

# BERMUDAGRASS VARIETIES, HYBRIDS, AND BLENDS FOR TEXAS

Vanessa A. Corriher<sup>1</sup> and Larry A. Redmon<sup>2</sup>

Bermudagrass (*Cynodon dactylon*) is a warm-season perennial forage that forms the basis of most forage systems throughout the southeastern United States. It is a deep-rooted, sod-forming grass that spreads by means of stolons (horizontal aboveground stems) and rhizomes (underground stems) that form new plants. It can grow 15 to 24 inches tall.

Productive during the months of June, July, and August, it produces much dry matter for grazing or hay production when soil moisture is not limiting. (Nutrient levels are calculated on the solid content or dry matter in the forage since water content varies depending on season, growth stage, and species.) Bermudagrass is available in both seeded and sprigged varieties. Although it adapts to a wide variety of soil conditions, it grows best in well-drained soils.

Bermudagrass can be used for winter feeding to reduce production costs. Standing or “stockpiled” bermudagrass can be grazed in fall and early winter. Bermudagrass pastures can also be overseeded with cool-season annual forages such as small grains, ryegrass, clovers, or medics (an annual forage legume) for late winter and spring grazing. The combined use of stockpiled bermudagrass and overseeded ryegrass can reduce winter feeding costs by up to \$100 per cow through the winter.

To maximize bermudagrass production and quality, plant the variety or blend that is best suited to your climate, soil, and site conditions, and fertilize it adequately. When selecting a bermudagrass variety, consider soil type, yield potential, forage quality, and palatability.

## HISTORY

Bermudagrass is native to southeast Africa. In the United States, the earliest mention of bermudagrass in the United States comes from the diary of Thomas Spalding, a prominent antebellum agriculturalist in Georgia:

*“Bermudagrass was brought to Savannah in 1751 by Governor Henry Ellis . . . .If ever this becomes a grazing country, it must be through the instrumentality of this grass.”* As early as 1807, bermudagrass was referred to as one of the most important grasses in the South, and it has been a part of Southern agriculture for at least 250 years.

Because of its improved productivity, nutrition, and tolerance of a wide range of soil types and pH values, hybrid bermudagrass has benefited livestock production across the southern United States for nearly 60 years. Since the early Common and hybrid cultivars do not tolerate cold well, several cold-tolerant varieties have been developed that are useful for the warm- and cool-season transition areas of Oklahoma, Arkansas, Missouri, and Tennessee.

In developing new varieties, scientists seek to improve productivity in terms of quality, quantity, and persistence tailored to soil properties and climate in different eco-regions. Many of the varieties included in this publication are the result of research from universities, governmental agencies, and industry.

Table 1. Effects of fertilizer and broiler litter application rate on Coastal bermudagrass dry matter (DM) yield.<sup>1</sup>

Application rate	DM 1992 (lb/ac)	DM 1993 (lb/ac)
N-P <sub>2</sub> O <sub>5</sub> -K <sub>2</sub> O (lb/ac)		
0-0-0	4,780	4,050
100-33-67	7,140	6,450
200-67-134	8,680	8,290
400-134-268	9,640	10,460
Poultry litter (tons/ac)		
2 SPR + 2 SUM <sup>2</sup>	7,580	6,930
4 SPR	8,320	7,450
4 SPR + 4 SUM	8,850	7,840
8 SPR	9,810	9,270

<sup>1</sup> Assistant Professor and Extension Specialist, The Texas A&M System

<sup>2</sup> Professor and Extension State Forage Specialist, The Texas A&M System

<sup>1</sup> Evers, 1998

<sup>2</sup> SPR: late spring; SUM: mid-summer

## YIELD

Although bermudagrass produces well, it must be fertilized for maximum production (Tables 1 and 2). Test the soil each year to determine the soil nutrient status. Pay close attention to soil fertility to ensure maximum growth, disease resistance, and cold tolerance and to minimize weed infestations.

Besides water, nitrogen is usually the most limiting factor for forage production, but appropriate levels of potassium and phosphorus are also critical to yield and persistence. Inadequate levels of nitrogen also reduce

crude protein levels, a measure of a forage's ability to meet livestock protein needs.

Low potassium levels can lead to reduced yields, poor stands, and winter kill. Phosphorus affects root growth and development. Adequate pH (5.8 to 6.5) is needed to maintain a vigorous bermudagrass stand.

Warm-season perennial grasses such as bermudagrass generally are less nutritious than warm-season annuals or cool-season forages. However, if you fertilize well (Table 3) and harvest at the proper stage of maturity (Table 4), warm-season perennials can provide forage of good to excellent nutrition.

Table 2. Warm-season perennial grass yields from 1997 through 2001.<sup>3</sup>

Entry	1997	1998	1999	2000	2001	Average
	-----lb dry matter/ac-----					
Tifton 85 bermuda <sup>1</sup>	5,044 a	8,064 a	12,915 a	12,032 a	15,680 a	10,747 a
CD 90160 bermuda	2,737 b	3,550 d	9,696 bc	10,347 b	13,395 a-c	7,945 b
Texas Tough bermuda	2,480 bc	5,262 b	11,749 ab	7,956 e-g	10,993 cd	7,688 b
Ranchero Frio bermuda	1,943 cd	2,912 de	8,984 c	9,991 bc	12,428 b-d	7,251 bc
Terra Verde bermuda	2,085 cd	4,885 bc	9,054 c	8,318 d-f	11,748 b-d	7,218 bc
Coastal bermuda <sup>1</sup>	1,611 d	3,739 cd	8,507 cd	9,440 b-d	11,549 b-d	6,969 bc
Cheyenne bermuda	2,408 bc	3,430 de	6,640 d-f	8,928 c-e	13,431 ab	6,967 bc
KF CD 194 bermuda	1,914 cd	3,664 cd	7,407 c-e	7,525 fg	10,075 de	6,117 c
Pensacola bahia	583 e	2,167 e	4,771 f	6,809 gh	7,682 ef	4,402 d
Tifton 9 bahia	767 e	2,203 e	5,470 ef	5967 h	7,398 f	4,361 d
Common bermuda <sup>2</sup>			383	7,445 fg	11,352 b-d	6,393
Giant bermuda <sup>2</sup>			836	7,356 fg	6,643 f	4,945
Wrangler bermuda <sup>2</sup>			188	6,744 gh	7,550 f	4,827
Kikuyugrass <sup>2</sup>			0	7,620 e-g	5,539 f	4,386

<sup>1</sup> Bermudagrass varieties established from sprigs.

<sup>2</sup> Varieties planted in 1999. All other varieties planted in 1997.

<sup>3</sup> Yields within a column followed by the same letter do not differ significantly at the 0.05 levels (Fisher's Protected Least Significant Difference Test).

Table 3. Coastal bermudagrass crude protein content as affected by fertilizer and broiler litter application rate.<sup>1</sup>

Application rate	-----Crude Protein (% Dry Matter)-----									
	-----1992-----					-----1993-----				
	June 1	July 9	Aug 6	Sept 8	Oct 7	May 7	June 17	July 19	Aug 23	Sept 22
	N-P <sub>2</sub> O <sub>5</sub> -K <sub>2</sub> O (lb/ac)									
0-0-0	11.2	9.4	9.8	10.0	8.9	11.5	9.4	6.6	8.9	8.1
100-33-67	13.2	10.1	13.1	11.8	9.0	19.8	8.5	9.3	9.5	9.3
200-67-134	14.2	11.2	15.0	14.6	11.5	20.3	9.8	11.7	10.0	10.3
400-134-268	16.8	13.1	16.9	16.4	14.3	21.8	14.3	12.8	11.1	12.9
	Poultry litter (ton/ac)									
2 SPR + 2 SUM <sup>2</sup>	13.0	10.4	13.0	11.9	9.4	13.7	10.4	7.8	10.1	10.0
4 SPR	13.4	10.5	10.2	10.7	8.8	18.1	10.0	7.0	9.8	10.3
4 SPR + 4 SUM	13.8	11.3	15.5	14.2	9.6	17.0	11.7	10.1	10.9	11.8
8 SPR	15.9	13.8	13.1	12.5	10.1	22.3	14.3	9.5	9.5	10.6

<sup>1</sup> Evers, 1998

<sup>2</sup> SPR is late spring and SUM is mid-summer.

**Table 4. Effect of clipping frequency on yield and nutritive value of Coastal bermudagrass hay.<sup>1</sup>**

Clipping interval (wk)	DM <sup>2</sup> yield (ton/ac)	Leaf (% DM <sup>2</sup> )	Crude protein (% DM <sup>2</sup> )	Lignin (% DM <sup>2</sup> )
1	6.3	---	21.4	---
2	7.8	87.6	20.8	9.4
3	8.6	81.3	18.8	9.6
4	9.7	74.8	17.0	10.3
6	12.6	57.7	13.8	11.2
8	12.5	51.4	12.2	12.0

<sup>1</sup> Burton and Hanna, 1995

<sup>2</sup> DM: dry matter

**Table 5. Blends of seeded bermudagrasses**

Trade name	Components
Pasto Rico	Common, Giant
Pasture Supreme	Common, Giant
Primero	CD 90160, Mirage, Giant, Panama
Ranchero Frio	Cheyenne, Cheyenne 2, Mohawk, Giant
Sungrazer	KF 194, Wrangler
Sungrazer 777	KF 194, Jackpot, CD 90160
Sungrazer Plus	KF 194, CD 90160, Giant
Texas Tough	Common, Giant
Texas Tough Plus	Common, Giant, Majestic
Tierra Verde	Common, Giant
Vaquero	CD 90160, Mirage, Pyramid

**Table 6. Three-year yields of several seeded and hybrid bermudagrass lines at Overton, Texas.**

Variety	2002	2003	2004	Average
-----Yield (lb dry matter/acre)-----				
Coastal	6,383	11,618	14,966	10,989
Tifton 85	8,878	13,810	13,716	12,135
Common <sup>†</sup>	7,557	10,624	12,908	10,363
Giant <sup>†</sup>	5,675	9,062	10,230	8,322
Cheyenne <sup>†</sup>	6,370	10,438	13,183	9,997
Wrangler <sup>†</sup>	4,966	10,123	9,713	8,267
Seed lines	3,532-9,691	5,119-15,619	7,962-16,121	6,879-13,402

<sup>†</sup> Seeded.

## CULTIVARS AND COLLECTIONS FOR EAST TEXAS

### Seeded Bermudagrasses

Seeded varieties work well on small acreages that are not economical to sprig, as well as on steep slopes and cutover timberland where seedbed preparation for sprigging is not feasible. Most seeded bermudagrass on the market are blends that contain two to four lines, or individual varieties, and often contain Giant (NK 37) and Common.

Components of some of the blends on the market are reported in Table 5. Table 6 compares the dry matter yield of several seeded varieties at Overton, Texas. The percentage of each line in the blend may vary from year to year, depending on seed availability and cost.

### Cheyenne

Cheyenne is a cross between a bermudagrass from an old turf site in the Pacific Northwest and another plant from

the former Yugoslavia. Originally released as a turfgrass, it was promoted as a pasture variety by the mid-90s.

Like Common bermudagrass, Cheyenne establishes quickly. In a 5-year evaluation trial at Overton (Table 2), Cheyenne produced the least dry matter yield of the seeded bermudagrasses.

### Common

Highly variable in appearance, Common responds favorably to good management and grows under almost every conceivable condition throughout East Texas. Depending on its location, Common can be considered a forage grass, a turfgrass, or a noxious weed.

Because its performance is well established, it is often used as a standard for evaluating new material. Common's dry matter yields are generally about one-third lower than Coastal and its forage nutritive value and forage quality are about the same. It is generally more winter hardy than the hybrids.

## Guymon

Guymon, a cultivar developed from lines found in the former Yugoslavia, grows near Guymon, Oklahoma. Very winter hardy, with large stems, it can be grown in the northern portion of the bermudagrasses growing region. In Texas, Guymon yields less dry matter than does Common bermudagrass.

## Giant (NK-37)

Giant is a strain of Common bermudagrass that grows more upright, is less likely to form a sod, and has longer leaves, finer stems, fewer rhizomes and stolons, and no pubescence (soft, fine hairs). It begins growing later in the spring than Common bermudagrass and is not as cold tolerant. In severe winters, damage can be high. However, the loss appears to be associated with disease damage and low fertility rather than as a direct result of low temperatures.

Giant does well in lower humidity climates. It is susceptible to leaf spot disease, and dry matter yield declines in 2 to 3 years due to cold weather and diseases. Plantings will typically become a Common bermudagrass stand.

## Wrangler

Wrangler is cold hardy and produces good cover during the establishment season. Forage yields can be higher than those of Guymon.

## SEEDED BERMUDAGRASS BLENDS

### Pasto Rico

Pasto Rico is a blend of Giant (NK-37) and Common bermudagrass that contains both hulled and unhulled seed.

### Ranchero Frio

Ranchero Frio is a mixture of Giant (NK-37) bermudagrass and Cheyenne. Over a 3-year trial, it placed near the bottom in the seeded bermudagrass evaluation trial, averaging 4,613 pounds of dry matter per acre (Table 2).

### Sungrazer

Sungrazer is a mixture of KF 194 and Wrangler.

### Sungrazer Plus

Sungrazer Plus is a mixture of Giant, KF 194, and CD 90160 bermudagrass.

### Texas Tough

Texas sting of one-third Giant and two-thirds Common bermudagrass, one-half of which is hulled and the other

half unhulled. At Overton, Texas, a 5-year study found that Texas Tough was the most productive of the seeded varieties in the trial, averaging 7,496 pounds of dry matter per acre (Table 2).

### Texas Tough Plus

Texas Tough Plus is a mixture of Common, Giant, and Majestic seeded bermudagrasses blended for grazing or hay production.

### Tierra Verde

Tierra Verde, like Texas Tough, is a mixture of Giant and Common bermudagrass. The Tierra Verde blend is 50 percent hulled and unhulled Giant and 50 percent hulled and unhulled Common. A 5-year variety evaluation trial at Overton found that Tierra Verde averaged 6,967 pounds of dry matter per acre, which placed it third among the seeded varieties (Table 2).

## HYBRID BERMUDAGRASSES

Bermudagrass hybrids are essentially sterile—they may produce seed heads but little viable seed—and must be propagated vegetatively (sprigs and/or green tops). Compared to Common bermudagrass and many seeded varieties, properly managed hybrids generally offer more dry matter (Table 7), better forage nutrition, greater drought tolerance, and/or greater cold tolerance.

### Alicia

Alicia spreads primarily by stolons and although it has fewer rhizomes than Coastal, it spreads and establishes more rapidly. Usually propagated by cuttings rather than by sprigs, it is not as winter hardy as Coastal and is more susceptible to rust and other diseases. Under moderate to heavy grazing and fairly severe winters, its recovery in the spring has been slow. Its forage yield is generally equal to Coastal, but its forage nutrition is lower.

### Brazos

A hybrid of African plant materials, Brazos has wider leaves, has thicker stems and rhizomes, and creates a more open sod than Coastal does. It has constantly been 2 to 4 percentage points higher than Coastal in digestibility. On heavy soils, Brazos produces about as much dry matter as Coastal, but up to 20 percent less on sandy soils. It establishes more slowly than Coastal does, but is equal to or superior in stand density persistence under grazing and in winter hardiness. This cultivar is best used for grazing because its larger stems require more drying time.

### Callie

A robust grass with large stolons, wide leaves, and tall growth, Callie establishes rapidly the first year. It

Table 7. Comparison of seeded bermudagrass varieties at Texas AgriLife Research and Extension Center at Overton.<sup>1</sup>

Variety	-----1997-----		1998	1999	2000	2001	Average
	Grass	Weeds					
-----DM (lb/ac)-----							
Texas Tough	2,480	523	5,262	11,749	6,997	10,993	7,496
Ranchero Frio	1,943	291	2,912	8,984	9,116	12,428	7,077
Tierra Verde	2,085	159	4,885	9,054	7,065	11,748	6,967
Cheyenne	2,408	268	3,430	6,640	8,159	13,431	6,814
Common	---	---	---		6,666	11,352	9,009
Wrangler	---	---	---		6,239	7,550	6,895
Giant	---	---	---		6,591	6,443	6,617

<sup>1</sup> Evers, 2001

produces as much dry matter yields as Coastal and provides good animal gains. Since it produces a ground cover with an open type of sod, spring recovery may be slower than with Coastal. Not as cold tolerant as Coastal, Callie is extremely susceptible to rust, reducing forage yield and nutrition.

### Coastal

The most widely planted bermudagrass in the southern United States and Texas, Coastal is a highly productive bermudagrass that produces both rhizomes and stolons and is adapted to a wide range of climatic conditions. It has exceptional longevity, readily responds to fertility and irrigation, and tolerates drought better than Common does. Coastal also tolerates heavy grazing pressure or frequent and close defoliation.

### Coastcross-1

Coastcross-1 produces more stolons than Coastal and has few small rhizomes, creating an open sod that makes it more susceptible to weed invasion. Coastcross-1 grows taller and has broader, softer leaves than Coastal. Highly resistant to foliage diseases, it produces about the same dry matter yield as Coastal, but is 11 to 12 percent higher in digestibility. Although Coastcross-1 produces more fall growth, it does not have Coastal's winter tolerance, limiting it to the more southern bermudagrass growing region.

### Grazer

The Grazer cultivar is a cross between a bermudagrass found growing in the Alps of northern Italy and one introduced from Kenya, Africa. Used for pasture and/or moderate production of highly nutritious forage hay, it produces few rhizomes but many stolons.

It yields less dry matter than does Coastal but more forage nutrition in the summer. The average daily gain and gain per acre are comparable to or higher than Coastal; drought, disease, and cold tolerance is equal.

Grazer forms a dense sod and establishes faster than Coastal does.

### Hardie

Hardie, a cold-hardy infertile hybrid derived from plants native to Turkey and Afghanistan, is established by planting sprigs. Compared to Midland, Hardie produces larger rhizomes, longer, broader leaves, somewhat more dry matter, and more gain per acre due to its increased digestibility. Hardie does not tolerate disease as well as do Midland or Coastal. Because dry matter yields are less than Coastal in Texas and Louisiana, it is generally grown north of Texas.

### Jiggs

Jiggs establishes rapidly from sprigs or tops; its dry matter yields equal Coastal and Tifton 85. It may be most advantageous on tight and poorly drained sites. This variety, however, has problems with rust and may not be as cold tolerant as Coastal.

### La Grange

La Grange is like Coastal in growth characteristics and digestibility.

### Lancaster

The cold-hardiness, dry matter yield, and forage nutrition of Lancaster are supposedly equal to Coastal, but very little research has been conducted on this variety.

### Luling

A deep green, broad-leaved bermudagrass with short, dense growth, Luling forage is like that of Common but significantly less than Coastal.

### Midland

Midland is leafier and darker green and tends to produce a more open sod than does Coastal. It is established

primarily by using sprigs. Midland is very cold tolerant and usually grown north of regions where Coastal will not persist. It has about the same forage nutrition as Coastal, but yields are usually lower where winter kill is not a factor.

### Naiser

Naiser is a very short, compact, and coarse plant that produces a rather dense ground cover. It has consistently produced less forage than Coastal but remains more nutritious later in the growing season. Because of its density as ground cover, it might be used to stabilize waterways.

### Rockdale Series

Rockdale-1 is a fine-leaved, dense-growing bermudagrass of medium height. It produces about as much forage dry matter yields as Common, but is of slightly more digestible. It is slightly superior to Coastal in in-vitro dry matter digestibility, or true digestibility, but lower dry matter production more than offsets that slight advantage. Rockdale-2 is a selection out of the original collection produced from one of the two growth types present in Rockdale-1.

### Russell

Russell is believed to be either a mutation of Callie or a natural hybrid between Callie and an ecotype of Common bermudagrass. It yields more, spreads faster, and is more winter-hardy than Coastal. However, its forage quality appears to be equivalent to Coastal. Russell produces both rhizomes and stolons, creating a dense sod that allows grazing and helps prevent erosion.

### Scheffield

Scheffield is an intermediate-textured plant that tends to produce a somewhat denser stand of grass than Coastal does. Its forage production is much like that of Coastal, but its digestibility is lower.

### Tifton 44

A cross between Coastal and another winter-hardy plant, Tifton 44 offers a dry matter yield and disease resistance that is like that of Coastal. It has a slightly greater forage nutrition and greater cold tolerance. Its higher nutrition has resulted in 15 to 20 percent greater average daily gains for cattle grazing during the summer.

Tifton 44 generally greens up 7 to 10 days earlier in the spring and remains green 7 to 10 days longer in the fall. Slow to establish, taking as long as 3 years, it needs to be planted in soils relatively free of Common bermudagrass and other weedy species. Because of its cold-tolerance, Tifton 44 is used more in north and northeast Texas.

### Tifton 78

Tifton 78 is a hybrid cross between Tifton 44 and Callie bermudagrass. It can be established either from top cuttings or sprigs, but establishing with tops increases susceptibility to winter kill. Tifton 78 is similar to Callie except that it is slightly more winter-hardy and resistant to rust. Compared to Coastal, Tifton 78 is taller, spreads faster, establishes easier, yields more, and is more digestible. Its higher digestibility allows for improved animal gains.

Tifton 78 appears to be adapted only to the most southern areas of the state—plantings at the Texas AgriLife Research and Extension Center at Overton, TX, were killed by hard freezes 2 years in a row, while Coastal plantings were not harmed.

### Tifton 85

Tifton 85 is a hybrid between Tifton 68 and a plant from South Africa. Established by either planting sprigs or tops, Tifton 85 has large stems, long stolons, and large rhizomes (though fewer than Coastal and Tifton 44).

In a 3-year trial in Georgia, it produced 26 percent more dry matter and was 11 percent more digestible than Coastal. Because of its higher digestibility, animal gains with Tifton 85 are about 10 percent greater than with Coastal. At Overton, Tifton 85 has greened up earlier and remained green longer than Coastal but is not highly winter-hardy.

### Wheelock Series

Wheelock-1 and 3 are inferior to Coastal and have shown no real promise as potential new cultivars. Wheelock-2 is a more vigorous-growing bermudagrass, intermediate in height between Coastal and Common, but somewhat denser than Coastal. Forage dry matter yield and digestibility are similar to Coastal.

### World Feeder

World Feeder bermudagrass has rhizomes and stolons, grows rapidly, and also has good winter-hardiness. It produces less than most of the commonly used hybrid bermudagrasses, is similar in forage nutrition, and very expensive to establish.

### Zimmerly Select

Zimmerly Select produces both stolons and rhizomes. Forage production has been below that obtained from Coastal, and, during the growing season, digestibility also tends to be slightly lower than Coastal.

For more information, go to [www.soilcrop.tamu.edu](http://www.soilcrop.tamu.edu). Contact the authors at [vacorriher@ag.tamu.edu](mailto:vacorriher@ag.tamu.edu) or [Iredmon@ag.tamu.edu](mailto:Iredmon@ag.tamu.edu).