UF IFAS UNIVERSITY of FLORIDA

Range Cattle Research & Education Center

UF UNIVERSITY of FLORIDA

Nitrogen Use Efficiency of Limpograss

2018 UF/IFAS Range Cattle REC Webinar

Joao Vendramini

Introduction

UF UNIVERSITY of FLORIDA

- Limpograss (*Hemarthria altissima*) is the second most cultivated forage for beef cattle production in South Florida

Introduction

UF UNIVERSITY of FLORIDA

- The first plants were brought to the USA in 1964 via the Rietondale Research Station, Pretoria, South Africa.

Introduction

- Floralta was among the first limpograss cultivars released by Dr. Quesenberry in the 1980's
- In 2014, two new cultivars, Gibtuck and Kenhy, were released by IFAS. They are the first and only limpograss hybrids in the world.

Introduction


Introduction

- Fertilization is among the most costly input in forage production
- In addition, soil and climatic conditions usually decrease fertilization efficiency in grasslands in Florida

Introduction

- "Identification of Superior Limpograss Cultivars Under Low-Input Systems"
- Project funded by the Florida Cattle Enhancement Board
- The objective of this project was to test cultivars/entries of limpograss under different fertilization regimes

Material and Methods

- The project has been conducted from 2016-2018 in Ona, Gainesville, and Marianna
- Treatments were the combination of:
  - 4 limpograss cultivars/entry (Floralta, Gibtuck, Kenhy, and Entry 1)
  - 2 fertilization levels (40-10-40 or 80-20-80)
  - 2 harvest frequencies (6 or 12 weeks)

Material and Methods

- Nitrogen use efficiency was calculated as the N applied divided by the herbage accumulation.
- Data was collected in 2016 and 2017 in Ona and Gainesville and 2017 and 2018 in Marianna.
- The 2017 data from Ona will be presented.

Results - Ona

Response variables	Herbage accumulation (lb DM/acre)	Nitrogen use efficiency (lb DM/lb N fertilized)	Crude Protein (%)	Digestibility (%)
Cultivar				
Gibtuck	4,100a	68a	8.1a	55.8a
Kenhy	2,900b	48b	8.9a	54.6a
Floralta	3,420b	56b	8.4a	54.8a
Entry 1	2,800b	46b	8.8a	54.2a
Regrowth Interval				
6 weeks	2,800b	46b	9.8a	57.6a
12 weeks	6,270a	104a	7.3b	52.2b
Fertilization				
80-20-80	5,000a	62b	8.7a	55.2a
40-10-40	4,000b	100a	8.4a	54.5a

Results - Ona

Response variables	Herbage accumulation (lb DM/acre)	Nitrogen use efficiency (lb DM/lb N fertilized)	Crude Protein (%)	Digestibility (%)
Cultivar				
Gibtuck	4,100a	68a	8.1a	55.8a
Kenhy	2,900b	48b	8.9a	54.6a
Floralta	3,420b	56b	8.4a	54.8a
Entry 1	2,800b	46b	8.8a	54.2a
Regrowth Interval				
6 weeks	2,800b	46b	9.8a	57.6a
12 weeks	6,270a	104a	7.3b	52.2b
Fertilization				
80-20-80	5,000a	62b	8.7a	55.2a
40-10-40	4,000b	100a	8.4a	54.5a

Results - Ona

Response variables	Herbage accumulation (lb DM/acre)	Nitrogen use efficiency (lb DM/lb N fertilized)	Crude Protein (%)	Digestibility (%)
Cultivar				
Gibtuck	4,100a	68a	8.1a	55.8a
Kenhy	2,900b	48b	8.9a	54.6a
Floralta	3,420b	56b	8.4a	54.8a
Entry 1	2,800b	46b	8.8a	54.2a
Regrowth Interval				
6 weeks	2,800b	46b	9.8a	57.6a
12 weeks	6,270a	104a	7.3b	52.2b
Fertilization				
80-20-80	5,000a	62b	8.7a	55.2a
40-10-40	4,000b	100a	8.4a	54.5a

Results - Ona

	Root mass (lb DM/acre)	Ground cover (%)
Cultivar		
Gibtuck	4310a	88a
Kenhy	2988b	50b
Floralta	2650b	64b
Entry 1	3600ab	61b
Regrowth Interval		
6 weeks	2980b	54b
12 weeks	3900a	87a
Fertilization		
80-20-80	3900a	85a
40-10-40	2800b	58b

Results - Ona

	Root mass (lb DM/acre)	Ground cover (%)
Cultivar		
Gibtuck	4310a	88a
Kenhy	2988b	50b
Floralta	2650b	64b
Entry 1	3600ab	61b
Regrowth Interval		
6 weeks	2980b	54b
12 weeks	3900a	87a
Fertilization		
80-20-80	3900a	85a
40-10-40	2800b	58b

Results - Ona

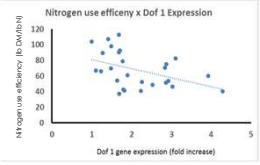
	Root mass (lb DM/acre)	Ground cover (%)
Cultivar		
Gibtuck	4310a	88a
Kenhy	2988b	50b
Floralta	2650b	64b
Entry 1	3600ab	61b
Regrowth Interval		
6 weeks	2980b	54b
12 weeks	3900a	87a
Fertilization		
80-20-80	3900a	85a
40-10-40	2800b	68b

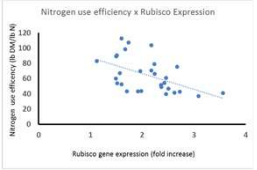
Results

	Herbage accumulation (lb DM/acre)	N concentration (%)	N content (lb N/12 week harvest)
Fertilization			
80-20-80	3900a	1.4	55
40-10-40	2800b	1.4	40

Results

Cultivar	Dof 1	Rubisco
	Fold increase	
Ona		
Gibtuck	1.9b	1.7c
Kenhy	1.5b	2.0b
Floralta	2.2a	2.1b
Entry 1	2.5a	2.5a





Implications

- There are evidences that Gibtuck is a superior limpograss cultivar in South Florida. Gibtuck had the greatest root mass and ground cover and it is more persistent than other cultivar under adverse management practices.
- Greater regrowth intervals consistently resulted in greater herbage yield and ground cover, indicating that limpograss management should be slightly different from other warm-season perennial grasses. As expected, longer regrowth intervals resulted in slightly lesser nutritive value; however, the magnitude of the increase is not justified by the decrease in herbage yield and stand.

Implications

- It is perceived that lower fertilization levels may be used in situation of unfavorable cattle market conditions or grazing; however, there may be a decrease in persistence if lower fertilization levels are used for an extended period of time for hay or haylage production.
- Preliminary gene expression results are promising but it will be necessary to further explore the relationship between Dof -1 and Rubisco gene expression and nitrogen use efficiency in warm-season grasses.

Joe What? Podcast

Joe Vendramini jv@ufl.edu