TECHNICAL NOTES

COFFEEVILLE PLANT MATERIALS CENTER

No. 2 Coffeeville, Mississippi 1985

INITIAL EVALUATION OF LIMPOGRASSES

Abstract

Ten varieties of limpograss were evaluated at the Coffeeville Plant Materials Center (PMC) from 1982 to 1984, primarily to determine their tolerance to cold. All were killed back the first winter when the low temperature was only 16 F, but recovered sufficiently for good production the following summer. The second winter, when the temperature dropped to -2 F., some were killed outright and most others were weakened. However, two varieties, PI-364875 and PI-364887, were least damaged and offer some potential of extending the range of this very productive grass in Florida farther to the north.

Introduction

Limpograss (Hemarthria altissima stapf & Hubb.) is a stoloniferous, perennial, warm-season grass that derived its name from the Limpopo River Valley in South Africa where it was first collected. It is a high producer of good forage, and is widely used for hay and forage in Florida where several varieties have been released (Quesenberry et. al., 1978). These grasses are damaged by freezing temperatures outside Florida. Recently at the Americus (Georgia) Plant Materials Center, some other accessions have shown more cold tolerance and appear to have potential for extending the use of this grass farther north.

In 1981, nine accessions were sent to the Coffeeville PMC to determine if they would survive winters in the Coffeeville area. 'Redalta' (PI-299993) was the standard for comparison.

Materials and Methods

Stolons of ten accessions were'transplanted to 6-meter rows on May 17, 1982. Rows were 2 meters apart and spacing between plants, in the row was 60 cm. Prior to planting, the field (Oaklimeter sil., 0-2% slope) had been pulverized and treated with methyl bromide for weed control. Fertilizer (13-13-13) had been applied at the rate of 600 lbs./acre.

Evaluations were made periodically throughout the growing season (1982-84) according to standard procedures described in the National Plant Materials Manual. Data were stored in the National Plant Materials Data Base at Ft. Collins, Colorado. Emphasis was placed on factors related to forage production, vigor, and cold tolerance. The rows were cultivated and fertilized during the period 1983-1984.

Clippings were taken at a height of 10 cm. from selected rows in September 1983 and 1984 to calculate total potential yield near the end of the growing season,

Results

Except for height and width measured in centimeters, other evaluations were rated subjectively on a scale of 1 to 9 with 1 considered to have the best appearance. To arrive at a single composite value that could be used to rate each accession statistically, individual evaluations were grouped by factors (foliage production, cold tolerance, and vigor) that were considered important for selection. The visual rating (1-9) was subtracted from 10 to give the best the highest number. Then a composite score was calculated for each factor by an equation that gave higher values to accessions having the best individual evaluations. Decimals were moved so the values would be in the 10 to 100 order of magnitude. Means were compared using the Duncan's Multiple Range test. Evaluations are given in Table 1.

Scores for foliage productivity (FOL PROD) were computed by the equation FOL PROD = FOL HT x FOL WD X (FOL ABN + FOL UNI) where:

1) FOL HT = Foliage height.
2) FOL WD = Foliage width.
3) FOL ABN = Foliage abundance.
4) FOL UNI = Foliage uniformity.

Duncan's Multiple Range test showed differences at the 95 and 99 percent levels of confidence as follows:

ACCESSION	MEAN	95% LEVEL	99% LEVEL
349753	348.1	a	a
364888 (a)	302.6	ab	ab
365509	291.9	abc	ab
364887	273.9	abcd	ab
364875	254.2	abcd	ab
364888 (b)	192.1	bcde	ab
364884	187.2	bcde	ab
Redalta	177.2	bcde	ab
364334	159.6	cde	ab
364874	146.3	de	ab
410138	101.7	e	b

One accession, PI-364888, was planted in two rows (a & b). Row b was completely killed the second winter which explains the lower average production for that row.

Vigor (VIG) or overall appearance was calculated by the equation

VIG = (V1 - V2)/2, where:

1) V1 = Early season vigor.
2) V2 = Mid-season vigor.

An analysis of variance showed that differences in vigor by accession not significant, however, early season vigor was significantly lower because all accessions were affected by the cold winter weather.

Resistance to cold (RES COL) was very low for 5 accessions (Redalta, PI-349753, PI-364884, PI-364888, and PI-410138). PI-36587s suffered least followed closely by PI-364887.

Discussion

Data for these initial evaluations are mostly qualitative rather than quantitative. However, a few selected clippings were made in September 1983. Plots were 1 X 1/2 meter in size. In 1984, duplicate samples were taken and oven dry weight recorded.

Oven dry weights in tons/acre (grams/plot) were as follows:

Accession	364874	364875	364887
Plot 1	5.61 (650)	6.90 (800)	4.31 (500)
Plot 2	5.61 (650)	4.53 (525)	3.23 (375)
Average	5.61 (650)	5.72 (662.5)	3.77 (437.5)

Although these data are too few to show significant difference in production between the accessions, they do indicate the amount of forage that may be expected with favorable conditions.

Conclusion

Of the ten accessions none performed exceptionally well at the Coffeeville PMC. Two accessions, PI-365875 and PI-365887, survived the winters best. They would probably survive and produce an abundance of forage in the southern part of the Coffeeville PMC service area. These are not recommended for use in all the service area because other species perform better.

Reference

Quesenberry, K.H., L.S. Dunavin, Jr., E. M. Hodges, G. B. Killinger, A. E. Kretschmer, Jr., W. R. Ocumpaugh, R. D. Roush, O. C. Ruelke, S. C. Schank, D. C. Smith, G. H. Snyder, and R. L. Stanley. 1978. Redalta, Greenalta, and Bigalta Limpograss, Hemarthria altissima, Promising Forages for Florida, Florida Agricultural Station, Bulletin 802.

TABLE I. EVALUATIONS FOR LIMPOGRASSES AT COFFEEVILLE PMC

Project 28I281G

PI NUMBER	YR RC	FOL HT	FOL WD	FOL ABN	FOL UNI	FOL PROD	V 1	V 2	VIG	RES COLD	RES DROUTH
299993	82	76	183	1	1	250.3	3	3	70		1
	83	76	175	1	1	239.4	3	2	75	1	1
	84	30	100	5	1	42.0	6	5	45	8	1
349753	82	100	305	3	1	488.0	3	3	70		
	83	80	213	1	1	306.7	1	1	90	1	3
	84	130	120	3	1	249.6	5	3	60	8	1
364344	82	61	183	3	3	156.3	5	3	60		
	83	65	175	5	1	159.2	1	3	80	1	3
	84	80	120	2	1	163.2	3	3	70	5	5
364874	82	18	213	3	1	61.3	3	3	70		
	83	80	200	3	3	224.0	3	3	70	1	3
	84	80	120	3	1	153.6	5	3	60	6	
364875	82	90	213	3	1	306.7	3	1	80		
	83	80	200	4	1	240.0	3	3	70	1	1
	84	100	120	1	1	216.0	3	1	80	2	1
364884	82	51	152	1	5	108.5	5	3	60		
	83	106	152	1	1	290.0	3	3	70	1	3
	84	80	120	2	1	163.2	5	3	60	7	1
364887	82	90	244	1	1	395.3	1	1	90		
	83	76	213	2	3	242.8	2	3	75	1	3
	84	90	120	2	1	183.6	4	2	70	3	1
364888(a)	82	90	183	3	1	263.5	3	3	70		
	83	110	180	1	1	356.4	1	1	90	1	1
	84	120	150	3	1	288.0	5	3	60	8	1
364888(b)	82	76	213	1	1	291.4	1	1	90		
	83	80	220	1	1	288.0	1	1	90	1	1
	84					0.0	0	0	0	9	
365509	82	100	213	1	1	383.4	3	1	80		
	83	100	220	2	2	352.0	2	1	85	1	1
	84	90	120	5	2	140.4	5	3	60	6	1
410138	82	36	183	3	1	105.4	5	5	50		
	83	78	160	3	1	199.7	1	3	80	1	3
	84					0.0	0	0	0	9	

Legend:

- YR RC = Year of Record
- FOL HT = Foliage Height (cm)
- FOL WD = Foliage Width (cm)
- FOL ABN = Foliage Abundance
- FOL UNI = Foliage Uniformity
- FOL PROD = Foliage Productivity
- V-1 = Early Season Vigor
- V-2. = Mid-Season Vigor
- VIG = Composite Vigor
- RES COLD = Resistance to Cold
- RES DROUTH = Resistance to Drouth