PRODUCTION OF SEEDED AND VEGETATIVELY PLANTED BERMUDAGRASSES

G. W. Evers, M. J. Parsons, and T. J. Butler[1]

Abstract

Bermudagrass varieties planted from seed are less expensive to establish and do not require the intense seedbed preparation that sprigged varieties do. A study comparing seeded bermudagrasses, two bahiagrasses, 'Coastal' bermudagrass, and 'Tifton 85' bermudagrass was conducted for four years in northeast Texas. Summer droughts occurred in two of the four years. Tifton 85 was the most productive averaging 9500 lb dry matter/ac over four years. Bermudagrass varieties established from seed had average yields ranging from 5000 to 6800 lb dry matter/ac and were similar to Coastal bermudagrass. 'Pensacola' and 'Tifton 9' bahiagrasses were the least productive with annual yields averaging only 3600 lb dry matter/ac.

Introduction: Bermudagrass is the most widely planted introduced warm-season perennial grass in the southeastern USA (Burton and Hanna, 1995). Adaptability to acid soils, good drought tolerance because of a deep root system, and tolerance to close, frequent grazing are its main attributes. If fertilized and managed correctly, it produces a high quality hay and is also excellent for grazing. All available hybrid bermudagrasses must be established vegetatively using either sprigs (shoot, crown, rhizome, stolon, and root portions) or with some varieties, tops (6 to 8 week old topgrowth). Recommended planting rate is 20 to 40 bu/ac. A bushel equals 1.25 cu ft and contains about 100 sprigs (Muller et al., 1992). Establishment costs including land preparation, sprigs or tops, planting, fertilizer, and weed control are about $125 per acre.

There has been a great deal of interest in bermudagrass established from seed as opposed to sprigs. Besides being less expensive than sprigging, seeded varieties can be used on small acreages, steep slopes, and cut-over timberland where good seedbed preparation is not economical or feasible. The first seeded variety was 'NK 37' which was selected by Northrup, King, and Company, and is now sold as giant bermudagrass (Hanson, 1972). Trials conducted in Georgia show yields of some of the new seeded varieties similar to Coastal bermudagrass (Hoveland, 1996).

Some of these new varieties are selected bermudagrass lines and others are mixtures

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of giant (old NK 37) bermudagrass which is a diploid and common bermudagrass which is a tetraploid. 'Cheyenne' and 'KF-CD 194' bermudagrass are selected lines. 'Ranchero Frio' is a mixture of Cheyenne and giant bermudagrass. 'Tierra Verde' is 50% hulled and unhulled giant bermudagrass and 50% hulled and unhulled common bermudagrass. 'Texas Tough' is a mixture of 33% giant bermudagrass and 67% common bermudagrass. Present seed cost of these new seeded types is from $4 to $5 per lb which is twice the price of common bermudagrass seed. Recommended seeding rate is 5 to 10 lb/ac of hulled seed planted from 0 to **2** in. deep.

A concern about the seeded varieties, especially mixtures of common and giant, is that they may revert back to common bermudagrass over time. Hybrid bermudagrasses such as Coastal and Tifton 85 produce very few seedheads and most of the seed are sterile. That is why these hybrid varieties must be established from sprigs or tops. Common bermudagrass is a cross pollinated plant so that a common bermudagrass pasture is actually a mixture of many different ecotypes. Giant bermudagrass is taller than common but seed yields are lower. A study comparing some of the seeded bermudagrass varieties, vegetatively propagated Coastal and Tifton 85 bermudagrass, and Pensacola and Tifton 9 bahiagrass, was planted at the TAMU Agricultural Research and Extension Center at Overton to compare growth and persistence in northeast Texas.

Materials and Methods: The trial was planted May 2, 1997, on a Redsprings fine sandy loam soil with a pH of 6.8. Experimental design was a randomized complete block with four replications and 6 by 15 ft plots. Six seeded bermudagrass varieties were planted at 10 lb/ac by broadcasting the seed on a prepared seedbed and then rolling. Coastal and Tifton 85 bermudagrass plots were established from plants started in the greenhouse in 4-in. pots. They were transplanted 2 ft apart within each of two rows 3 ft wide. Pensacola and Tifton 9 bahiagrass were planted at 20 lb seed/ac by broadcasting the seed on the soil surface and rolling. Number of harvests, fertilization, and monthly rainfall from March through October for each year are reported in Table 1. Grassy weeds were a major problem during the establishment year so the study was mowed off in mid-August. A single harvest was taken on November 7 in the establishment year. In April 1999, common, giant, and 'Wrangler' bermudagrasses and kikuyugrass were added to the study by planting 10 lb seed/ac on a prepared seedbed and rolling.

Results and Discussion: Tifton 85 bermudagrass was the most productive grass in the establishment year producing 5000 lb dry matter per acre (Table 2). This was twice as much forage as bermudagrass varieties established from seed and more than three times greater than Coastal bermudagrass yields. The rapid establishment of Tifton 85 is a major attribute of this variety (Burton et al., 1993). Three of the bermudagrass varieties started from seed ('CD 90160', Texas Tough, and Cheyenne) produced significantly more forage than Coastal during the establishment year. Bahiagrass varieties were also very slow to establish resulting in the lowest yields.

Growth and spread of the grasses in 1998 were restricted because of the severe summer drought. Overton received only about 5 in. of rain from April through July (Table

1). Good rainfall occurred in August through October, but an extreme infestation of armyworms removed much of the fall production. Tifton 85 bermudagrass continued to be the most productive entry at 4 tons dry matter per acre (Table 2). Texas Tough and Tierra Verde were the highest yielding seeded varieties at 2.5 tons dry matter per acre. One reason for the lower yields of the other entries is that they did not have solid stands by the end of 1998. There was little yield difference between Coastal bermudagrass and the seeded bermudagrass entries except for Texas Tough.

Good yields occurred in 1999 ranging from 2 to 6 t/ac because of good moisture conditions during the growing season except for August (Table 2). Tifton 85 and Texas Tough continued to be the most productive entries with Coastal bermudagrass yields similar to the other seeded entries. In 2000, a severe drought occurred during the summer with about 1 in. of rain from July through September (Table 1). However, all entries except Texas Tough produced yields similar to 1999. Texas Tough is a mixture of common and giant bermudagrasses and the amount of common in the mixture had increased. Except for Texas Tough and KF CD 194, yields of the other seeded varieties were similar to Coastal. The four entries planted in 1999 were harvested in 2000 and produced yields comparable to bahiagrasses, Texas Tough, and KF CD 190.

For the four year average, Tifton 85 was the most productive entry followed by Texas Tough and CD 90160. The rapid establishment and high productivity of Tifton 85 is in agreement with previous work at this location (Evers et al., 1999). All the seeded bermudagrass entries had average yields comparable to Coastal which is in agreement with the results reported by Hoveland (1996). Tifton 9 and Pensacola bahiagrasses had similar yields but were less productive than the bermudagrass entries. Seeded bermudagrass varieties are alternatives to Coastal bermudagrass but were not as productive as Tifton 85 bermudagrass. However, there is some evidence that common bermudagrass could become dominant in mixtures of common and giant bermudagrasses over time.

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Table 1. Number of harvests, fertilization, and rainfall from March through October for four years.

	1997	1998	1999	2000
Harvests (no.)	1	3	5	4
Fertility (N-P-K lb/ac)	132-65-125	220-75-150[1]	290-65-235	300-75-225
Rainfall (in.)				
March	2.94	2.06	4.11	3.60
April	6.00	2.06	5.94	4.71
May	1.23	0.27	5.60	7.37
June	5.70	1.57	2.39	2.39
July	2.75	1.28	3.61	0.11
August	3.20	4.04	0.21	0.06
September	1.50	11.53	2.70	0.81
October	6.70	7.44	1.85	2.59

[1]Plus 20 lb Mg and 20 lb S/ac.

Table 2. Warm-season perennial grass yields from 1997 through 2000.

Entry	1997	1998	1999	2000	Average
	----------lb dry matter/ac----------				
Tifton 85 bermuda[1]	5044 a[3]	8064 a	12915 a	12032 a	9514 a
Texas Tough bermuda	2480 bc	5262 b	11749 ab	7956 e-g	6862 b
CD 90160 bermuda	2737 b	3550 d	9696 bc	10347 b	6582 b
Tierra Verde bermuda	2085 cd	4885 bc	9054 c	8318 d-f	6086 bc
Ranchero Frio bermuda	1943 cd	2912 de	8984 c	9991 bc	5957 bc
Coastal bermuda[1]	1611 d	3739 cd	8507 cd	9440 b-d	5824 bc
Cheyenne bermuda	2408 bc	3430 de	6640 d-f	8928 c-d	5351 c
KF CD 194 bermuda	1914 cd	3664 cd	7407 c-e	7525 fg	5127 c
Tifton 9 bahia	767 e	2203 e	5470 ef	5967 h	3602 d
Pensacola bahia	583 e	2167 e	4771 f	6809 gh	3583 d
Kikuyugrass[2]				7620 e-g	
Common bermuda[2]				7445 fg	
Giant bermuda[2]				7356 fg	
Wrangler bermuda[2]				6744 gh	

[1]Bermudagrass varieties established from sprigs.

[2]Entries planted in 1999. All other entries planted in 1997.

[3]Yields within a column followed by the same letter are not significantly different at the 0.05 level, Fisher's Protected LSD Test.

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Bermudagrass is the dominant warm-season perennial grass grown in the southeastern USA. Hybrid bermudagrasses produce very little seed, which is usually sterile, and is established using springs (shoot, crown, rhizome, stolon, and root portions) or with some varieties, mature topgrowth. Seeded varieties would be an attractive alternative because they would be less expensive to plant and require less extensive land preparation than sprigged varieties. New bermudagrass varieties are now available that are pure lines or mixtures of common and giant bermudagrass that are established from seed. A variety trial comparing forage production of some seeded varieties with 'Coastal' and 'Tifton 85', which are established from sprigs, was carried out at the TAMU Agricultural Research & Extension Center at Overton for four years. Tifton 85 was the most productive entry averaging 9500 lb dry matter per acre over four years. The seeded varieties averaged from 5000 to 6900 lb dry matter per acre that were similar to Coastal bermudagrass at 5800 lb dry matter per acre. 'Texas Tough' and 'Tierra Verde' are mixtures of common and giant and there is some evidence that common will dominate the mixture over time.

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