Floralta

A Limpograss Selected for Yield And Persistence in Pastures

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IMPORTANT CHARACTERISTICS

Floralta Limpograss

Advantages	*Disadvantages*
More tolerant than Bigalta limpograss to heavy grazing.	Vegetative planting material dries rapidly when exposed to sun.
High production (when well fertilized).	Crude protein content can be low (with inadequate N fertilization).
Competitive with broadleaf and grassy weeds.	Not well adapted to dry, deep, sandy soils.
Adapted to wet soil.	Difficult to cure for hay at advanced stages of growth.
Superior late fall and early spring production.	
More palatable and digestible than Red alta limpograss.	

INTRODUCTION

'Floralta' Limpograss *(Hemarthria altissima* [Poir] Stapf and C. E. Hubb) is the direct release of an increase of USDA plant introduction 364888. This introduction was first extensively evaluated in Florida beginning in 1974. A systematic evaluation of performance in small plot experiments and grazing animal experiments has shown Floralta to be superior to the other released limpograsses in total dry matter yield. Floralta is superior to 'Redalta' and 'Greenalta' limpograss in *in vitro* organic matter digestion (IVOMD) and generally equal to or perhaps slightly lower in IVOMD than 'Bigalta'. Floralta was specifically selected for persistence under grazing and is markedly superior to Bigalta. Floralta is best adapted to the poorly drained sandy soils of peninsular Florida, but good production has been obtained in west Florida also. Superior production data on Floralta have been reported from Venezuela, Ecuador, and New Zealand.

ORIGIN AND DESCRIPTION

Floralta limpograss is a stoloniferous perennial tropical grass of the tribe Andropogonea of the family Poaceae. The plant introduction (P.I.364888) now designated as Floralta was originally collected from a small island in the Luvuvhu River several kilometers above its confluence with the Limpopo River in Kruger National Park, Republic of South Africa (Oakes 1973). Floralta has a tetraploid chromosome number (2n = 36) (Quesenberry, et al., 1982). Like most other limpograsses, Floralta produces few seed, and is thus vegetatively propagated. Its general morphological appearance is similar to Bigalta in that it has larger stems and wider leaves than the diploid Redalta and Greenalta cultivars. Floralta has a more intense purple coloration under cool temperature stress or fertility deficiency than Bigalta, but it generally does not show the intense red pigmentation that Redalta shows under similar environmental conditions. Floralta appears to be similar to other released cultivars of limpograss in winter hardiness. Oakes (1980) reported that Floralta showed 80% survival, whereas Redalta, Greenalta, and Bigalta had 84%,78% and 76%, survival, respectively, at several locations in the United States. At a more temperate latitude (49°S) in New Zealand, Floralta was significantly more winter hardy than Bigalta.

SMALL PLOT EVALUATIONS

Gainesville, Florida

A series of forage yield and performance experiments at Gainesville, following the scheme proposed by Quesenberry *et al.* (1977) led to the initial identification of Floralta as a superior genotype. The first of these experiments was a small plot clipping trial established at the Beef Research Unit (BRU) near Gainesville in 1974 (Ruelke *et al.*, 1976). Floralta was the top yielding genotype in this experiment in both 1975 and 1976 with markedly superior performance in 1976. The IVOMD data from 1976 shows that Floralta was superior to Redalta and Greenalta and comparable to Bigalta (Table l).

Table 1. Yield and IVOMD of limpograss cultivars in a small plot clipping experiment at the Beef Research Unit near Gainesville, FL

	1975		1976	
Limpograss	Total	Total	IVOMD	
Cultivar	yield	yield	(5 weeks)	Persistence
	------lbs/A------		-------%------	
Floralta	14,620	11,390	60.6	67
Redalta	9,170	7 ,460	54.5	23
Bigalta	14,010	3,530	60.5	0
Greenalta	7 560	4 230	58.6	52

NOTES: This experiment included 44 other limpograsses and Floralta was superior to all in yield. Data from Dr. O. C. Ruelke.

Multiply Ibs/A by 1.12 to convert to kg/ha.

In late 1976, a second series of small plot experiments was established to compare a selected group of limpograss genotypes under clipping defoliation and under mob grazing defoliation. Mob grazing is a research technique for forage evaluation where a large number of cattle are allowed to consume in 1 to 3 days the forage production from small plots of a number of different forage genotypes. The animals are then removed and the grass is allowed to regrow. Both experiments were planted at the BRU and first harvested in 1977. The clipping experiment was harvested four times at 5-week intervals. The clipping plots were fertilized with 200 Ibs/A 16-4-8 (N-P2O5-K2O) complete fertilizer with micronutrients after each harvest. The mob grazing experiment was grazed five times at 5-week intervals. The grazing plots received 300 Ibs/A of 0- 10-20 fertilizer in the spring of each year and 100 Ibs/A of 33-0-0 fertilizer before each regrowth period. The yield of the grazed plots was estimated using a simple disk meter and converted to Ibs/A by multiplying total disk heights by the regression coefficient of 110. Table 2 shows that Floralta limpograss was superior to other cultivars in both 1977 and 1978 in total yield and persistence under clipping defoliation. The IVOMD data from 1977 show that Floralta is comparable to Bigalta under similar management conditions and superior to Redalta and Greenalta. Floralta had persistence superior to Bigalta under grazing defoliation in both 1977 and 1978. The higher yields of Redalta and Greenalta in 1978 under grazing are probably due to poorer animal acceptance of these cultivars than of Floralta. The technique used in mob grazing resulted in more complete utilization of Floralta than Greenalta and Redalta. Thus at the end of the grazing period Floralta had less stubble than Greenalta and Redalta, which resulted in less regrowth for Floralta than for

Greenalta and Redalta. In 1979 Floralta was highest in yield and maintained good persistence.

Table 2. Yield, IVOMD and persistence of limpograss when defoliated by either clipping or grazing at the Beef Research Unit near Gainesville, FL

	1977*				1978*			
	Clipping		Grazing		Clipping		Grazing	
Limpograss cultivar	Total yield	IVOMD	Total yield	IVOMD	Total yield	Persistence	Total yield	Persistence
	Ibs/A	-%-	lbs/A**	-%-	lbs/A	-%-	lbs/A	-%-
Floralta	10,440	67.3	12,760	64.8	15,300	81	9,900	85
Redalta	7,470	58.8	10,120	56.5	11,340	87	12,650	95
Bigalta	5,940	67.8	10,890	67.4	9,090	28	0	0
Greenalta	7,920	58.1	10,230	54.2	9,720	70	13,200	82

* Grazing and clipping frequency was 5 weeks.

** Calculated yield from total drop disk height multiplied by regression coefficient of 110.

NOTES: Data from Drs. K. H. Quesenberry and ~ R. Ocumpaugh. Multiply Ibs/A by I .12 to convert to kg/ha.

Table 3. Dry matter yield of limpograss cultivars as affected by three rates of N fertilization and three intervals of defoliation, Gainesville, FL(lb/A)

		Dry matter yield		
Limpograss cultivars	Total N fertilization	Defoliation interval		
		3 weeks	9 weeks	18 weeks
Floralta	0	2,430	5,310	9,360
	110	3,960	10,890	15,660
	430	6,120	21,960	26,370
Bigalta	0	2,970	5,850	7,920

	110	4,230	10,440	17,100
	430	6,840	17,190	16,470
Redalta	0	2,430	8,190	9,360
	110	2,790	8,730	14,400
	430	5 040	15,570	17,730

NOTES: Data from Dr. Scott Christiansen (1982).

Multiply Ibs/A by 1.12 to convert to kg/ha.

Following these clipping and grazing experiments, an experiment was initiated in 1980 (Christiansen 1982) to study the effects of several different defoliation and N fertilization treatments on Floralta, Bigalta, and Redalta. Table 3 is an abstract of a portion of these data and shows that Floralta was generally either first or second in total dry matter yield at all defoliation frequencies and all N fertilization levels. At the 9-week defoliation treatment Floralta yielded 10,890 lbs/A when fertilized with approximately 110 lbs/A of N. This treatment approximates the type of yields that could be expected under a stockpiling management regime. Of interest also are the extremely high yields obtained on Floralta with approximately 430 lbs/A of N, harvested at either the 9 or 18-week defoliation frequency.

An experiment designed to evaluate the fall production potential of Floralta was initiated on August 1, 1981 (Ruelke and Quesenberry 1983). Previous summer growth of Floralta was removed to a height of approximately 3 inches on August 4, 1981, and 67 Ibs/A of N was applied as 15-5- 10 fertilizer. Dry matter yield harvests were then taken at 2-week intervals beginning 4 weeks after the initial staging of the experiment and continuing until February 1, 1982. As shown in Figure 1, Floralta reached a yield plateau of approximately 9,000 lbs/ A about October 1, with only minimal accumulation of dry matter occurring after this date. A slight decrease in total dry matter accumulation occurred after the first killing frost. Little or no additional accumulation occurred in north central Florida prior to the termination of the experiment on February 1. Crude protein (CP) content declined as the grass matured to levels at which animals may require supplementation after about October 1. These low CP values were similar to those found with the other limpograsses in previous research (Quesenberry and Ocumpaugh, 1980).

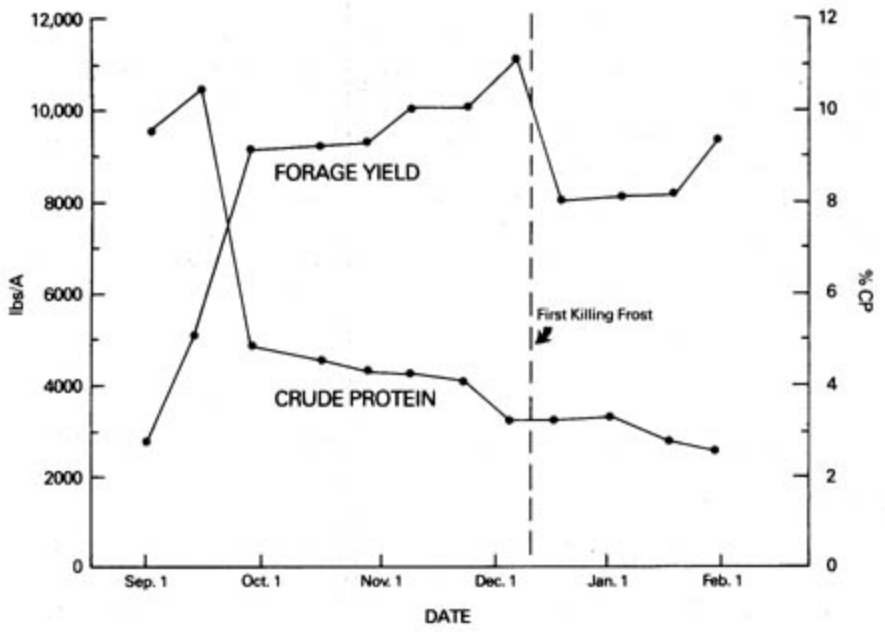

Figure 1. Yield and crude protein content of Floralta limpograss managed for autumn production.

ARC, Jay, Florida

Floralta and Redalta limpograsses have been compared with a number of bermudagrasses in northwest Florida at the Jay Agricultural Research Center (ARC). Table 4 shows that Floralta gave comparable yields to the best yielding bermudagrasses in the establishment year (1978); however, in 1979 and 1980, yields of the limpograsses were generally poorer than the bermudagrasses. These data probably indicate that this cooler and dryer location in northwest Florida is not as well suited for limpograss production as the warmer and wet, sandy, flatwood soils of central and south Florida.

Table 4. Dry matter yields of bermudagrasses and limpograsses for three years at ARC, Jay, FL

	1978	1979	1980
	Sept 6.		
Grasses	(1 harvest)	(5 harvests)	(5 harvests)
Limpograsses			
Floralta	4,410	7,830	5,040
Redalta	1,440	8,280	8,100

Bermudagrasses			
Callie	4,500	12,870	8,550
Coastal	1,980	12,690	10,620
Coastcross-1	3,150	14,130	9,360
Tifton 44	1,620	9,630	11,430
NOTES: Data from Dr. L. S. Dunavin, ARC, Jay, FL. Multiply Ibs/A by 1.12 to convert to kg/ha.			

Floralta limpograss has also been compared at the Jay ARC with two other pasture grasses ['Tifton 44' bermudagrass *(Cynodon daclylon L.)* and 'Pensacola' bahiagrass *(Paspalum notatom* Flugge)], planted in combination with 'Florigraze' rhizome peanut. This peanut-grass experiment, established in 1980, was harvested in 1981 on August 24, and on June 16 and August 30 in 1982. Floralta maintained a better grass-peanut mixture and was highest in total dry matter yield in 1981 and 1982 (Table 5). In the spring of 1982 all legume-grass combinations showed a high percentage of Florigraze rhizome peanut. Summer 1982 production shows a higher percent of Floralta and significantly greater total dry matter yield than the other grass-legume combinations.

Table 5. Percent botanical composition and dry matter yield of three tropical grasses and Florigraze rhizome peanut at ARC, Jay, FL.

	August 24, 1981				June 16, 1982			August 30, 1982		
Grasses	Grass	Peanut	Weed	Total dry matter	Grass	Peanut	Total dry matter	Grass	Peanut	Total dry matter
	---------- % ----------			Ibs/A	-------- % --------		Ibs/A	-------- % --------		Ibs/A
Floralta										
limpograss	59	35	6	4810a*	19	81	4140a	59	41	6100a
Pensacola										
bahiagrass	61	36	3	4280a	11	89	3474a	29	71	4620b
Tifton 44										
bermudagrass	54	40	6	3640a	23	77	3920a	36	64	4690(b)

NOTES: Data from Dr. L. S. Dunavin, ARC, Jay, FL.
Multiply Ibs/A by 1.12 to convert to kg/ha

*Yields for a harvest date followed by the same letter are not significantly different at P = 0.05 by Duncan's multiple range test.

New Zealand

Floralta has received only limited evaluation at international locations. In one experiment at Palmerston North, New Zealand (a rather temperate environment at latitude 40° south), Floralta was compared with four other limpograsses including Bigalta. Floralta yielded 11,690 lbs/A vs 10,800 for Bigalta in the first year of this experiment; however, the best yielding introduction yielded 15,800 lbs/A. These yield differences are probably due to variability in winter hardiness. Floralta was more winter hardy than Bigalta at this location, but less winter hardy than two other unreleased plant introductions (PI. 364884 and 349753). These results suggest that Floralta is probably not suited to colder locations in the southeastern United States.

INTERMEDIATE LEVEL GRAZING EVALUATIONS

Gainesville, Florida

A mob grazing experiment was initiated in 1977 on Floralta and seven other advanced lines of limpograss to evaluate production and persistence under grazing conditions. Each of four approximately 1/4 acre pastures was assigned one of the four different grazing defoliation frequencies (3, 5, 7 and 9 weeks). Small plots of the eight different limpograsses were vegetatively established in the summer of 1977 in two replications in each pasture. Grazing treatments were imposed in the spring of 1978. By the end of the first season Bigalta and PI. 364874 were showing marked decreases in percent stand of limpograsses at the 5,7, and 9-week grazing frequencies compared with Floralta. The marked superiority of Floralta in overall persistence was clearly demonstrated by the end of the third season (Figure 2). At the 3, 5, and 9-week defoliation intervals, both Bigalta and P.I. 364874 had drastic stand reduction, whereas Floralta and Redalta remained near 80% ground cover at all four defoliation frequencies. A major factor contributing to the persistence of Redalta is poor animal acceptability. Floralta, however, showed no evidence of animal unpalatability and plots were generally grazed as closely as Bigalta.

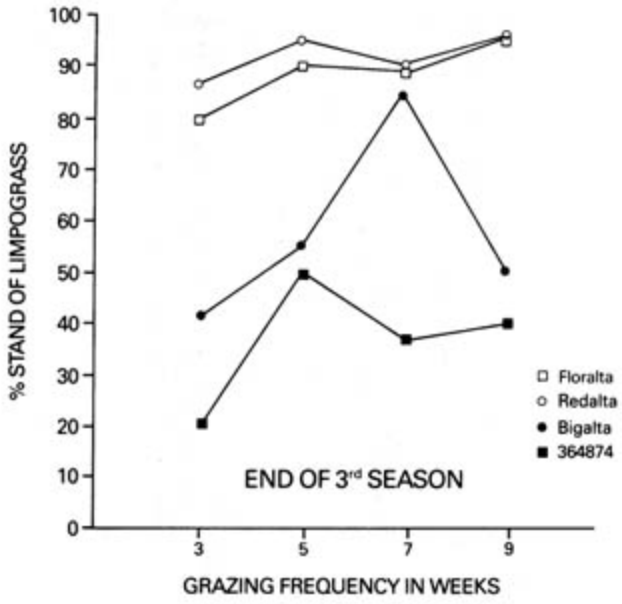

Figure 2. Percent stand of four limpograsses after three years of mob grazing at four frequencies of defoliation at the Beef Research Unit, Gainesville.

ARC, Ona, Florida

A companion mob grazing experiment similar in design to the one at Gainesville was established at the ARC, Ona in 1978, and grazing treatments were imposed in 1979. Grazing defoliation frequencies in this experiment were 3, 6, 9, and 12 weeks. Common bermudagrass *(Cynodon daclylon L.) is* a major weed problem at this location in improved pasture experiments and often becomes the predominant species under heavy grazing pressures. Floralta had consistently higher percent ground cover than Bigalta at all grazing frequencies in both years of this experiment (Figure 3). These data suggest, however, that frequent, close defoliation of Floralta may also result in increased weed competition. Dry matter yields taken prior to each grazing from April 1980 to March 1981 show that Floralta yielded more than Bigalta at all grazing frequencies (Table 6).

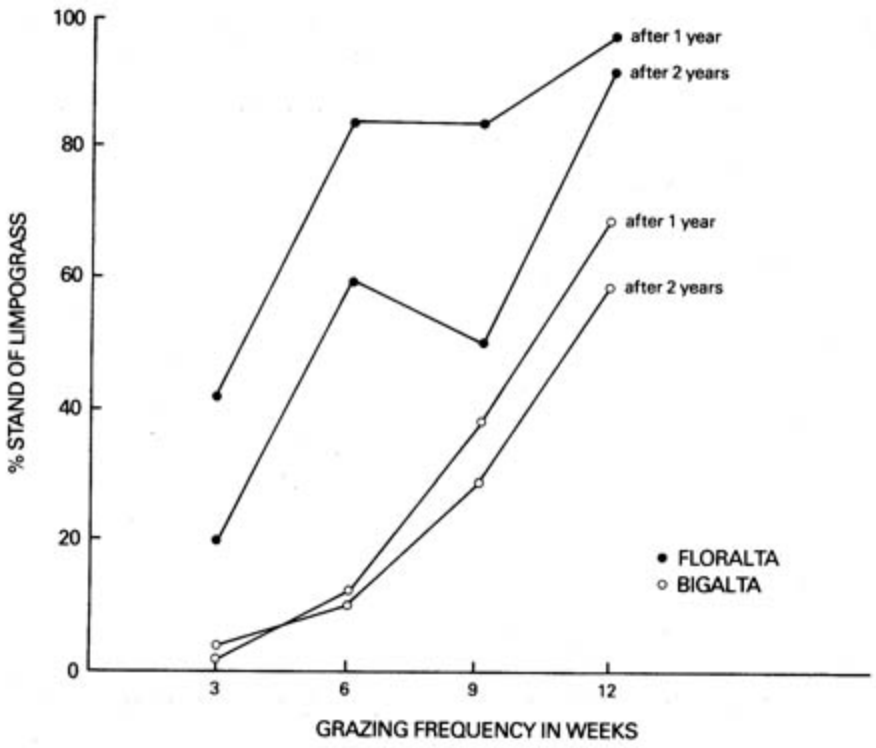

Figure 3. Percent stand of Floralta and Bigalta limpograss after one and two years of mob grazing at four frequencies of defoliation at the ARC, Ona.

Table 6. Effect of grazing frequency on total yearly dry matter production of limpograss cultivars at ARC, Ona, FL, April 1980-March 1981(lbs/a)

Limpograss cultivars	Grazing frequency			
	3 weeks	6 weeks	9 weeks	12 weeks
Floralta	7,800	13,300	14,300	19,800
Bigalta	5,400	7,000	10,300	12,500

NOTES: Data from Dr. Paul Mislevy, ARC, Ona, FL. Multiply Ibs/A by 1.12 to convert to kg/ha.

ANIMAL PERFORMANCE

Gainesville, Florida

In 1980 an animal performance grazing trial designed to compare beef gains on Floralta limpograss and Pensacola bahiagrass *(Paspalum notatum* Flugge) was established at the BRU. Grazing was initiated on these pastures in the spring of 1981, using the put-and-take technique to maintain an adequate level of available forage. The Floralta paddocks were ready to graze approximately 6 weeks earlier than the Pensacola bahiagrass paddocks, and continued producing forage 28 days longer in the fall than Pensacola (Figure 4). Mean number of animals per/acre was 1.2 throughout the grazing season for Pensacola and varied from 1.2 to 2.4 on Floralta with a mean of 1.63 throughout the grazing season. Average daily gains (ADO) were similar on Floralta and on Pensacola bahiagrass (0.77 and 0.72 lbs/A, respectively); however, the increased carrying capacity and additional calendar days of grazing per acre resulted in an almost two-fold difference in total gain per acre for Floralta. The 1982 results of this grazing experiment again showed that animal days per acre and average number of animals per acre were greater for Floralta limpograss than Pensacola bahiagrass, although ADG was slightly higher for Pensacola than Floralta (Table 7). In 1982 the Floralta pastures appeared to be under utilized in the early part of the grazing season resulting in lower quality forage and thus lower ADG in the late summer and fall. Floralta pastures should be grazed sufficiently close in the early summer to prevent a buildup of mature stems near the soil.

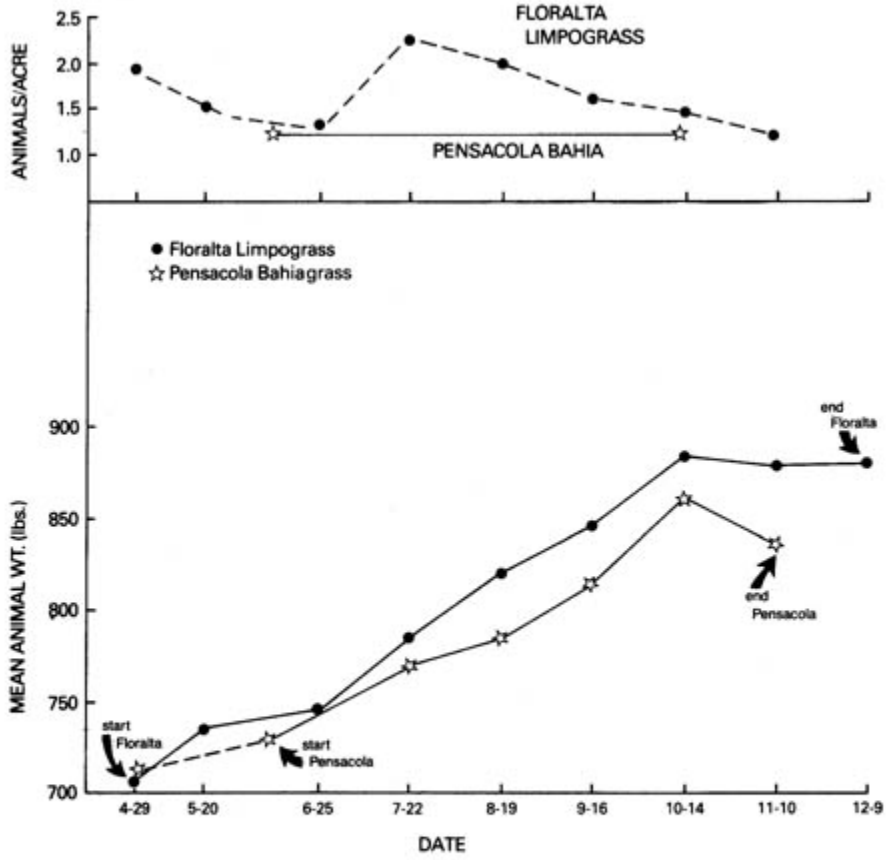

Figure 4. Mean animal weight and animals per acre on Floralta limpograss and Pensacola bahiagrass during the 1981 grazing season.

Ecuador

Mixed grass-legume pastures of Floralta limpograss, *Neonotonia wightii* (Arnott) Lackey, and *Centrosema pubescens* Benth, were compared with other pastures of guinea grass, *Panicum maximum* Jacq, and *Neonotonia wightii* in a grazing experiment conducted at the Pichilingue Tropical Experiment Station in Ecuador. Data from the 1981 grazing season show that average daily gains on Floralta limpograss plus legume pastures were slightly higher during the wet season and considerably higher during the dry season (Table 8). However, the robust guinea grass carried a greater number of animals per acre compared to Floralta limpograss (0.96 vs. 0.80, respectively) and, thus, total gains per acre on the guinea grass-legume mixture were higher in the wet season but equal to the Floralta limpograss-legume mixture in the dry season. These data suggest that Floralta limpograss is well adapted to a tropical environment with alternating wet and dry seasons and shows promise for animal gains similar to the more robust guinea grass under similar management conditions.

Table 7. Animal grazing performance on Floralta limpograss and Pensacola bahiagrass.

	1981		1982	
Item	Pensacola limpograss	Floralta bahiagrass	Pensacola limpograss	Floralta bahiagrass
Calendar days of grazing	224	154	223	223
Gain/animal (Ibs)	173	113	210	245
Average daily gain (Ibs)	0.77	0.72	0.94	1.11
Animals days/A	365	185	540	468
Stocking rate (animals/A)	1.63	1.2	2.42	2.10
Total gain/A (Ibs/A)	281	133	508	519
NOTE: Data from Dr. ~ R. Ocumpaugh and Dr. G. O. Mott.				

Table 8. Animal gain on tropical forages at the Pichilinque Tropical Experiment Station in Ecuador

	Wet season 1981 (Jan.-May)			Dry season 1981 (June-Oct.)		
Forage mixture	Avg. daily gain	Animals	Total gain	Avg. daily gain	Animals	Total gain
	Ibs/Animal	no./A	Ibs/A	Ibs/Animal	no./A	lbs/A
Floralta limpograss + *Neonotonia wightii* & *Centrosema pubescens*	2.03	0.8	251	1 . 14	0.8	158
Guineagrass +	1.97	0.96	293	0.94	0.96	141

Neonotonia wightii						

NOTES: Data provided by Dr. Raul Santillan (1982 unpublished). Multiply Ibs/A by 1.12 to convert to kg/ha.

PEST PROBLEMS

No major insect problems have been observed on Floralta limpograss. The armyworm complex which attacks many tropical grasses in Florida can cause severe damage in isolated circumstances. Damage appears to be no worse on Floralta than most other tropical grasses. In a series of sting nematode *(Belonolaimus longicaudatus* Rau) tolerance trials (Quesenberry and Dunn, 1978), Floralta was significantly poorer in sting nematode tolerance than the most tolerant line; however, it was not significantly different from the released cultivars of Bigalta and Redalta in sting nematode tolerance. Floralta was significantly less susceptible to the yellow sugar-cane aphid *(Siphaflava* Forbes) than Pangola digitgrass *(Digitaria decumbens* Stent), and was not different from Greenalta (Oakes, 1978).

No major foliar diseases of Floralta limpograss have been identified.

WINTER HARDINESS

Oakes (1980) has shown that Floralta limpograss was slightly less winter hardy than Redalta, but equal to or more winter hardy than Greenalta and Bigalta. Research experience in Florida has indicated that little or no winter killing occurred in Gainesville with minimum temperatures of 14°F (- 10°C). Observations at the ARC, Jay, Florida, indicate that some winter killing did occur during the winter of 1981-82. The minimum temperature experienced at this location was 8°F (- 13°C) with the temperature below freezing for 53 consecutive hours. Plot studies at the ARC, Ona, indicated that Floralta was more cold tolerant than Bigalta in 1981 -82. The minimum low temperature at this location was 14°F. Other data from New Zealand also indicate that Floralta is superior to Bigalta in winter hardiness.

PRODUCTION AND MANAGEMENT RECOMMENDATIONS

Initial Establishment

Floralta limpograss is vegetatively propagated. It produces few, if any, viable seed. Ruelke *et al.* (1978) compared three planting techniques (sprigged, sprigged and disked, and sprigged and disked, plus cultipacked) for establishment of limpograss. The disked, and disked, plus cultipacked establishment methods, where two-thirds or more of the limpograss stems were covered with soil, were superior planting techniques to simple spreading of the material on top of the soil without disking. A soil compaction operation such as cultipacking or rolling is recommended to improve establishment of limpograss. In this experiment, planted on August 1, 1977, Floralta spread more rapidly than Redalta, but slightly less rapidly than Bigalta. Ratings from the experiment taken on April 17, 1978, (8 months after planting) showed that Floralta had overall higher percent ground cover than both Redalta and Bigalta, resulting in greater 1978 total

dry matter yield from comparable establishment treatments. This experiment demonstrates that within 3 months after establishment a satisfactory percent ground cover can be obtained from Floralta. Establishment year fertilization in this experiment at Gainesville was 66, 20, and 40 lb/A of N, P_2O_5, and K_2O, respectively.

Mature Floralta planting material should be mowed, allowed to wilt only slightly, and baled green for transportation to a new planting area (Figure 5). Experience has shown that a bermudagrass sprig planter can be used effectively for establishing Floralta limpograss; however, for rapid coverage it is recommended that the normal 40 inch planting row spacing of this device should be reduced to 20 inch centers. Using a bermudagrass sprig planter with 20 inch rows requires approximately 15 to 20 bales per acre for establishment. An alternate approach is broadcasting planting material, either by hand or mechanically, and incorporating it into the soil. Observations have suggested that a supplemental nitrogen application 2 to 3 weeks prior to mowing planting material promotes more rapid establishment. Establishment fertilizer should be low in nitrogen and high in phosphorus and potassium to encourage root development without promoting excess weed growth. A minimum rate of 400 lbs/A of 5-10-15 with minor elements should be applied prior to planting. When Floralta plants reach about 4 to 5 inches in height, an application of Dicamba (3, 6-dichloro-0-anisic acid) at 0.5 to 0.75 lbs/A may be useful to control broadleaf weeds. Once the grass becomes well rooted, nitrogen should be applied to stimulate forage growth.

Annual Maintenance

Research at Gainesville has shown that Floralta responds with increasing dry matter yields to nitrogen fertilizer application up to 430 lbs/A of N (Table 3); however, these rates are not generally recommended. In this same experiment, yields of 10,890 lbs/A were obtained with 110 lbs/A of N at 9-week harvest intervals. N fertilizer at this level also produced adequate crude protein content. N, P_2O_5, and K_2O aplied in a 4:1:2 ratio generally is acceptable for tropical grasses. Follow soil test recommendations to avoid any nutrient deficiencies.

Limpograss is moderately susceptible to 2, 4-D herbicide, and this product is not recommended for use on Floralta for broadleaf weed control. Dicamba, used at the recommended rates, has shown no phytotoxicity on limpograss and can be used for maintenance control of broadleaf weeds in Floralta. Read and follow label directions concerning grazing of herbicide treated pastures. Weed invasion should be less in Floralta pastures than in Bigalta pastures because of Floralta's superior persistence.

PLANTING MATERIAL

Vegetative planting material will be available in the summer of 1984 at the Beef Research Unit, Gainesville, Florida, and at the ARC, Ona, Florida. Distribution will be on a limited quantity basis.

The Florida Foundation Seed Producers, Inc., PO. Box 309, Greenwood, Florida, 32433, will maintain a list of growers who have obtained foundation planting material for future distribution to producers.

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