UF IFAS
UNIVERSITY of FLORIDA

Range Cattle
Research & Education Center

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Identification of Superior Limpograss Under Low-Input Systems

Joao Vendramini, Lynn Sollenberger, Jose Dubeux, and Maria Silveira

Limpograss

- The first plants were brought to the USA in 1964 via the Rietondale Research Station, Pretoria, South Africa.
- Today, over 250,000 acres of limpograss are grown in Florida, predominantly southern Florida.

Limpograss Review (2004) by K. H. Quesenberry, L. E. Sollenberger, and Y. C. Newman. ASA/CSSA/SSSA Agronomy Monograph No. 45

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Limpograss

- Limpograss produces up to 40% of its total annual yield during the cool-season with considerable cold hardiness variability among varieties.
- 'Floralta' limpograss selected for persistence in Florida and is the most common variety used.
- In general, limpograss has high digestibility and low crude protein.

Limpograss

New Limpograss Cultivars: Gibtuck and Kenhy

Herbage Accumulation Under Advanced Grazing Evaluation at FESL of Limpograss Hybrids

Limpograss entry	Year		P value
	2012	2013	
	Mg ha^{-1} yr^{-1}		
1	9.0 b[†]	10.8 a	0.13
4F	11.7 a	13.0 a	0.32
10	12.8 a	11.5 a	0.26
32	9.2 b	7.8 b	0.22
34	9.2 b	5.7 b	0.007
Floralta	10.7 ab	8.1 b	0.05
SE	1.20		

Table 1. Average herbage accumulation and ground cover of limpograss entries.

Limpograss Entries	Herbage accumulation ----------Mg ha^{-1}----------	Ground Cover ----------%----------
1	5.7b[†]	82
4F	5.2c	80
10	6.8a	82
41	5.2c	75
62	5.2c	74
Bigalta	5.3c	78
Floralta	5.8b	76
SE	0.2	4

[†]Means followed by different letters within columns are different (P<0.06)

Limpograss

- Fertilizer is the most expensive input in forage production
- The selection and release of the new hybrids was conducted at similar fertilization levels
- Silveira et al. (2017) observed that limpograss herbage accumulation and persistence was greatly influenced by harvest frequency

Objectives

- To test the nitrogen use efficiency of Gibtuck, Kenhy, 1, and Floralta
- To identify key genes responsible for nitrogen use efficiency in limpograss
- Evaluate the potential merit of releasing entry 1 as a commercial limpograss cultivar

FCA Priority List

- #1 Fertilization – Update fertilizer recommendations
- #5 Forage varieties under low-input systems

Locations

- UF/IFAS Range Cattle Research and Education Center, Ona, FL
- UF/IFAS Beef Research Unit, Gainesville, FL
- UF/IFAS North Florida Research and Education Center, Marianna, FL

Treatments

- Treatments are the combination of:
  - Four cultivars – Gibtuck, Kenhy, 1, and Floralta
  - Two fertilization levels – 80-20-80 or 40-10-40
  - Two harvest frequencies – 6 or 12 weeks

Harvest

- Plots will be harvest 3 – 12 weeks cycles in Ona or 2 – 12 weeks cycles in Gainesville and Marianna
- Forage will be harvested at 7 inches stubble height and used for herbage accumulation, CP, and IVDOM determination
- Samples for RNA analysis will be collected at the start and termination of the study
- Real time PCR will be used for RNA determination

Harvest

- The expression of the genes RBCS (Rubisco), glutamine synthetase (GS, wheat), and DOF 1(corn) were evaluated.
- Limpograss ground cover will be evaluated at the termination of the experimental period

Results

Results

Cultivar effect on herbage accumulation, nitrogen use efficiency, CP, and IVDOM

Response variables	Herbage accumulation (lb/acre)	NUE (lb DM/lb N fertilized)	CP (%)	IVDOM (%)
Cultivar				
Gibtuck	3,300a	57a	7.6a	54a
Kenhy	2,700b	41b	8.0a	53a
Floralta	2,500b	47b	7.4a	54a
Entry 1	2,000c	36c	8.1a	54a

Results

Regrowth interval effect on herbage accumulation, nitrogen use efficiency, CP, and IVDOM

Response variables	Herbage accumulation (lb/acre)	NUE (lb DM/lb N fertilized)	CP (%)	IVDOM (%)
6 weeks	2,600a	45a	9.2a	57a
12 weeks	2,700a	46a	6.2b	51b

Results

Fertilization effect on herbage accumulation, nitrogen use efficiency, CP, and IVDOM

Response variables	Herbage accumulation (lb/acre)	NUE (lb DM/lb N fertilized)	CP (%)	IVDOM (%)
80-20-80	2,700a	34b	8.5a	54a
40-10-40	2,100b	54a	7.1b	53a

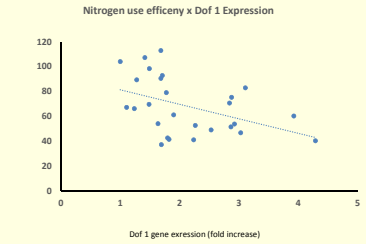
Results

Gene expression of Rubisco and DOF 1 in Ona and Marianna

Location/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
Marianna		
Gibtuck	2.0b	1.9b
Kenhy	1.6c	2.7a
Floralta	2.3b	2.7a
Entry 1	2.8a	3.0a

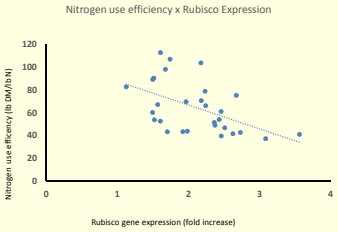
Results

Gene expression x NUE in Ona and Marianna



Results

Gene expression x NUE in Ona and Marianna



Summary

- In south Florida, Gibtuck is consistently the most productive limpograss cultivar under high or low fertilization levels.
- In addition, Gibtuck showed greater nitrogen use efficiency and the least expression of Rubisco and DOF 1 genes
- Entry 1 did not show merit to be considered for future release

Joe What? Podcast

Thank you for your attention

Joe Vendramini
Forage Specialist
Range Cattle Research and Education Center
University of Florida – IFAS, Ona
(863) 735-1314
jv@ufl.edu