



‘Mislevy’ Bermudagrass

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Introduction

Bermudagrass is the most planted forage species in the southeastern USA, covering approximately 30 million acres. This species was introduced into Savannah, GA in 1751 by the former governor of Georgia, Henry Ellis. Currently, bermudagrass is used for grazing, haying or silage, but there are also varieties being used for ornamental purposes. Bermudagrass has been preferred over other warm-season perennial grass species due to greater nutritive value and persistence under adverse climatic conditions and management practices.

In the southeastern USA, warm-season perennial grass production is limited in early spring and late autumn and there is a need to develop cultivars less sensitive to shorter daylength and/or decreased temperatures to have greater forage production in those periods. Early spring forage production is highly desirable because producers may increase their profitability by decreasing the need for supplementation. In addition, hay producers could harvest and market hay earlier than any other producers in the country. Therefore, there has been a need to develop and release a bermudagrass cultivar with early spring production that would meet the needs of forage producers in the southeastern USA.

‘Mislevy’ is a natural bermudagrass hybrid entry that was found at the UF/IFAS Range Cattle Research and Education Center in 2000. Dr. Paul Mislevy noticed an off-type bermudagrass plant present in a Tifton 85 bermudagrass field. The plant was collected, multiplied in a greenhouse, and later transferred to the field where a pure stand of Mislevy was established in 2001. Research projects conducted in Florida indicated that the variety has greater early spring forage production than most bermudagrass cultivars with similar nutritive value and persistence, indicating that it has merit to be released as a bermudagrass cultivar with greater early-spring forage production.

Ona Clipping Trial

An experiment was conducted at the UF/IFAS Range Cattle Research and Education Center in Ona, FL in 2015 and 2016.

Treatments included 5 bermudagrass cultivars/genotypes (hereafter called “cultivar”): Coastal, Tifton 44, Tifton 85, Jiggs, and Mislevy distributed in a randomized complete block design with 4 replicates.

Plots were established in August 2014 and fertilized with 300 lb/acre of 10-10-10. Plots were 9 x 6 ft with 3 ft between plots. Plots were staged on April 4, 2015 and harvested manually with clippers to 6-inch stubble height every 5 weeks thereafter. Plots were fertilized with 300 lb/acre of 20-05-20 after every harvest. In 2015, plots were harvested on May 5, June 16, July 20, August 24, and September 28. In 2016, harvest dates were March 29, April 26, May 24, June 21, July 19, August 16, September 13, October 11, and November 3.

Mislevy and Jiggs had greater herbage accumulation than Tifton 44, Tifton 85 and Coastal in March (Table 1). Tifton 85 had greater herbage accumulation than other cultivars in May and June. Mislevy had greater herbage accumulation than the other cultivars in August but similar to Jiggs and greater herbage accumulation than Tifton 85, Tifton 44, and Coastal in September and October. The cumulative annual herbage accumulation of Mislevy was similar to Jiggs and greater than Tifton 85, Tifton 44, and Coastal.

There was a cultivar x month interaction for CP and IVDOM concentrations (Table 1). Crude protein concentration of Mislevy did not differ from Jiggs in March but was less than Tifton 85, Coastal, and Tifton 44 in March and April. However, Mislevy was among the cultivars with the greatest CP concentration during the other months of the experimental period.

There were no differences in IVDOM among cultivars in March, but Tifton 85 was among the cultivars with the greatest IVDOM concentrations during the experimental period. Mislevy did not differ from Tifton 85 in May and August but had greater IVDOM concentration than Tifton 85 in June. Mislevy had similar IVDOM to Jiggs and Tifton 44 during the majority of the experimental period and greater than Coastal in June, July, and August.

No viable seed from any of the cultivars were observed in this trial. At the termination of the study, the experimental plots were sprayed with 4 qt/acre of glyphosate and all cultivars had 100% control with no remaining vegetation after 1 month.

Marianna Clipping Trial

An experiment was conducted at the UF/IFAS North Florida Research and Education Center in Marianna, FL in 2015 and 2016.

Treatments included 7 bermudagrass cultivars: Alicia, Russell, Coastal, Tifton 44, Tifton 85, Jiggs, and Mislevy distributed in a randomized complete block design with 4 replicates.

Plots were established in July 2014 and fertilized with 300 lb/acre of 10-10-10. Plots were 9 x 6 ft with 3 ft between plots. Plots were staged on April 4, 2015 and harvested manually with clippers to a 6-inch stubble height. Plots were harvested and fertilized with 300 lb/acre of 20-05-20 every 5 weeks thereafter. In 2015, plots were harvested on May 11, June 15, July 22, August

24, and September 28, and November 3. In 2016, harvest dates were, April 4, May 8, June 13, July 20, August 19, September 27.

There was no difference in herbage accumulation among cultivars in April and November; however, Mislevy and Jiggs had greater herbage accumulation than the other cultivars in May (Table 2). Tifton 85 had greater herbage accumulation than Mislevy in June, July, and August, and was similar to Mislevy in September. Mislevy, Tifton 44, Tifton 85, and Jiggs had greater herbage accumulation than the other bermudagrass cultivars in September. Mislevy, Jiggs, Tifton 85, and Coastal had the greatest and Tifton 44, Alicia, and Russell had the least herbage accumulation.

There was no difference in CP concentrations among cultivars; however, there was a cultivar x month interaction in IVDOM concentrations (Table 2). Coastal had the least IVDOM concentration in April and there was no difference among the other cultivars. Tifton was among the cultivars with the greatest IVDOM concentration in all months except November. Mislevy had lower IVDOM concentration than Tifton 85 in June and September but did not differ in other months. Mislevy had greater IVDOM concentration than Jiggs in May and November.

Ona Grazing Study

A grazing study was conducted at the UF/IFAS Range Cattle Research and Education Center, in Ona, FL from 2002 to 2004.

Four bermudagrass cultivars/entry, Mislevy, Jiggs, World Feeder, and Tifton 85, and 4 stargrass (*Cynodon nlemfuensis*), Stargrass 2000, Florona, Okeechobee, and Ona Pasture 2 were evaluated using four grazing frequencies, 2, 4, 5, and 7 weeks. These were distributed in a split-plot arrangement in a randomized complete block design with three replicates.

Main plots (forage species/cultivar) was 90 x 90 ft divided in 4 subplots of 10 x 10 ft each. Plots were fertilized with 178 lb N/acre/year during the experimental period.

The mob stocking method was used to graze the plots. Thirteen steers were used to graze the plots to a stubble height of approximately 4 inches. Prior to grazing, samples were collected from each experimental unit for herbage accumulation and nutritive value determination. Plots were not grazed from November to March but the herbage accumulation in the period was recorded. The procedures for nutritive value determination are similar to procedures described for the clipping trial at Ona.

Mislevy, Jiggs, and Florona had the greatest herbage accumulation among the bermudagrass and stargrass cultivars tested (Table 3). There was a year x cultivar interaction and the interaction occurred because few cultivars decreased herbage accumulation from 2002 to 2003, likely due to poor persistence. Mislevy and Jiggs had the greatest herbage accumulation during the cool season (November to March). In addition, there was a grazing frequency x cultivar interaction. Mislevy had the greatest herbage accumulation when harvested at 7 weeks regrowth interval. Bermudagrass cultivars are susceptible to diseases and pests at longer regrowth intervals and it was hypothesized that Mislevy had the least tissue damage due to diseases and insects.

Tifton 85 had the greatest IVDOM concentrations among the cultivars and Mislevy and Jiggs had similar IVDOM and CP concentrations. However, the average nutritive value for Mislevy, Jiggs, and Florona was 16.3% CP and 59% IVDOM, which are above the nutritional requirements of most beef cattle categories.

Mislevy, Jiggs, Tifton 85 and Florona were the most persistent cultivars in the trial, averaging only 2% weeds in the herbage mass after 3 years of grazing.

Conclusions

Jiggs has been the most planted bermudagrass cultivar in South Florida, while Tifton 85 has been the most planted in North-Central Florida. Jiggs is more adapted to the poorly drained soils found in South Florida, where Tifton 85 has decreased persistence under those conditions. However, Tifton 85 has consistently presented greater IVDOM due lower concentrations of ether-linked ferulic acid in the cell wall than other bermudagrass cultivars.

It has been reported that Jiggs has greater spring and fall herbage accumulation than Tifton 85, but similar during the summer. Early herbage accumulation is of great interest to producers because early spring and fall are periods of limited forage.

Mislevy showed similar early spring and fall production to Jiggs with similar nutritive value. In Marianna, Mislevy had slightly greater IVDOM concentrations than Jiggs in the spring. The superior herbage accumulation of Mislevy and Jiggs in the cool season was confirmed in the grazing study. Mislevy and Jiggs had the greatest annual herbage accumulation among the bermudagrass and stargrass cultivars tested in the grazing study. In addition, Mislevy had greater herbage accumulation at longer regrowth intervals. Due to the unpredictability of Florida weather, this may be an important characteristic to give flexibility to producers to delay forage harvest.

Considering hay production, Mislevy will be attractive to producers because it has thinner stems than Tifton 85 and will dry faster in the field. In addition, hay with thin stems have better appearance for marketing due to the perception that thinner stems result in better nutritive value. Mislevy has potential to become an important forage for grazing and hay production in Florida.

Mislevy is propagated by mature tops and sprigs. One-acre plots were planted in Gainesville and Marianna in 2019 to supply plant material to producers in a near future. The Range Cattle Research and Education Center has approximately 5 acres of Mislevy and will be able to supply plant material to producers in summer 2020.

Table 1. Cultivar/Entry x month interaction effects on herbage accumulation, crude protein (CP), and in vitro digestible organic matter (IVDOM) concentrations of bermudagrass harvested every 4 weeks in 2015 and 2016 at Ona, FL.

Cultivar/Entry	Month								Total	SE
	March	April	May	June	July	August	September	October		
	Herbage accumulation (kg DM/ha)									
Mislevy	1,070a†	2680ab	1400b	1500b	1800a	1800a	1900a	1000ab	13200a	250
Tifton 44	800b	2600ab	1300b	1500b	1300b	1500b	1700ab	900b	11700b	
Tifton 85	620b	2860a	1800a	2000a	1500b	1400b	1600b	360c	12300b	
Jiggs	1070a	2900a	1400b	1500b	1400b	1600b	1800ab	1100a	12800a	
Coastal	715b	2300b	1400b	800c	800c	700c	600c	900b	8200c	
SE					170					
	CP (%)									
Mislevy	13.4b	14.8c	18.9a	19.9a	12.7a	11.9a	11.4b	10.6a		1.30
Tifton 44	16.9a	16.8b	19.6a	20.3a	13.9a	13.2a	12.4b	11.3a		
Tifton 85	15.8a	19.6a	20.2a	17.0b	11.0b	10.8a	11.8b	9.7b		
Jiggs	13.6b	14.7c	19.5a	19.5a	12.9a	12.0a	11.8b	10.8a		
Coastal	15.3a	16.4b	17.3b	17.5b	12.5a	12.8a	13.6a	10.2a		
SE					0.48					
	IVDOM (%)									
Mislevy	44.3a	52.4b	55.9a	60.0a	48.9b	46.2a	43.8b	45.6b		0.69
Tifton 44	47.7a	53.4b	55.8a	55.2b	45.4bc	48.9a	45.4ab	47.7b		
Tifton 85	45.8a	58.9a	55.0a	56.4b	53.9a	50.7a	48.6a	50.0a		
Jiggs	44.2a	52.1b	54.8a	56.8b	46.0bc	45.8a	44.4ab	45.4b		
Coastal	44.2a	52.1b	56.4a	52.2c	44.4c	42.8b	44.5ab	47.5b		
SE					1.52					

†Means followed by the same letter are not different ($P \geq 0.05$)

Table 2. Cultivar/Entry x month interaction effects on herbage accumulation, crude protein (CP), and in vitro digestible organic matter (IVDOM) concentrations of bermudagrass harvested every 4 weeks in 2015 and 2016 at Marianna, FL.

Cultivar/Entry	Month							Total	SE
	April	May	June	July	August	September	November		
	Herbage accumulation (kg DM/ha)								
Mislevy	290a†	2400a	2200b	2000b	900b	650a	380a	8900a	240
Tifton 44	300a	1600b	1600c	1900b	1000ab	410ab	350a	7400b	
Tifton 85	190a	1500b	2500a	3400a	1150a	500ab	410a	9600a	
Jiggs	290a	2400a	2100b	2000b	1200a	570a	410a	9000a	
Coastal	150a	1600b	2800a	2200b	1200a	340b	490a	8900a	
Alicia	320a	1400b	2500a	2000b	850b	300b	350a	7800b	
Russell	300a	1500b	2500a	2000b	650c	330b	480a	7800b	
SE					110				
	CP (%)								
Mislevy	14.2	10.0	8.9	11.2	13.9	12.5	14.3	1.3	
Tifton 44	14.1	11.0	8.8	12.9	13.8	12.9	12.7		
Tifton 85	14.7	12.8	8.9	11.8	14.5	12.3	13.4		
Jiggs	12.7	12.9	8.9	12.2	14.6	11.9	14.5		
Coastal	13.9	13.2	9.1	10.6	13.6	13.1	15.1		
Alicia	14.7	11.0	10.1	10.8	15.5	12.2	13.4		
Russell	14.8	12.8	8.7	10.8	14.5	13.3	12.8		
SE					0.7				
	IVDOM (%)								
Mislevy	65.6a	55.1a	45.2b	47.4b	51.6ab	43.7b	47.0b	1.4	
Tifton 44	66.5a	53.2ab	48.9ab	45.0b	47.9b	44.3b	46.5b		
Tifton 85	66.0a	59.8a	51.1a	52.3a	54.7a	49.0a	47.3b		
Jiggs	66.9a	48.8b	46.5b	47.1b	52.0ab	45.0b	42.8c		
Coastal	61.8b	52.9ab	46.4b	46.7b	52.1ab	50.2a	53.3a		
Alicia	63.4ab	48.0b	38.4c	38.2c	47.0b	42.2b	45.7b		
Russell	63.3ab	45.3c	47.0b	42.6c	49.9b	46.9b	42.4c		
SE					1.0				

†Means followed by the same letter are not different ($P > 0.05$)

Table 3. Grass entry effects on total seasonal herbage accumulation during 2002 and 2003 [Adapted from Mislevy et al. (2008)].

	Year	
	2002†	2003
Bermudagrass		
	kg DM/ha	
Mislevy	15670a‡	13900a
Jiggs	15470a	12790ab
World Feeder	12330cd	10000c
Tifton 85	13000bc	11200bc
Stargrass		
2000	10760d	9800c
Florona	14570ab	12300ab
Okeechobee	12100cd	12100b
Ona Pasture No. 2	13220bc	12100b

† Harvest period from 6 June to 15 December 2002 and 7 April to 24 November 2003.

‡ Means within columns followed by the same letters are no different ($P \geq 0.05$)