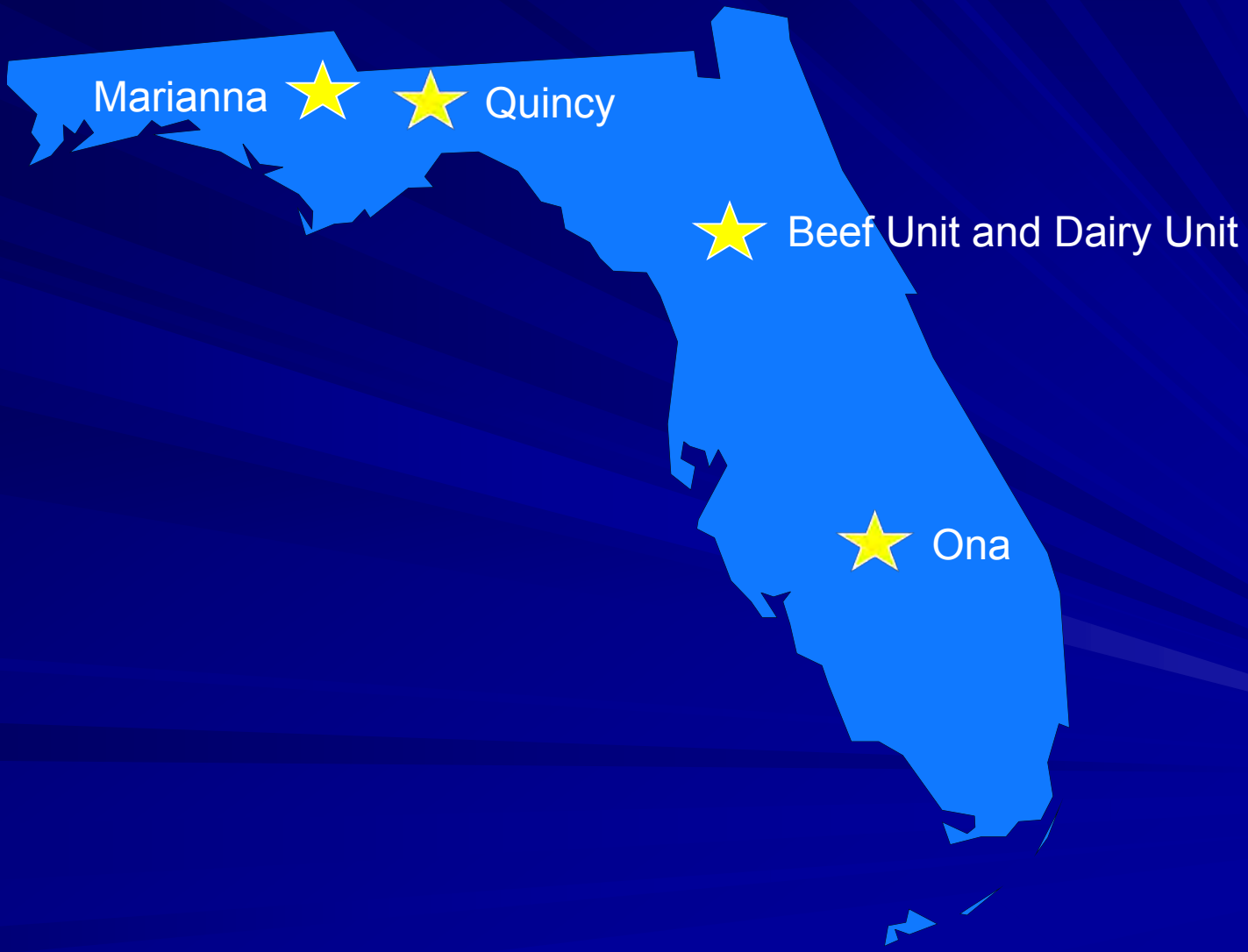
Agronomy Forage Research Update

Lynn Sollenberger
UF/IFAS Agronomy Dept.

Outline

- Statewide Agronomy Forage Management and Breeding Team
- Problems Being Addressed and Outcomes

Research Facilities



Forage Management Team

LBR

Vacant extension position

Forage Breeding Team

Problems Being Addressed

- Short term
  - Cool-season forage supply
  - Nitrogen fertilizer cost on grass-based systems
  - Bahiagrass decline
  - Warm-season grass alternatives

Problems Being Addressed

- Longer term
  - Breeding Florida-adapted varieties of important forage species
  - Effects of forage systems on the environment

Problem: Cool-season Forage Supply

- Limpograss
- Ryegrass, small grains, and clovers

Limpograss Breeding

- 50 new limpograss hybrids produced (Quesenberry and Blount)

Agronomy Forage Research Unit – north of Gainesville

Limpograss Evaluation

- 8 hybrids selected for evaluation under grazing
- Grazed every 2 or 4 weeks to 8 inches

Initial Grazing of Limpograss Hybrids

Initial Grazing Evaluation at Beef Unit

Limpograss entry	Year	
	2010	2011
	tons/acre	
1	3.3	3.0
4B	3.0	2.5
Kenhy	4.4	4.5
9	2.7	2.1
Gibtuck	4.5	4.4
27	3.0	2.4
32	3.6	2.8
34	3.6	3.0
Floralta	4.1	3.3

Initial Grazing Evaluation at Beef Unit

Limpograss entry	After 2 years of grazing	
	Limpograss cover (%)	Weed frequency (%)
Kenhy	85	14
Gibtuck	92	9
Floralta	82	18

Advanced Grazing Evaluation of Limpograss Hybrids at Beef Unit

Limpograss entry	Year	
	2012	2013
	tons/acre	
1	4.0	4.8
Kenhy	5.2	5.8
Gibtuck	5.7	5.1
32	4.1	3.5
34	4.1	2.5
Floralta	4.8	3.6

Stockpiling Yield, CP, & Digestibility

Entry	Herbage yield (tons/acre)	Crude protein (%)
Kenhy	3.3	3.2
Gibtuck	2.8	3.9
Floralta	2.4	3.7

Stockpiling Yield, CP, & Digestibility

Entry	Yield (Mg ha^{-1})	Crude protein (%)
Kenhy	3.3	3.2
Gibtuck	2.8	3.9
Floralta	2.4	3.7

Entry	Stockpiling period (wk)	
	8	12
	Digestibility (%)	
Kenhy	59.4	53.0
Gibtuck	52.0	51.9
Floralta	52.8	46.5

Summary and Recommendations

- Kenhy
  - May be the best for stockpiling
- Gibtuck
  - May be the best for more regular grazing or hay production during the growing season

Current Status

- Kenhy and Gibtuck released July 2014 to selected growers throughout the state for increase.
- Planting material available for general distribution from at least some of these growers later this year

Problem: Cool-season Forage Supply

- Ryegrass, small grains, and clovers

Annual Ryegrass Breeding

- Breeding program of Kevin Kenworthy

Annual Ryegrass Breeding

- Disease Resistance
  - Crown Rust and Grey Leaf Spot

Crown rust susceptible

Crown rust resistant

Annual Ryegrass Breeding

Objectives:

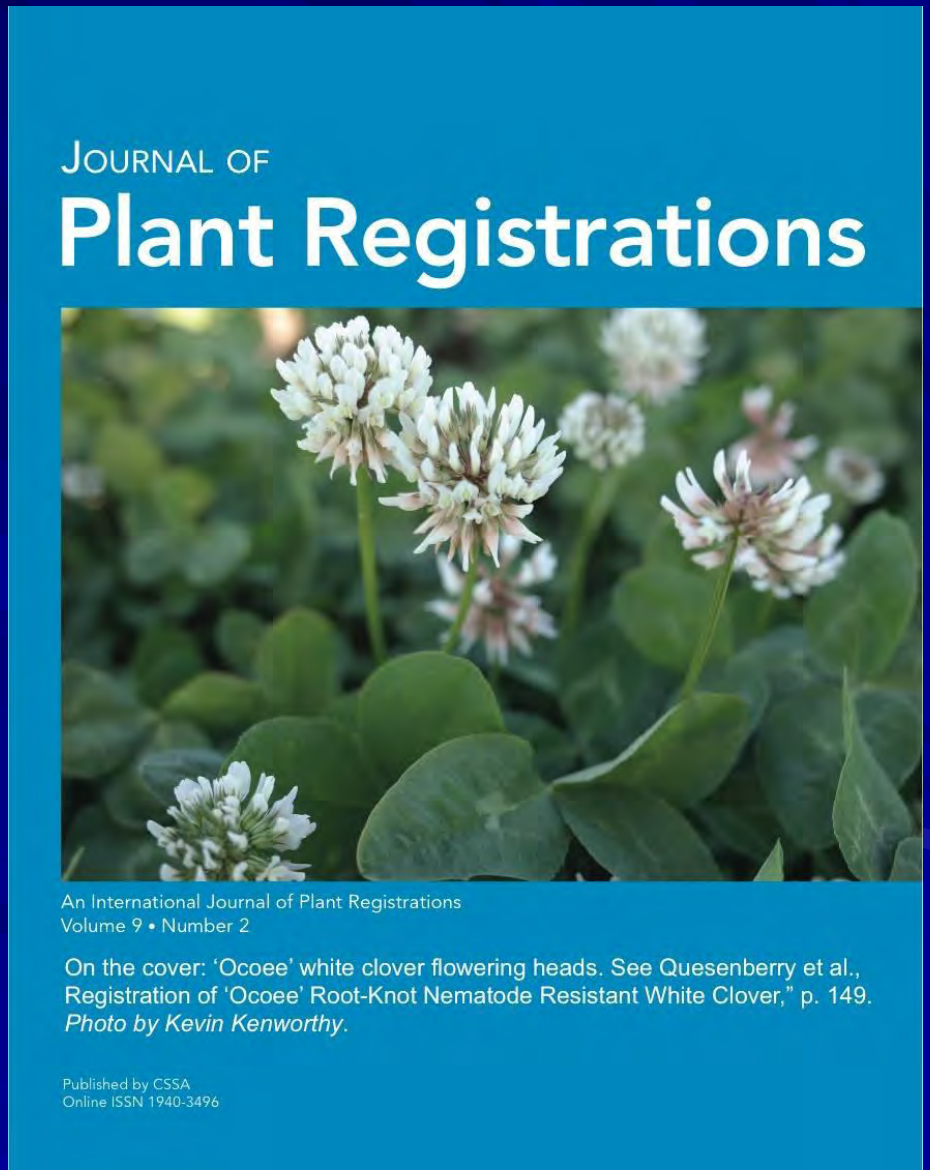
- Maturity Dates
  - Early and late maturing varieties for different uses

Small Grains Program

- Dr. Blount's Breeding Program Goals
  - Rust resistance of oat
  - Early-growing and high yielding triticale for harvested forage
  - Earlier and more leafy rye

Cool-Season Legumes

- New Releases
  - White Clover
  - Red Clover



White Clover

- Ocoee - seed coming on line; superior nematode resistance, yield, and rooting characteristics

Osceola **Ocoee**

Red Clover

<u>Status</u>

2,4-D resistant red clover (FL24D) released 2014

Will be licensed this year

Not Sprayed

Sprayed with 2,4-D

Problems Being Addressed

- Short term
  - Cool-season forage shortage
  - **Nitrogen fertilizer cost on grass-based systems**
  - Bahiagrass decline
  - Warm-season grass alternatives

Rising Cost of Nitrogen

From USDA ARS

Use of Legumes

Strategy to reduce N fertilizer inputs:

Warm-season

Cool-season

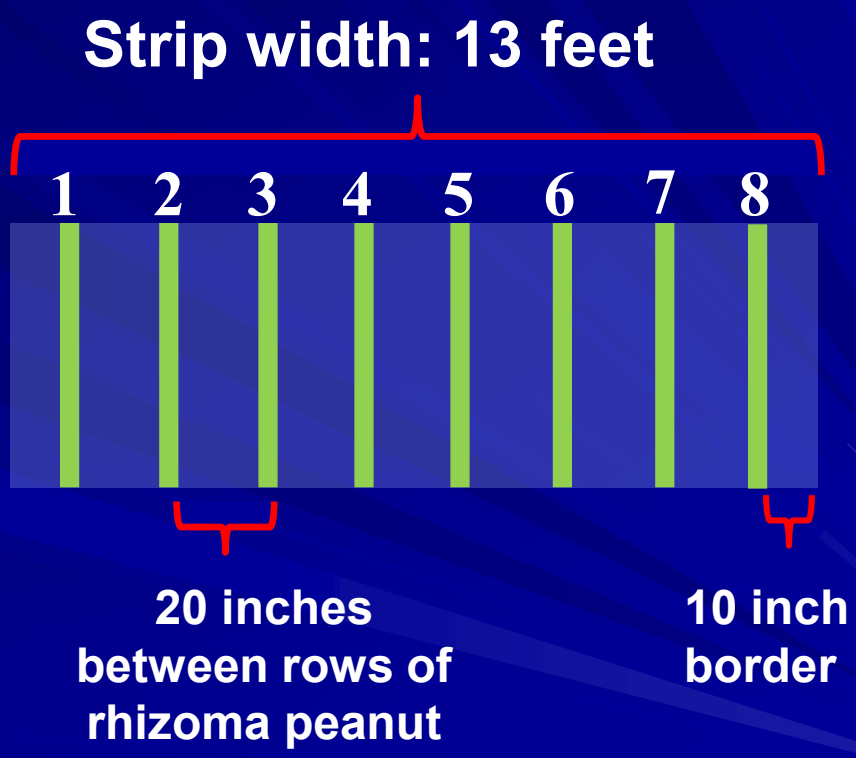
Perennial Peanut - Primarily a Hay Crop

Perennial peanut pasture for beef cattle?

Rhizoma peanut-grass pastures

- Mixed pastures have survived 50 yr at Brooksville and > 30 yr at Gainesville with > 30% legume.

The approach



Planting process

On-farm trials – Perennial peanut

- Two establishment methods x two PP varieties
- Four locations in Florida

Several **cool-season** legume trials carried out since Oct. 2013:

- ✓ Red clover variety trial
- ✓ White clover variety trial
- ✓ Alfalfa trials
- ✓ 2,4-D clover
- ✓ Screening of cool-season legumes
- ✓ Novel legumes and their potential in FL
- ✓ Reseeding potential of cool-season legumes
- ✓ Seed rate of ball clover in ryegrass mixtures
- ✓ Rye/ryegrass or ryegrass mixed with different legumes
- ✓ Grazing trial - mixtures


UNIVERSITY OF FLORIDA
IFAS
Red Clover
Variety


UNIVERSITY OF FLORIDA
IFAS
Alfalfa
Variety


UNIVERSITY OF FLORIDA
IFAS
White Clover
Variety


UF UNIVERSITY of FLORIDA
2, 4 D Clover
Tolerance

Establishment of long-term grazing trial at Marianna

1) Grass-legume based system

+

2) Grass in the warm-season (without N fertilizer) and grass-legume in the cool-season

+

3) Grass-N fertilizer in both seasons

+

Problems Being Addressed

- Short term
  - Cool-season forage supply
  - Nitrogen fertilizer cost on grass-based systems
  - Bahiagrass decline
  - Warm-season grass alternatives

Bahiagrass Decline

- Pastures with weak bahiagrass sampled throughout the state
- Data collected on management practices, plant and soil characteristics
- Data synthesis ongoing in an attempt to establish causal factors

Problems Being Addressed

- Short term
  - Cool-season forage shortfall
  - Nitrogen fertilizer cost on grass-based systems
  - Bahiagrass decline
  - Warm-season grass alternatives

Warm-season Perennial Grasses

- Jiggs bermudagrass and Mulato brachiariagrass

What we have learned so far

- No evidence that Jiggs is less cold tolerant in North Florida that T-85
- Jiggs is more productive using a shorter cutting height than T-85
- Jiggs is easier to establish and tolerates wetter soils than T-85
- Jiggs is less digestible than T-85

What we have learned so far

- Mulato is slower to grow in spring, grows longer in fall, and yields as much as Jiggs or T-85
- Mulato has higher digestibility than either Jiggs or T-85
- Mulato consistently survives two North Florida winters, but all bets are off after that
- Mulato is not tolerant of poorly drained soils

Problems Being Addressed

- Longer term
  - Need for Florida adapted varieties of important forage species
  - Effects of forage systems on environment

Breeding Alfalfa for Florida

Rationale

High yield, protein, and digestibility.

Yield distribution complements warm season grasses.

Challenges: persistence and leaf diseases.

Breeding objectives

1. Persistence high yield and disease resistance

Breeding Alfalfa for Florida

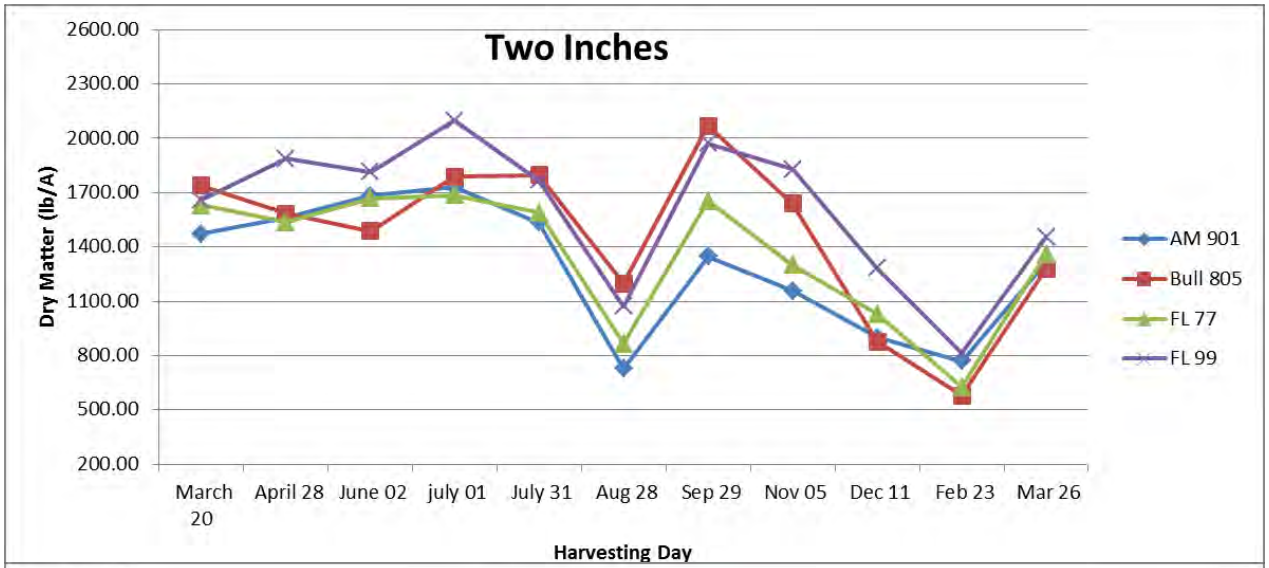
Status

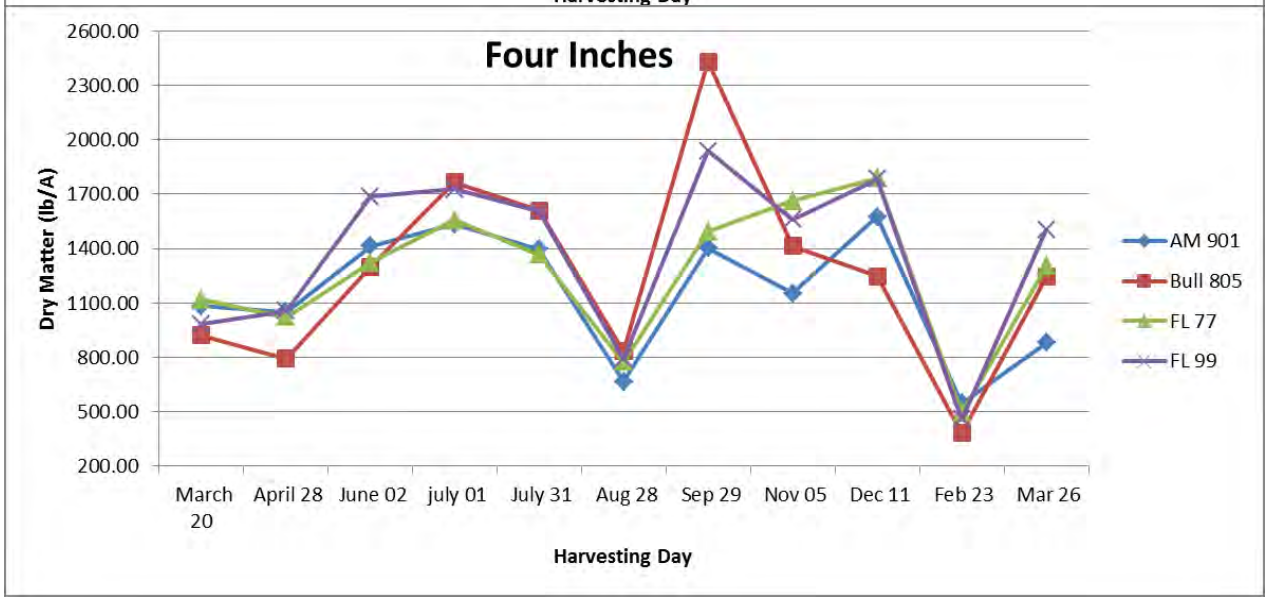
Location: Citra

Cumulative Yr1 (lb/A):
7 tons/A – 2 in
6 tons/A – 4 in

NFH Yr1
9 tons/A

Testing 28 varieties
In 2 FL sites
overseeded in
bermudagrass





Alfalfa no-till drilled on bahiagrass and Tifton-85

Breeding Bermudagrass for Florida

Rationale

Very important warm-season forage in Florida - High yield

Challenges: Pasture decline, stem maggot, yield distribution, quality, no commercial cultivars developed in FL

Breeding objectives

1. High yield and quality
2. Improve seasonal yield distribution

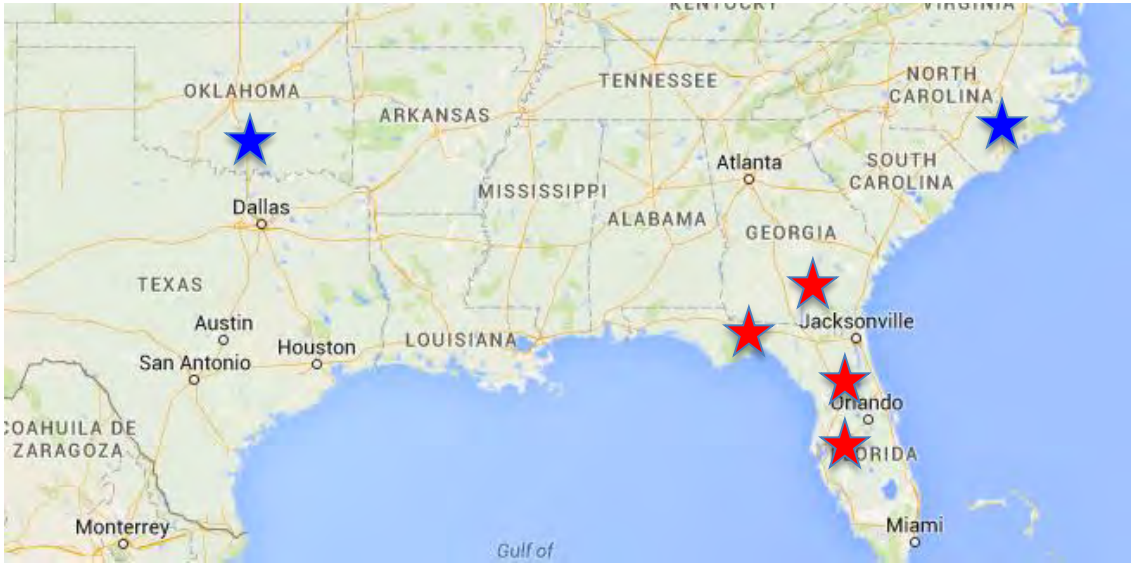
Breeding Bermudagrass for Florida

Status

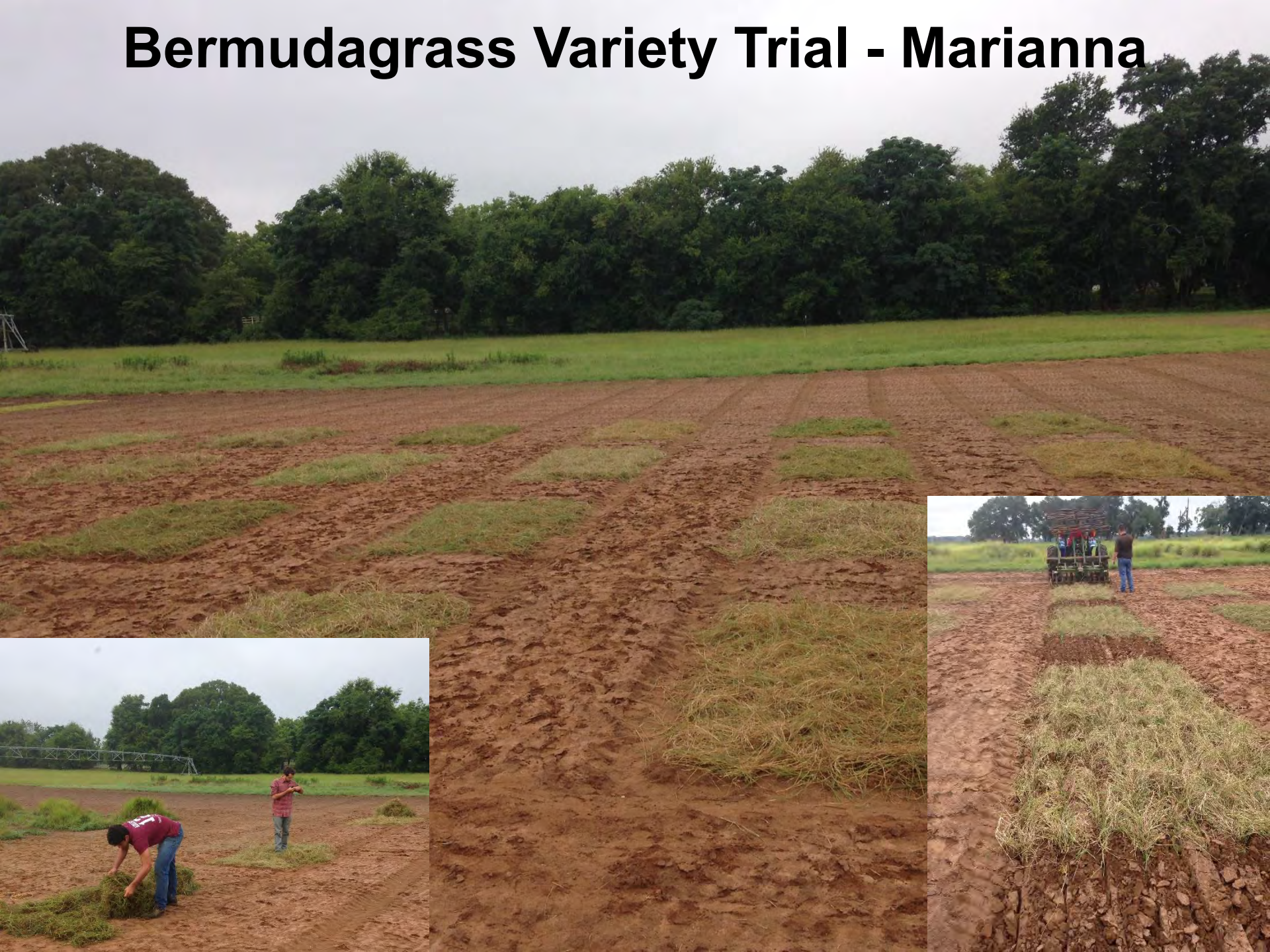
Testing ~300 experimental lines from the core collection from Tifton and the USDA Germplasm Center (GRIN)

Six locations:

- Ona, FL
- Citra, FL
- Marianna, FL
- Tifton, GA
- Ardmore, OK
- North Carolina



Bermudagrass Variety Trial - Marianna



Breeding Red Clover for Florida

Rationale

High quality and versatile

Legume for cool-season mixtures – late-season production

Challenges: Establishment, yield and yield distribution

Breeding objectives

1. Fast establishment, yield and yield distribution

Problems Being Addressed

- Longer term
  - Need for Florida adapted varieties of important forage species
  - Effects of forage systems on environment

Forage Systems and Soil Carbon

Perennial forage base:
Rhizoma peanut vs. T-85

Utilization method:
Hay vs. pasture

With or without
cool-season forage

Legumes vs. N fertilizer effects on environment

1) Grass-Legume based system

+

2) Grass in the warm-season (without N fertilizer) and grass-legume in the cool-season

+

3) Grass system based on N fertilizer in both seasons

+

Where are we today?

- The Agronomy forage team is better staffed than for several years (aided by LBR), but needs to refill the extension position in Gainesville
- Although some are showing their age, we have good facilities throughout the state to do forage research

Where are we today?

- We will continue addressing the most pressing forage problems of the industry by leveraging funding from several sources to address a broad range of production, environment, and basic science questions.



UF/IFAS Forage Program