Broomsedge and Smutgrass Management in Bahiagrass Pastures

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Broomsedge (*Andropogon* sp.)

- Native
- Warm-season
- Short-lived Perennial
- ~ 18 species present
- Extremely evident this time of year

Broomsedge (*Andropogon* sp.)

- Some species are desirable in native rangelands
- Serious problem in planted/improved pastures

How Do We Control Broomsedge ?

- There is no selective herbicide available

How Do We Control Broomsedge ?

- Increasing competitive ability of bahiagrass by increasing soil pH ?
- Soil pH is not necessarily the reason

Location	pH	P	Cu	Zn
		-----------ppm-------------		
Hardee	5.9	42	0	1.46
Polk	5.1	1	0	0.74
Polk**	6.0	105	1.37	19.39
Polk	4.5	3	0	7.34
Okeechobee	5.4	0	0	3.38
Highlands	4.1	2	0	3.97
Manatee	5.6	0	0	0.43
Ona	4.3	2	0	0.95
Glades	5.8	0	0	6.55
DeSoto	7.8	40	0	0.54

Circumstantial Evidence

- Do P, Cu, or some other macro- or micro- nutrients play a role in broomsedge decline in addition to optimizing soil pH?
- Does something else have a role?

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Methods

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- **3 locations**
  - Ona (2012)
  - Arcadia (2012)
  - St. Cloud (2013)
- **Treatments**
  - 10-5-10 (500 lbs/A)
  - Frit 503-G (25 lbs/A)
  - Lime if needed
  - RCBD, 4 reps

- **Broomsedge counts annually**
- **Soil and tissue samples** – Fall every year and prior beginning of the experiment

Methods - Plot Layout

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Rep 4	0Lime 0 NPK Micro	Lime 0 NPK 0 Micro	0 Lime NPK Micro	Lime NPK 0 Micro	Lime 0 NPK Micro	0 Lime 0 NPK 0 Micro	Lime NPK Micro	0 Lime NPK 0 Micro
Rep 3	0 Lime NPK 0 Micro	Lime 0 NPK Micro	Lime NPK Micro	0 Lime 0 NPK 0 Micro	0 Lime NPK Micro	0 Lime) NPK Micro	Lime 0 NPK 0 Micro	Lime NPK 0 Micro
Rep 2	0 Lime NPK Micro	0Lime 0 NPK Micro	0 Lime NPK 0 Micro	0 Lime 0 NPK 0 Micro	Lime NPK Micro	Lime 0 NPK 0 Micro	Lime NPK 0 Micro	Lime 0 NPK Micro
Rep 1	Lime NPK Micro	0 Lime NPK Micro	Lime 0 NPK Micro	0Lime 0 NPK Micro	Lime NPK 0 Micro	0 Lime NPK 0 Micro	0 Lime 0 NPK 0 Micro	Lime 0 NPK 0 Micro

- Ona = Lime (2012); Aracadia = S; St. Cloud = None

Methods – Location Information

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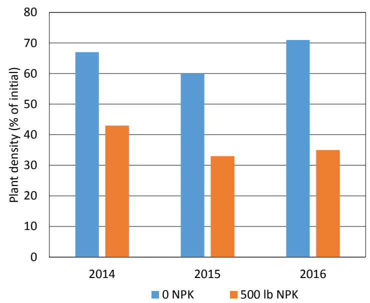
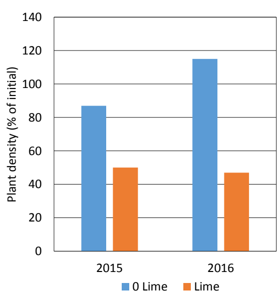
Location	Soil pH	P	K	Mg	Ca	Cu	Mn	Zn	Species	Density
		——————PPM——————								plants/m^2
Arcadia	7.8	13	10	69	1879	0	2	2	Bushy bluestem	5.0
Ona	4.3	2	19	24	116	0	0	0	Purple bluestem	2.8
St. Cloud	5.5	2	22	44	281	0	0	0	Broomsedge bluestem	4.4

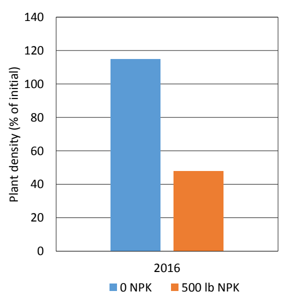
Results - Arcadia

- NPK response
- No response:
  - S
  - Micros



Results - Ona





Soil pH

- Arcadia: No change
- Ona: 4.3 to 4.9 (limed plots)
- St. Cloud: 5.5 to 5.0 (averaged across all plots)

Soil Macronutrients

- No major changes in P concentrations (4 to 6”)
- Differences in K only in Arcadia

NPK	2013	2014	2015
lb/acre		lb/acre	
0	31 b[1]	22 b	19 b
500	48 a	39 a	24 a

Tissue P Concentrations

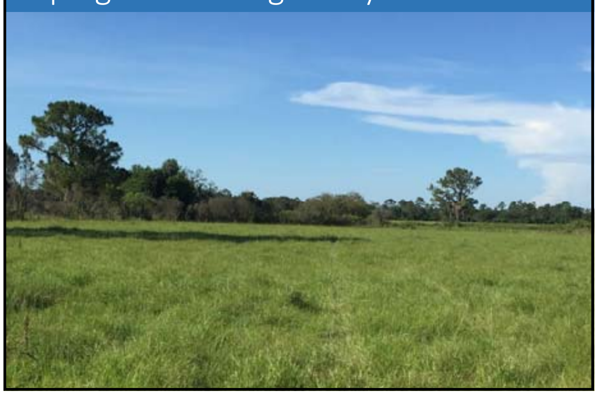
	Arcadia		Ona		St. Cloud	
Year	0 NPK	NPK	0 NPK	NPK	0 NPK	NPK
			%			
2012	0.07	**0.13**	0.15	**0.17**	0.09	**0.12**
2013	0.10	**0.15**	0.26	**0.30**	0.15	**0.18**
2014	0.07	**0.12**	0.13	**0.15**	NS (0.15)	
2015	0.09	**0.14**	0.15	**0.17**	0.09	**0.13**

Using a Wiper

- Usually a 10% v/v solution (glyphosate)
- Wipe in two directions
- Practice makes perfect
  - Use of foam marker solution?

Wiping Broomsedge

Wiping Broomsedge – 2 years



Broomsedge Summary

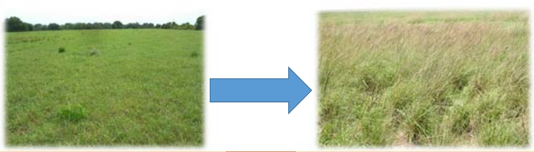
- Where soil pH is off, broomsedge decline beginning to respond
- This approach will take years
- Wiping is an alternative
- More research
  - Which macronutrient is doing the work?
  - What is the optimal glyphosate concentration for wiping?

Smutgrass Management

- Perennial warm-season bunch grass weed
- Invasive (tropical SE Asia)
- Very problematic in planted pastures systems
- Two varieties in FL
  - Small smutgrass
  - Giant smutgrass

Why is giant smutgrass so troublesome ?

- In general, It’s not grazed (specially when mature)
- Prolific seed production
- Good adaptation to infertile sandy soils
- Very challenging to keep it from spreading



Past Research

- Researchers have been studying smutgrass control since 1950s
  - Mechanical:
    - Mowing → Temporary solution / Spread Seeds
  - Cultural:
    - Grazing → Too labor intensive
  - Biological:
    - Fungus

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Past Research

- Researchers have been studying smutgrass control since 1950s
- Chemical:
  - Hexazinone at 1 lb/acre from June to September
  - Velpar at 2 qt/A or Velossa at 1.67 qt/A
  - No grazing restrictions when rate lower than 1.13 lbs/A
  - 38-d haying restriction
  - Good control, but …

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Challenges with Hexazinone

- Very expensive (≈ $40-50/A) whereas $8/A (2,4-D) or $18/A (Grazonnext + Pasturegard)
- Ranchers are forced to accept loses
- Will kill oak trees if you don't pay attention !
- Occasional lack of control / leaching or lack of incorporation.
  - Xylem mobile
  - Primarily absorbed by the roots
  - Limited foliar absorption

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Objectives

1) **Main Objective:** To enhance the current standard recommendations for giant smutgrass control with hexazinone by better understand the impacts of rainfall.

2) **Specific Objectives:** To determine the minimum and maximum amount of rainfall that will incorporate the herbicide without leaching it.

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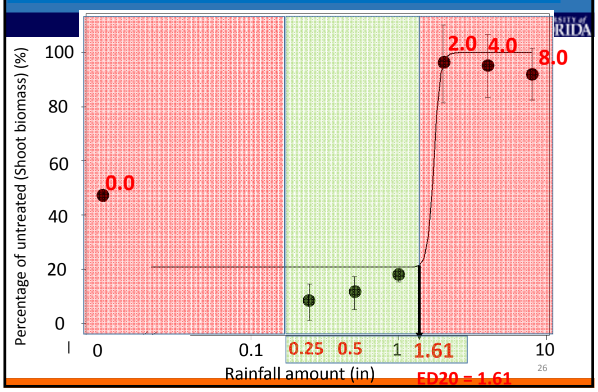
Greenhouse Preliminary Study

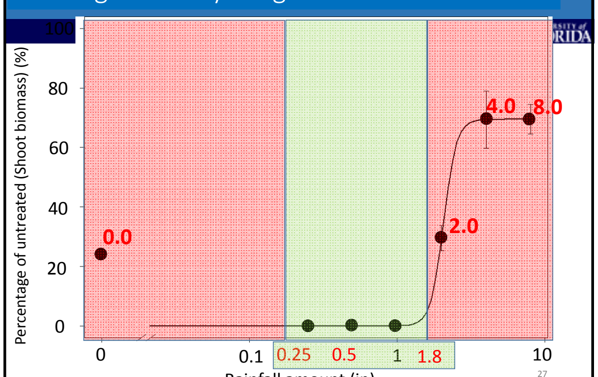
- Conducted twice at the RCREC at Ona, in 2016.
- Plants collected at site, stems separated and transplanted into pots.

- Soil was collected from the field at site and is classified as Placid Fine sand.

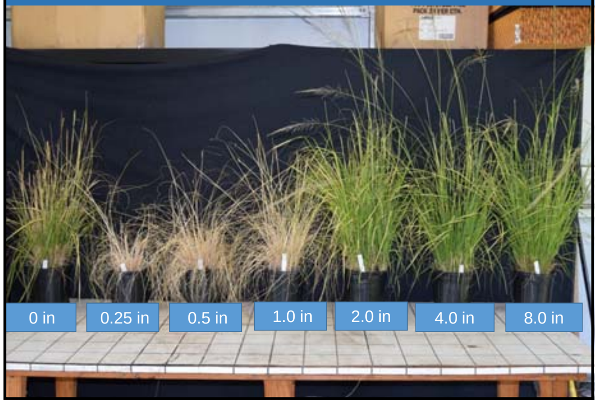
Aboveground dry weight 60 DAT – First Run



Aboveground dry weight 60 DAT – 2^{nd} Run



Greenhouse Preliminary Study - Results



Field Study

Field Study – Material & Methods

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- An old bahiagrass pasture, but completely infested with giant smutgrass at present.

- The soil present at the research site is classified as Placid Fine sand, same used in the greenhouse trial.

Field Study – Material & Methods

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Factor	Levels
Hexazinone rate	0.50 and 1.00 lb ai/acre
Application timing	19 weekly applications (started on April 22th and ended on August 26th)

❖ Rainfall was recorded every week and then correlated with % visual control.

Field Study – Material & Methods

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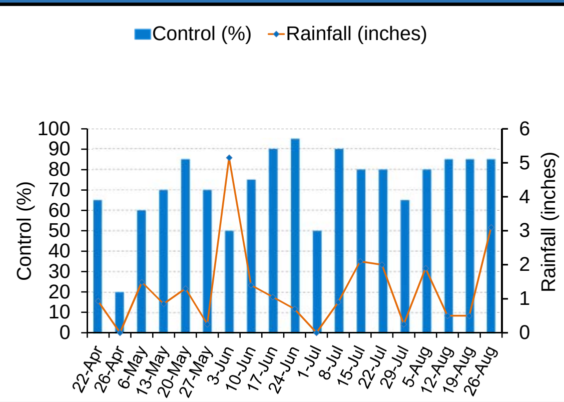
- Visual % control at 30 DAT.

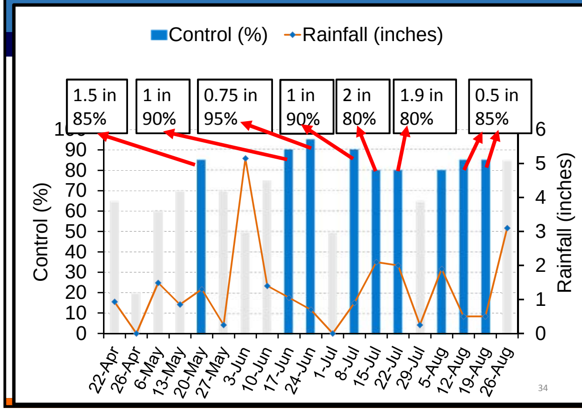
Day of application

30 days after application

Rainfall effects on activity of hexazinone (4 pts/A) 30 DAT



Rainfall effects on activity of hexazinone (4 pts/A) – 30 DAT



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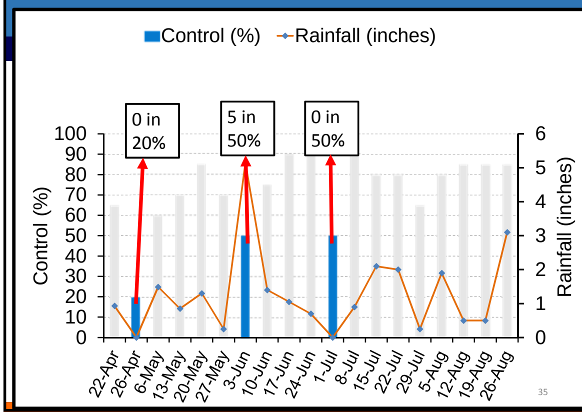
Rainfall effects on activity of hexazinone (4 pts/A) – 30 DAT



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Conclusions

- The rainfall amount after hexazinone application appears to significantly impact the efficiency of hexazinone on the control of giant smutgrass in south FL.
- Rainfall amounts between 0.25 – 3.0 inches within the first seven days after application resulted in acceptable levels of control most of the time.

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Current Research

- Additional rainfall studies (greenhouse and field)
- Impact of fire, grazing, and hexazinone
- Optimizing glyphosate & hexazinone rates using a roto-wiper
- Impregnating dry fertilizer with hexazinone
- Tank-mixing with residual herbicides for increased long-term control
- Utilizing smutgrass as a forage
- Using glyphosate as a “selective” treatment

Questions

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