msucares
Coordinated Access to the Research and Extension System
Mississippi Agricultural and Forestry Experiment Station

Bermudagrass Variety Evaluations in South Mississippi

Bulletin 1059 -- October 1996

Carl H. Hovermale
Agronomist
South Mississippi Branch Experiment Station
Poplarville, Mississippi

Greg Cuomo
Assistant Agronomist
Louisiana Agricultural Center
Southeast Research Station
Franklinton, Louisiana

Published by the Office of Agricultural Communications, Division of Agriculture, Forestry, and Veterinary Medicine, Mississippi State University.

Introduction

According to the diary of Thomas Spalding, one early path of bermudagrass entry into the United States was through Savannah, Georgia in 1751, by Governor Henry Ellis (Burton, 1951). Since that time, bermudagrass has become an important forage crop in the southern United States. Mixed bermudagrass pastures cover more than a million acres in Mississippi, and hybrid bermudagrass pastures cover an estimated 200,000 acres (Lamar Kimbrough, personal communication).

Procedures

Several of the bermudagrasses evaluated in this study are experimental lines and may not be available for distribution at this time. Some of these are local ecotypes and others may be "sports" from established varieties.

Holly Springs bermudagrass is a local ecotype selected by Joe Johnson from fields of common bermudagrass at the MAFES North Mississippi Branch Experiment Station, Holly Springs (Edwards et. al., 1995).

Murphy bermudagrass was selected in Leake County, Mississippi (Edwards et al., 1995).

Maddox bermudagrass was selected from pastures where Callie hay had been fed. Maddox was found in Simpson County, Mississippi (Edwards et al., 1995).

Gillihan bermudagrass was selected from pastures where Callie hay had been fed in Shelby County, Tennessee (Edwards, et al., 1995).

Lancaster bermudagrass is a large-type selection developed by Max Wade Lancaster in Alcorn County, Mississippi. Its stolons develop extensive lateral branching to produce a dense groundcover (Kimbrough, 1989).

The other bermudagrasses are available varieties.

Coastal bermudagrass, released in 1943, is the best of some 5,000 hybrids between an introduction from South Africa and a unique bermudagrass found in a south Georgia cotton patch. In numerous tests, it has yielded about twice as much as common bermudagrass. In 1954, with half average rainfall, Coastal stayed green throughout the summer, produced half as much as in a good year, and yielded six times as much as common bermudagrass. It was named Coastal for the Georgia Coastal Plains Experiment Station where it was bred (Burton, 1992).

Tifton 44 bermudagrass is the best of some 3,500 hybrids between Coastal and a winter hardy common bermudagrass found growing beside a railroad track in Berlin, Germany. It is a little finer-stemmed than Coastal and produces more rhizomes. It starts growth earlier in the spring, is more winter hardy, and can be successfully grown 100 miles further north than Coastal bermudagrass (Burton, 1992).

Tifton 78 bermudagrass is a hybrid between Tifton 44 and Callie. It is resistant to rust, has rhizomes, and is about a winter hardy as Coastal but not winter hardy enough for most of Mississippi. Compared to Coastal, Tifton 78 is taller, spreads much faster with above-ground stolons, establishes easier and thicker, and starts earlier in the spring. In a 3-year grazing test, Tifton 78 produced 36% more live weight gain per acre than Coastal. Fertilized with 150 lb/A of nitrogen plus P and K to soil test recommendations, Tifton 78 produced 877 lb/A/yr of liveweight gain on steers (Burton, 1992).

Alicia bermudagrass is a tall-growing bermudagrass selected and promoted by a Texan named Greer. Agronomically, Alicia is similar to Coastal bermudagrass. However the Hill Farm Research Station in Louisiana reports that Alicia is less winter hardy. It has been tested in experiment stations from Texas to Georgia. In no test has Alicia yielded more forage than Coastal. Cattlemen who have both varieties report that Alicia is less palatable than Coastal. Repeated tests show Alicia to be only 80% as digestible as Coastal bermudagrass (Burton, 1992).

Grazer bermudagrass is the best of many F_1 hybrids between PI320876, found in the Alps of northern Italy, and PI 255450 from Kenya. Grazer was bred at Tifton, Georgia and evaluated as Tifton 72-84. At Tifton, Grazer was comparable to Coastal in disease resistance, drought tolerance, and persistence, but usually produced 10 -15% less forage. The forage of Tifton 72-84 was up to 12% more digestible than Coastal, and steers grazing Tifton 72-84 made 13.5% better average daily gains (ADG). Gains per acre for the two grasses were similar. The excellent performance of two grasses were similar. The excellent performance of Tifton 72-84 in Louisiana led to its release under the name of Grazer (Burton, 1992.)

The varieties of **Common** and **Giant** were taken from commercially available seed.

Bermudagrasses were planted on 2-foot centers April 20, 1990 using a randomized complete block design with four replications. Nitrogen was applied at a rate of 68 lb N/A twice each year, once in late March or early April, and again in June or July. In 1994, nitrogen was applied at 102 lb N/A on the same schedule. Seventy-two pounds each of phosphorous and potassium were applied in April of each year.

Plots were harvested with a rotary lawn mower to a 3-inch stubble when bermudagrass was 12 to 18 inches tall. Dry matter (lb/A) was determined four times during 1990 and 1992, five times during 1991, and three times during the 1994 growing seasons. Crude protein (CP), acid detergent fiber (ADF), neutral detergent fiber (NDF),

and *in vitro* true digestible dry matter (IVTD) were determined at the Louisiana Agricultural Center's Southeast Research Station by Near Infrared Spectrophotometry for the 1991 and 1992 growing seasons.

In the spring of 1996, following periods of extreme cold, percentage ground cover and vigor ratings were taken. The percentage of each plot covered by vegetation was estimated. Vigor ratings were subjective ranging from 1 (poor) to 10 (6-inch high vegetation).

The objective of this study was to evaluate bermudagrass lines for forage production, determine seasonal yield distribution, and determine winter hardiness. Data were analyzed using the ANOVA procedures of the Statiscal Analysis System.

Results

In 1991, bermudagrass yields ranged from 5,353 to 12,212 pounds of dry matter per acre (lb DM/A), Table 1. The three highest-yielding lines and their yields (lb DM/A) were: Tifton 78 (12,212), Coastal (11,891), and Maddox (11,517).

In 1992, yields ranged from 5,133 to 12,765 pounds of dry matter per acre (Table 2). The three-highest yielding lines and their yields (lb DM/A) were: Gillihan (12,763), Coastal (12,305), and Tifton 78 (11,738).

In 1993, yields ranged from 2,884 to 10,450 pounds of dry matter per acre (Table 3). The three highest-yielding lines and their yield (lb DM/A) were: Gillihan (10,450), Coastal (10,032), and Murphy (8,343).

In 1994, yields ranged from 4,106 to 9.337 pounds of dry matter per acre (Table 4). The three highest-yielding lines and their yields (lb DM/A) were: Gillihan (9,337), Alicia (8,974), and Coastal (8,886).

In 1991, averaged over four harvest dates crude protein ranged from 9.9 to 12.6 percent (Table 5). The four lines with the highest CP and the percentage were: Holly Springs (12.6), Stallings (12.0), and Lancaster and Grazer (11.7). In 1992, averaged over four harvests, CP ranged from 14.9 to 17.7 percent (Table 6). The three lines with the highest CP and the percentages were Grazer (17.7), Stallings (17.4), and Lancaster (17.2).

In 1991, averaged over four harvests ADF ranged from 33.6 to 37.8 percent (Table 7). The three lines with the lowest ADF and the percentages were: Stallings (33.6), Common (33.7), and Lancaster (34.6). In 1992, averaged over four harvest dates, ADF ranged from 28.8 to 34.1 percent (Table 8). The three lines with the lowest ADF and the percentage were: Stallings (28.8), Maddox (30.7), and Grazer (31.2).

In 1991, averaged over four harvests, NDF ranged from 71.0 to 77.1 percent (Table 9). The three lines with the lowest NDF and the percentage were: Common (71.0), Stallings (72.0), and Maddox (72.5). In 1992, averaged over four harvest dates, NDF ranged from 65.4 to 73.0 percent (Table 10). The three lines with the lowest NDF and the percentages were: Stallings (65.4), Maddox (67.2), and Grazer (67.4).

In 1991, averaged over four harvests, percent IVTD ranged from 57.8 to 64.2 (Table 11). The three lines with highest IVTD and the percentages were: Stallings (64.2), Common (62.8), and Gillihan (62.3). In 1992, averaged over four harvests, percent IVTD ranged from 67.1 to 73.6 (Table 12). The three lines with the highest IVTD and the percentages were: Stallings (73.6), Maddox (73.2), and Lancaster (72.4).

Conclusions

Four-year average yields ranged from 4,369 to 10,778 pounds of dry matter per acre (Table 13). The three highest yielding lines and their yields (lb DM/A) were: Coastal (10,778), Gillihan (10,767), and Alicia (9,762). Averaged over the 2 years, CP ranged from 12.5 to 14.7% (Table 14). Grazer, Lancaster and Stallings had the highest percent CP, but there was no significant difference among varieties.

Averaged over the 2 years, percent ADF ranged from 31.1 to 35.9 (Table 14). Stallings, Lancaster, and Maddox had the lowest percent ADF and Giant, Alicia, Tifton 44, and Tifton 78 the highest.

Averaged over the 2 years, percent NDF ranged from 68.7 to 75.0 (Table 14). Stallings, Maddox, and Common had the lowest percent NDF and Giant, Alicia, Tifton 44, and Tifton 78 the highest. Averaged over the 2 years, percent IVTD ranged from 62.5 to 68.9 (Table 14). Stallings, Maddox, and Lancaster had the highest percent IVTD and Alicia, and Tifton 44 the lowest.

The highest-yielding, commercially available bermudagrass lines were Coastal and Alicia. These lines, unfortunately, have lower quality than some of the less available and lower-yielding lines such as Grazer and Stallings. Gillihan seems to be a very promising line; it has high yields and is among the highest in quality.

References

Burton G.W. 1992. Handout Hybrid Bermudagrass Spriggers Workshop. Rural Development Center, Tifton GA. Feb. 26, 1992.

Burton G.W. 1951. Bermudagrass. p. 270 *In* Hughes, H.D., M.E. Heath, and D. Metcalfe (ed) Forages, Revised Second Edition. Published by Iowa State University Press, Ames, IA.

Edwards, N.C. et al. 1995. Forage Crops, 1995 Variety Trials. MAFES Information Bulletin 289, August 1995.

Kimbrough, L.E. 1989. Forage Bermudagrass. MCES Information Sheet 860. August 1989.