance, and increased forage production during the cool season compared to the standard bahiagrass cultivars Argentine and Pensacola. Yields of bahiagrass in Mississippi produce from 2.5 to 5 tons/ac ([Table 2](#)). UF-Riata has reported 3-year yield average of 9683 lb/ac in Florida.

Table 2. Bahiagrass variety test yields at Mississippi State University.

Bahiagrass Varieties					
Year	Argentine	Pensacola	Sand Mountain	Tifton 9	Average
----- Yield (lb/ac) -----					
2004	9884	9349	9586	11614	10108
2005	10899	9238	9817	11409	10341
2006	3672	4378	4459	6001	4628
2007	4768	4254	5604	6258	5221
Average	7306	6805	7367	8821	7574

Bermudagrass: Extremely drought tolerant and can be planted throughout the state. Seeded bermudagrass should be planted between March and May at a seeding rate of 5 to 10 lb/ac. Bermudagrass is best adapted to sandy soils. Nitrogen and potassium fertilization are essential for high yields, especially for hay production. Ammonium nitrate (34-0-0) has been the fertilizer of choice for bermudagrass during summer months, but its availability has become limited due to regulations by the Department of Homeland Security. Urea Ammonium Sulfate is the N fertilizer available to Mississippi's livestock producers for hay and pasture. The new 33-0-0-12 is a blend of urea and ammonium sulfate that should be just as effective as ammonium nitrate in most situations. Some of the seeded bermudagrass varieties include Common, Giant, Cheyenne, Cheyenne II, CD90160, Guymon, Jackpot, KF-194, Majestic, Mirage, Mohawk, Pyramid, and Wrangler ([Table 3](#)). A 3-year annual yield comparison of seeded vs. hybrid bermudagrass in the variety tests at Mississippi State indicated that seeded bermudagrass produces 25% higher yield (11458 lb/ac) than hybrid varieties (9145 lb/ac). These yield results can differ from location to location in the state. There are a great number of seeded blends available for planting ([Tables 4](#) and [5](#)). Most producers have the notion that these blends usually "revert back to common bermudagrass". This is not surprising given the nature of blends. In this situation, it is not a case of the variety suddenly, or even gradually, turning into common bermudagrass, rather it is the common bermudagrass already present in the blend gradually replacing the giant type, due to its greater persistence.



Table 3. Characteristics of seeded bermudagrasses.

Variety	Overall Rating	Winter Hardiness ²	Persistence ²	Comments
CD90160	***	G	E	Good performance, but only sold in blends. Higher protein and digestible nutrients than Cheyenne.
Cheyenne¹	***	G	E	Most consistent seeded varieties, high yielding. Forage quality similar to coastal. Low seed producer
Common	*	G	G	Typical variety found in MS pastures, but poor yielding and has disease susceptibility.
Giant	*	P	P	Larger, fast growing, but less cold tolerant and short-lived than common.
KF-194	***	G	E	Good performance, but only sold in blends. Higher forage quality characteristics than CD90160.
Mohawk	***	G	G	High yielding and good seedling vigor
Wrangler	**	E	F	Good variety for the northern part of the state, but has a fair persistence.

¹The original Cheyenne is no longer available and has been replaced with Cheyenne II (selected for higher seed yield, but with characteristics similar to Cheyenne).

²E = Excellent, G = Good, F = Fair, P = Poor.

Table 4. Blends of seeded bermudagrasses

Commercial Name	Seed Composition
Laredo (2009)	25% Mohawk, 13.64% CD90160, and 11.3% KF-194
Morhay	Common and Giant
Pasto Rico	50% Common and 50% Giant
Ranchero Frio (2009)	15.5% Giant, 5.25% Cheyenne II, 3.25% SWI-810, and 30% Mohawk
Sungrazer 777	50% KF-194, 30% Jackpot, and 10% Giant
Sungrazer Plus	50% KF-194, 30% CD91060, and 20% Giant
Tierra Verde	50% Common, 50% Giant (hulled and unhulled seed mixture)
Texas Tough	67% Common, 33% Giant
Texas Tough Plus	33% Common, 33% Giant, 33% Majestic
Vaquero	33% CD90160, 33% Mirage, and 33% Pyramid
3 Way Blend	80% Common un-hulled, 10% Giant hulled, 10% Common hulled
4 Way Blend (2009)	Giant, Mohawk, Cheyenne and Cheyenne II

Note: Bermudagrass varieties and their percentages might vary in these blends depending on seed availability.

Table 5. Seeded bermudagrass variety test yields at Mississippi State University.

Year	Seeded Bermudagrass Varieties/Blends						Average
	Cheyenne	Gaicho	Pasto Rico	Sun Grazer	Texas Tough	Tierra Verde	
	----- Yield (lb/ac) -----						
2001	6857	6762	8418	5150	9488	7814	7415
2002	5040	4346	6174	3902	5888	6012	5227
Average	5949	5554	7296	4526	7688	6913	6321



Dallisgrass: It established at rate of 10 – 15 lb/ac. Dallisgrass grows well on clay or loam soils that are somewhat moist, but not flooded. Germination can be low, resulting in slow stand establishment. Seed usually germinate in spring and summer when soil temperatures are in the 60° to 65°F range. The optimum air temperature range for growth is 80° to 90°F and when temperatures are in this range, plants grow very rapidly. It initiates spring growth earlier than most warm-season perennial grasses and persists later into the fall. Seed heads can become infected with ergot, which can reduce seed set and, on rare occasions, cause ergot toxicity in cattle. ‘Sabine’ dallisgrass, a new hexaploid biotype was released in September 2008 in cooperation with Texas A&M Univ. AgriLife Research, USDA-ARS, and Louisiana State Univ. This is called a Uruguayan biotype. ‘Sabine’ produces higher yields and it is consistently more persistent under defoliation than common dallisgrass in multi-year forage evaluation plots in Louisiana and Texas (**Table 6**). Its forage nutritive value is equivalent to that of common, but has the same level of susceptibility to ergot. Seed is not commercially available at this point.

Table 6. Comparison of ‘Sabine’ and common dallisgrass.¹

Biotype	Yield (lb/ac)	Quality ¹			Plant Survival	
		CP ----- % -----	NDF ----- % -----	IVTD ----- % -----	Clipping ----- % -----	Grazing ³ ----- % -----
Common	13484	11.0	69.0	67.6	85.7	96.0
Sabine	13216	10.4	70.9	67.2	40.3	62.5

¹Yield and quality data are a 3-year average at two locations (Baton Rouge, LA and College Station, TX) from 1996 to 1998.

²CP = Crude Protein, NDF = Neutral Detergent Fiber, IVTD = *In vitro* True Digestibility.

³4-year average (1998-2001) at Jeanerette, LA

Source: Burson et al., 2008. Texas A&M University.

Summary

Pasture efficiency may be improved by having perennial warm-season grasses in conjunction with cool-season grasses and legumes where adaptability of them is possible. Cool-season grasses can be grazed in the early and late parts of the grazing season, with the warm-season grasses can be grazed during the summer. This management approach provides a larger and more uniform supply of forage, and greater seasonal animal gains can be expected. By utilizing warm-season grasses, cool-season grasses can have a rest during the hot summer months and improving their vigor and providing a greater supply of forage for late-summer and fall grazing.

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