Department of Agronomy & Soils
Departmental Series No. 50 April, 1979
Agricultural Experiment Station Auburn University
R. Dennis Rouse, Director Auburn, Alabama

NEW BERMUDAGRASS VARIETIES IN ALABAMA

NEW BERMUDAGRASS VARIETIES IN ALABAMA

C. S. Hoveland and R. F. McCormick, Jr., Agronomy & Soils Department

W. B. Anthony, Animal and Dairy Sciences Department

W. B. Webster and V. Calvert, Tennessee Valley Substation

J. T. Eason and M. L. Ruf, Sand Mountain Substation

W. A. Griffey, Piedmont Substation

H. E. Burgess and H. C. Hoyle, Plant Breeding Unit

L. A. Smith and H. W. Grimes, Jr., Black Belt Substation

J. A. Little and G. V. Grenade, Lower Coastal Plain Substation

J. G. Starling, Wiregrass Substation

E. L. Carden, N. R. McDaniel, and F. B. Selman, Gulf Coast Substation

Coastal bermudagrass, grown on an estimated 419,000 acres in the State, is more disease-resistant than common bermudagrass and much higher yielding when adequately fertilized. However, dry matter digestibility of Coastal bermudagrass is relatively low and weight gains of growing steers rarely exceed 1.0 lb per day for the season. Coastcross-1, a more digestible bermudagrass variety with the potential for higher daily gains, is not cold hardy and may be winterkilled even in southern Alabama. Cold-hardy bermudagrass varieties with higher digestibility are needed.

Several new bermudagrass varieties and potential varieties were planted at eight locations in the State to evaluate their yield potential, persistence, and digestibility.

Bermudagrass entries in these tests were as follows:

(1) Coastal -- a hybrid between Tift bermuda and a tall-growing introduction from South Africa developed by Dr. G. W. Burton, USDA-SEA, Tifton, Georgia.

(2) Tifton 44 -- A hybrid between a high-quality selection from Kenya, East Africa and a cold-hardy plant from Berlin, Germany developed by Dr. G. W. Burton, USDA-SEA, Tifton, Georgia.

(3) Tifton 68 -- A hybrid of high-quality giant or stargrass (giant bermudagrass) introductions from Kenya developed by Dr. G. W. Burton, USDA-SEA, Tifton, Georgia.

(4) Callie -- Selection from giant or stargrass (giant bermudagrass) introductions from northeastern Africa by Dr. V. H. Watson, Mississippi State University.

(5) Alicia -- South Texas selection by C. Greer of a bermudagrass introduction from southern Africa.

Plantings were made at seven locations in 1976 and at the Black Belt Substation in 1977. Sprigs of each variety were planted during April, 1976 in 4 x 20 foot plots, replicated 4 times, with 4 feet between each plot to prevent mixing of the varieties. Mineral fertilizers were applied according to soil test and 50 lb. N per acre was applied at planting followed by 50 lb. per acre 1 month later and 100 lb. per acre after each harvest. In subsequent years, 100 lb. N was applied in April with 100 lb. N per acre after each harvest. Plots were harvested with a flail harvester at 4- to 8-week intervals, depending on growth. Bermudagrass ground cover was estimated in each plot during spring to determine winter survival.

In vitro dry matter digestibility (IVDMD) of hand-harvested forage from each plot at each harvest was determined throughout the season at the Plant Breeding Unit. Determinations were made the first year by Dr. W. G. Monson, USDA-ARS, Georgia Coastal Plain Experiment Station, Tifton, Georgia and in sub-

sequent years at the Animal and Dairy Sciences Department, Auburn University.

RESULTS

Establishment

Good stands were obtained on all varieties at all locations. Both Callie and Tifton 68 spread rapidly by stolons (horizontal above-ground stems) and generally outgrew other varieties except at the Tennessee Valley Substation where Alicia made more rapid early growth. Tifton 44 formed a complete ground cover more slowly than other varieties in the tests.

Winter Survival

The cold winters of 1976-77 and 1977-78 resulted in severe stand losses of several bermudagrass varieties, Tables 1-8. Tifton 68, an unreleased experimental bermudagrass, was killed at all locations except in extreme southern Alabama. Surprisingly, there was some survival of Tifton 68 at the Piedmont Substation and the Lower Coastal Plain Substation in 1977 but after the second winter it was completely eliminated. Tifton 68 failed to survive the second winter at the Gulf Coast Substation but at the Wiregrass Substation it recovered to make good yields both years.

Callie bermudagrass was winter killed at both the Tennessee Valley and Sand Mountain Substations the first winter. Callie suffered severe loss of stand at other locations and by the third year was eliminated except at the Wiregrass Substation. Stand persistence at this location was probably a result of heavier thatch or residue which protected the stolons and roots. Alicia stands were badly damaged in northern Alabama and to a lesser degree in the central part of the State. Coastal bermudagrass stands were damaged only in northern Alabama and complete recovery was attained by early summer at these sites. Tifton 44 was outstanding in winter survival. Stands of this variety had little or no injury at any test location.

Forage Yield

The slower establishment of Tifton 44 resulted in somewhat lower first year production than that of other varieties, tables 1-8. However, in subsequent years it was the highest yielding variety in northern Alabama. At other locations, Tifton 44 was generally equal to Coastal and Alicia. Alicia yields were low in northern Alabama the second year and failed completely the third year. Elsewhere, Alicia was one of the top yielding varieties. Callie stands were generally eliminated by the third year, resulting in little or no production. At the Wiregrass Substation, Callie was one of the top yielding varieties. At this location, first-harvest yields were lower than Alicia or Coastal but rapid recovery of stands resulted in similar total yields for the year. As mentioned earlier, survival of Callie at this location was probably a result of heavy residue which protected the stands. Under close autumn grazing or cutting, it is likely that Callie production would have been similar to that at the Gulf Coast Substation.

Second and third year production of Tifton 44, throughout the State ranged from 4 to 9 tons of oven dry forage. Highest yields were obtained at the Wiregrass Substation with Coastal, Alicia, and Callie.

Forage Quality

Highest dry matter digestibility values at the Plant Breeding Unit were obtained for the non-cold hardy varieties, Tifton 68 and Callie, table 9. Tifton 44 forage was consistently more digestible than Coastal or Alicia. Alicia forage had dry matter digestibility lower than other varieties in each year of the test. Generally, digestibility of Alicia declined more than Tifton 44 in late summer and autumn. The in-vitro dry matter digestibility values obtained in the laboratory may not be the same as that obtained in animal feeding trials. However, the relative ranking of varieties in respect

to digestibility will be similar to that in animal feeding trials. From these results it is apparent that Tifton 44 is somewhat higher in digestibility than Coastal or Alicia bermudagrass and should result in higher animal performance. Grazing results with Tifton 44 in Georgia over 2 years show a 20% increase in daily gain as compared with Coastal bermudagrass.

SUMMARY

Bermudagrass variety trials were conducted at seven locations for 3 years and one location for 2 years. Results of these trials show that Tifton 44 had the best winter survival, dry matter digestibility higher than Coastal or Alicia, and forage yield generally equal or superior to that of other bermudagrass varieties. Callie, although having higher digestibility than Coastal or Tifton 44, was not sufficiently cold hardy to be a dependable full season forage producer in Alabama. Alicia was not cold hardy in northern Alabama and had no advantage over Tifton 44 or Coastal in central and southern Alabama. Tifton 44, with greater cold hardiness, was higher yielding than Coastal in northern Alabama and is the obvious choice for planting in that area.

Tifton 44 bermudagrass sprigs for planting are available from certified growers. Consult your County Extension Chairman for names of certified growers.

Table 1. Forage yield of bermudagrass varieties at Tennessee Valley Sub-Station, Belle Mina, Alabama. Planted April 8, 1976

Variety	Percent ground cover		Tons per acre oven dry forage			
	04-19-77	05-31-78	1976	1977	1978	Average
Tifton 44	76	96	3.0 bc*	5.8 a	6.5 a	5.1
Coastal	21	76	2.2 c	5.0 b	3.9 b	3.7
Alicia	0	0	4.3 a	3.2 c	0	-
Callie	0	0	3.4 b	0	0	-
Tifton 68	0	0	3.0 bc	0	0	-

*Any two yields within a column marked with the same letter are not significantly different at 5% level.

Table 2. Forage yield of bermudagrass varieties at Sand Mountain Substation, Crossville, Alabama. Planted April 8, 1976

Variety	Percent ground cover			Tons per acre oven dry forage			
	04-15-77	06-20-77	04-18-78	1976	1977	1978	Average
Tifton 44	98	100	100	3.2 a*	7.5 a	7.5 a	6.1
Coastal	10	42	62	3.4 a	5.2 b	3.9 b	4.2
Alicia	5	20	3	3.3 a	3.7 c	0.7 c	2.6
Callie	0	0	0	3.4 a	0	0	-
Tifton 68	0	0	0	3.6 a	0	0	-

*Any two yields within a column marked with the same letter are not significantly different at 5% level.

Table 3. Forage yield of bermudagrass varieties at Piedmont Substation, Camp Hill, Alabama. Planted April 21, 1976

Variety	Percent ground cover		Tons per acre oven dry forage			
	04-08-77	05-04-78	1976	1977	1978	Average
Tifton 44	70	90	1.3 c*	5.0 ab	5.0 a	3.8
Coastal	36	72	1.4 c	4.9 ab	5.0 a	3.8
Alicia	39	42	1.5 bc	5.5 a	4.0 b	3.7
Callie	10	0	1.8 b	4.4 bc	0	-
Tifton 68	14	0	2.4 a	3.8 c	0	-

*Any two yields within a column marked with the same letter are not significantly different at 5% level.

Table 4. Forage yield of bermudagrass varieties at Plant Breeding Unit, Tallassee, Alabama. Planted April 22, 1976

Variety	Percent ground cover		Tons per acre oven dry forage			
	04-08-77	05-04-78	1976	1977	1978	Average
Coastal	89	80	4.0 b*	10.5 a	5.8 b	6.8
Alicia	58	85	3.5 bc	9.8 a	6.5 a	6.6
Tifton 44	98	90	3.0 c	9.5 a	5.2 c	5.9
Callie	5	0	5.8 a	6.4 b	0	-
Tifton 68	0	0	5.3 a	0	0	-

*Any two yields within a column marked with the same letter are not significantly different at 5% level.

Table 5. Forage yield of bermudagrass varieties at Black Belt Substation, Marion Junction, Alabama. Planted May 31, 1977

Variety	Percent ground cover	Tons per acre oven dry forage		
	04-18-78	1977	1978	Average
Alicia	81	3.9 b*	7.7 a	5.8
Coastal	70	3.4 b	7.8 a	5.6
Tifton 44	97	2.4 c	8.1 a	5.2
Callie	0	5.4 a	0	-

*Any two yields within a column marked with the same letter are not significantly different at 5% level.

Table 6. Forage yield of bermudagrass varieties at Lower Coastal Plain Substation, Camden, Alabama. Planted April 12, 1976

Variety	Percent ground cover	Tons per acre oven dry forage			
	04-12-77	1976	1977	1978	Average
Coastal	74	4.2 c*	9.1 a	7.0 a	6.8
Tifton 44	95	4.8 bc	8.0 ab	7.0 a	6.6
Alicia	64	4.4 bc	8.5 a	7.0 a	6.6
Callie	3	6.8 a	7.2 b	1.6 b	5.2
Tifton 68	0	5.7 ab	2.6 c	0.7 c	-

*Any two yields within a column marked with the same letter are not significantly different at 5% level.

Table 7. Forage yield of bermudagrass varieties at Wiregrass Substation, Headland, Alabama. Planted March 31, 1976

Variety	Percent ground cover			Tons per acre oven dry forage			
	03-30-77	07-08-77	04-25-78	1976	1977	1978	Average
Callie	50	94	75	6.9 a*	9.9 a	9.4 a	8.7
Alicia	50	98	90	4.5 b	10.2 a	9.6 a	8.1
Coastal	100	100	90	5.1 b	10.0 a	8.8 ab	8.0
Tifton 68	22	92	20	6.3 a	7.6 b	7.6 b	7.2
Tifton 44	100	100	90	3.8 c	8.5 b	7.2 b	6.5

*Any two yields within a column marked with the same letter are not significantly different at 5% level.

Table 8. Forage yield of bermudagrass varieties at Gulf Coast Substation, Fairhope, Alabama. Planted April 10, 1976

Variety	Percent ground cover			Tons per acre oven dry forage			
	04-05-77	05-23-77	04-20-78	1976	1977	1978	Average
Tifton 44	95	98	98	3.2 a*	6.4 a	8.5 a	6.0
Alicia	92	100	91	2.5 a	6.9 a	8.4 a	5.9
Coastal	100	100	90	3.5 a	6.2 a	7.3 a	5.7
Callie	6	30	2	3.8 a	2.4 b	3.4 b	3.2
Tifton 68	0	10	0	2.9 a	0.4 c	0	-

*Any two yields within a column marked with the same letter are not significantly different at 5% level.

Table 9. *In vitro* dry matter digestibility (IVDMD) of bermudagrass varieties at Plant Breeding Unit, Tallassee, Alabama, 3-year average

Variety	Percentage IVDMD of forage			
	1976	1977	1978	Average
Tifton 68	66 a*	-	-	-
Callie	61 b	56 a	-	-
Tifton 44	59 c	54 b	48 a	54 a
Coastal	57 d	52 c	44 b	51 b
Alicia	54 e	52 c	43 b	50 b

*Any two yields within a column marked with the same letter are not significantly different at 5% level.