Herbicide treatments targeting cogongrass eradication

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ALABAMA COOPERATIVE Extension SYSTEM
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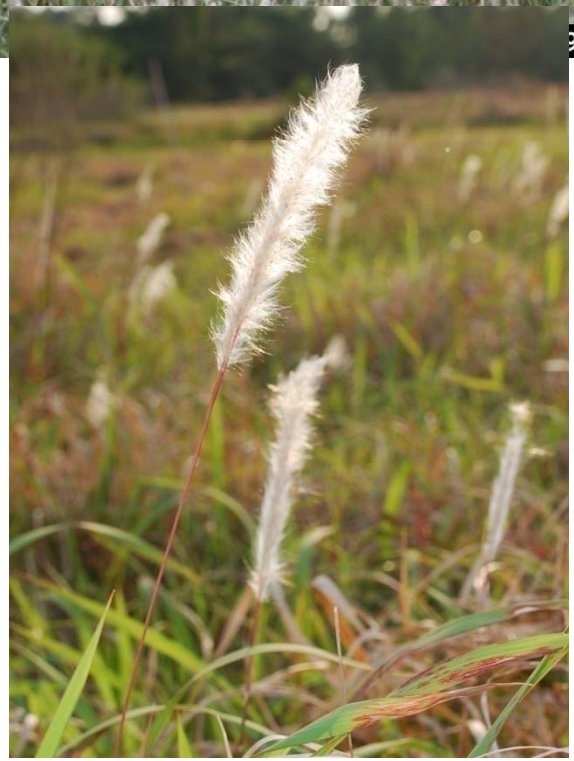
Cogongrass

Imperata cylindrica

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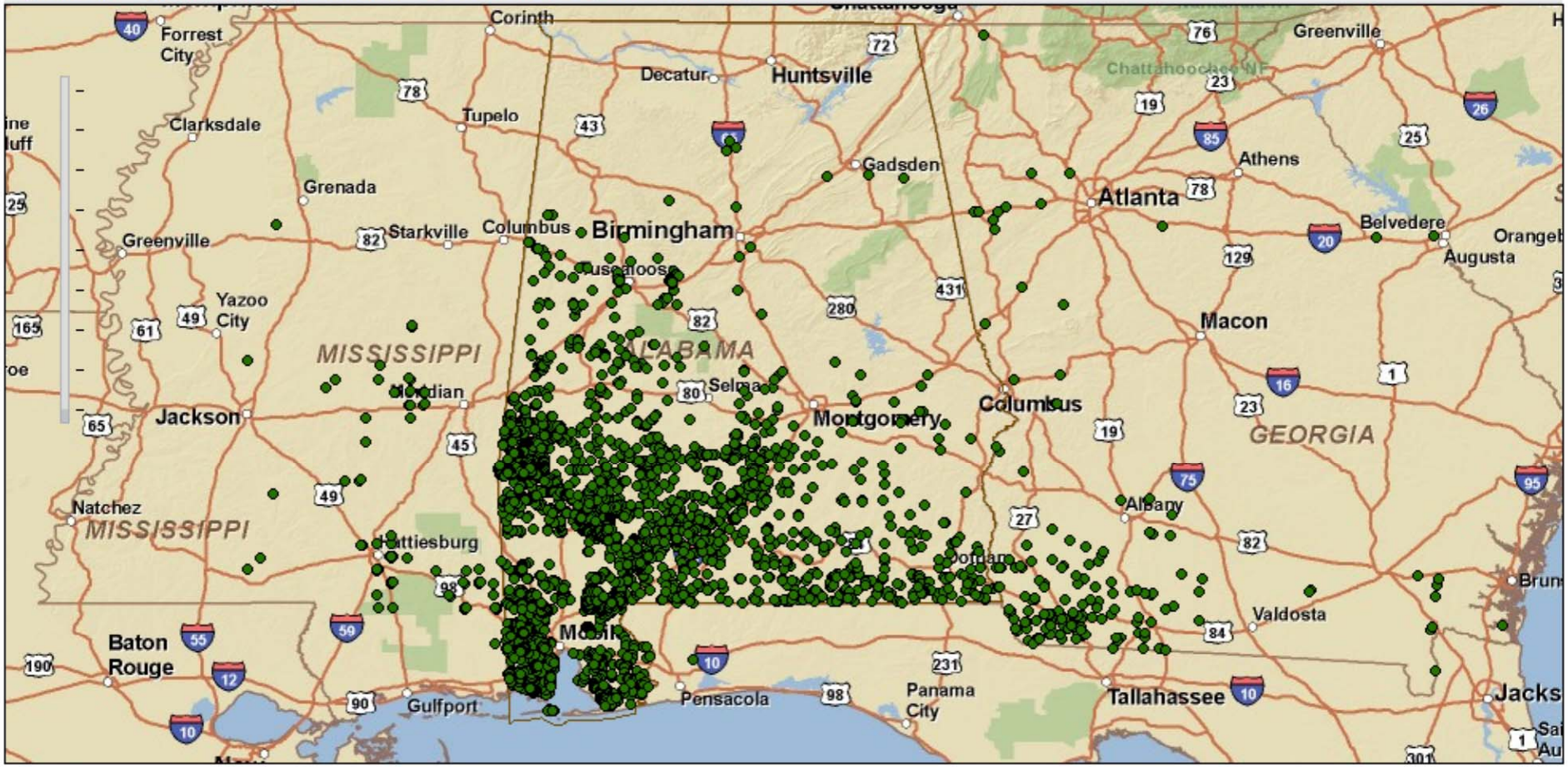
Zoom In | Zoom Out | Full Extent | Prev Extent | Next Extent | Pan



Click map icons for more information

To zoom: Select zoom tool icon and drag a box over area of interest

To report cogongrass infestation contact your local Alabama Forestry Commission Office.

Data updated daily by the Alabama Forestry Commission

Data as of 9/10/2009 3:07:41 PM *(Refresh screen to update data)*

5419

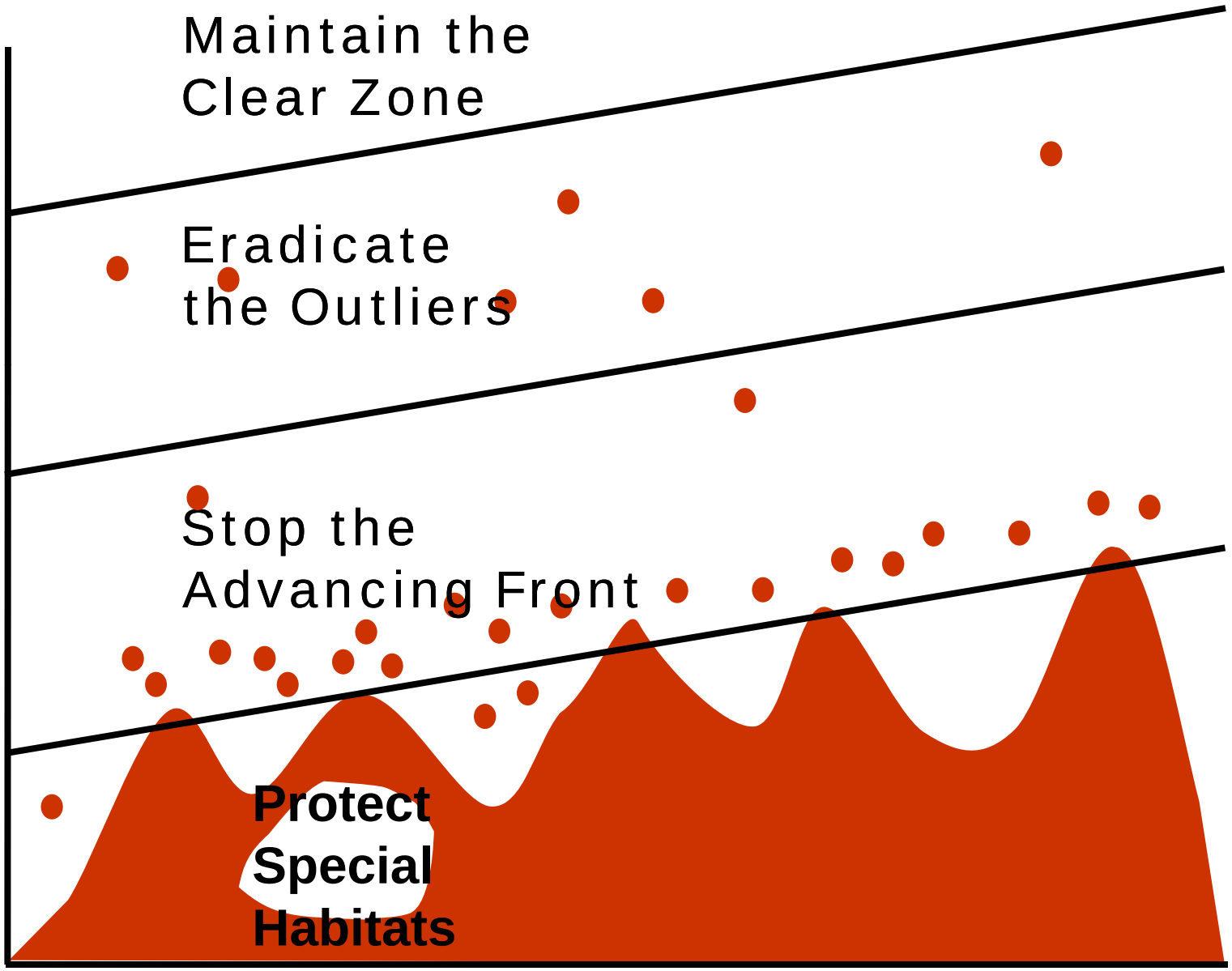
Number of Spots

If data does not display contact the GIS Manager - *Map Service provided by ISD Geospatial Office*

Disclaimer

The information presented on the maps have been compiled from many sources and are considered reliable. The Alabama Forestry Commission (AFC) makes no warranties either expressed or implied, concerning the location, accuracy, completeness, reliability, or suitability of this data for any use other than display. The maps and information contained on the maps may periodically change and may or may not be incorporated in any new version. AFC assumes no liability for the use or misuse of the information contained in these maps. Please contact the AFC GIS Manager if you discover any discrepancies with the online maps.

Wildfire Paradigm of Invasive Plant Management



Previous cogongrass control research

- Previous studies have found strategies that provide satisfactory “control”
  - Faircloth, 2004
  - Ramsey et al, 2003
  - Johnson et al, 1999
- No published study has found the treatment and timing combination that leads to eradication

Control versus Eradication

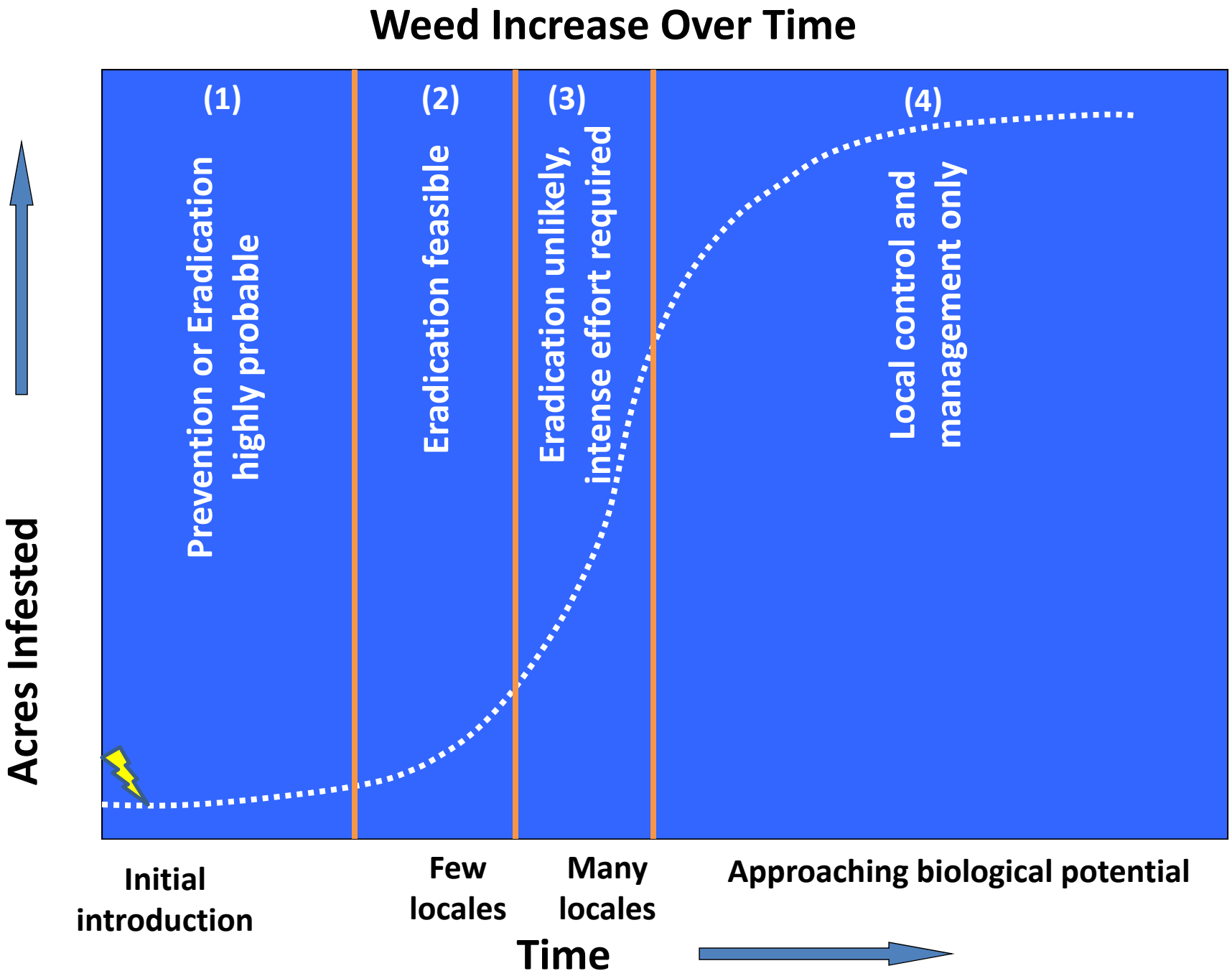
- Control: The reduction in a weed population to an “acceptable level” for a given period of time to meet your objectives
- Examples:
  - Cotton: Pigweed control to prevent crop yield loss
  - Forestry site prep: sweet gum control to allow pine seedling establishment
  - Natural areas: fescue suppression to release native grasses
  - Waterways: hyacinth control in ditches to maintain water flow

Control versus Eradication

- Eradication: The complete elimination of ALL living propagules, including sexual and asexual…

Eradication definition (Part 2)

- The complete elimination of ALL living propagules, including sexual and asexual…
- …within a defined boundary
  - Single patch
  - Watershed
  - County
  - State
  - National
  - Continental
  - Private, Federal or State lands


Weed Increase Over Time
(1)
Prevention or Eradication highly probable
(2)
Eradication feasible
(3)
Eradication unlikely, intense effort required
(4)
Local control and management only
Acres Infested
Initial introduction
Few locales
Many locales
Approaching biological potential
Time

Eradication very likely

Eradication difficult

Eradication nearly impossible

Cogongrass herbicide strategies

- At least two site visits per year
  - Glyphosate alone
  - Repeated spring and fall treatments
  - Used where tree injury is an issue
- Single site visit per year
  - Imazapyr
  - Imazapyr + glyphosate
  - Typically used in summer and fall

Cogongrass herbicide strategy questions

- How many applications are needed to reach rhizome eradication?
- Does glyphosate improve imazapyr performance?
- Does the initial treatment timing matter?
- Do herbicide treatments impact rhizome energy reserves?

Site 1. Tilman's Corner, AL


Site 2. Bayou La Batre, AL

Treatments

- Herbicides
  - Glyphosate 4 lb/A + NIS 0.5% v/v
    - Accord Concentrate (3 qt/A)
  - Imazapyr 0.75 lb/A + MSO (1% v/v)
    - Chopper Gen2 (3 pt/A)
  - Glyphosate (4 lb/a) + Imazapyr (0.75 lb/a) + MSO
    - Accord Conc. + Chopper Gen2
- Timings
  - Early May
  - Early August
  - Early October

- At both sites, rhizome depth is less than 12 inches and mostly in the top 4-6 inches
- Rhizome depth corresponds with the A (topsoil) horizon and some rhizomes run horizontally at the A-B horizon interface
  - Excavated ~400 holes so far-**NO** rhizomes any deeper

Statistical analysis

- Rhizome biomass and TNC Data were analyzed using proc glimmix
- Fixed effects
  - Location, herbicide and timing
- Random effects
  - Replication, replication x herbicide and replication x timing
- Treatment comparisons were made using Fisher's protected LSD test
- Additional analysis of presence/absence of live rhizomes within quadrats

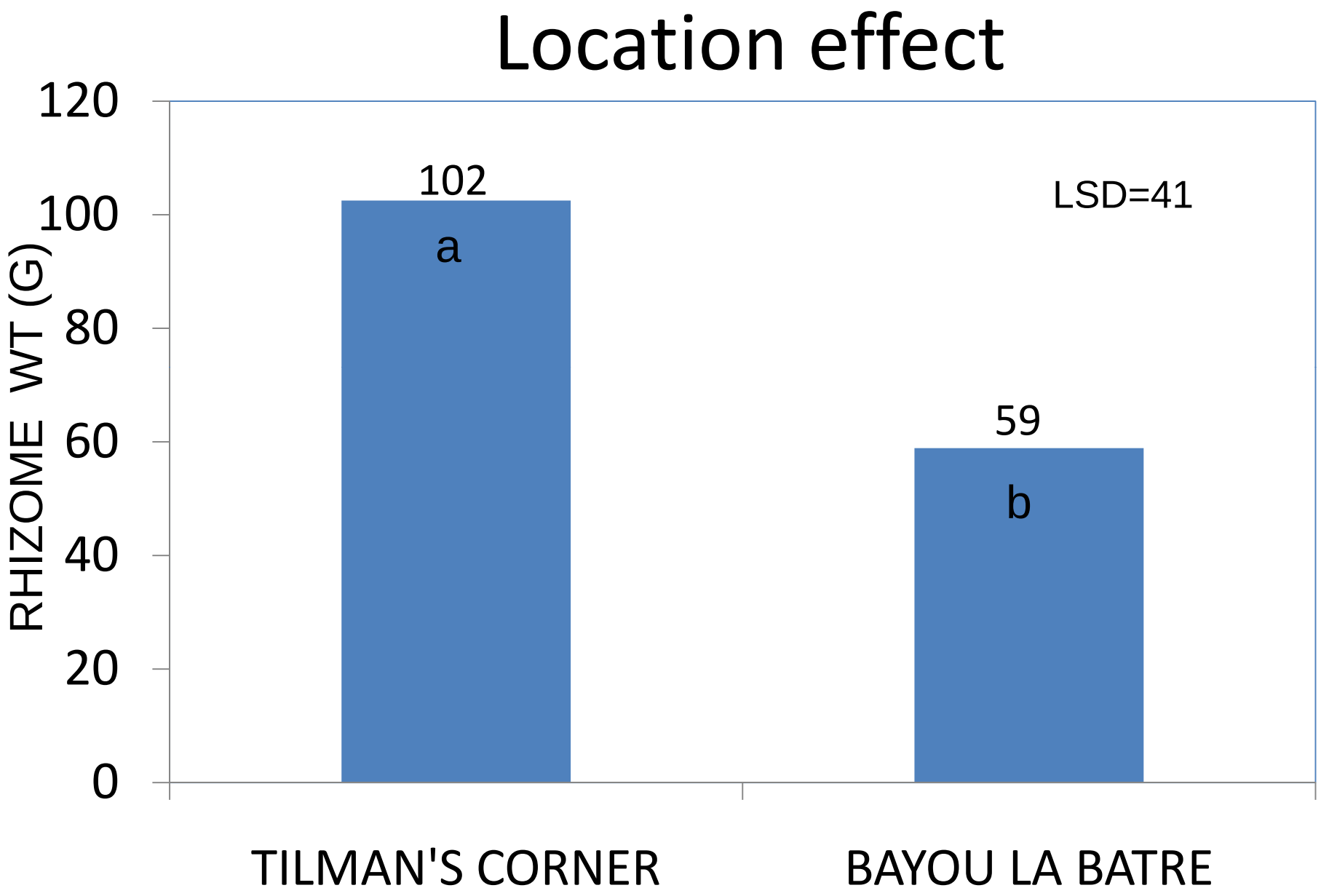
RESULTS

RESULTS

- At 12 months after initial treatment:
  - Cogongrass is responding differently between the two locations
  - The herbicide treatments are performing differently in rhizome kill
  - The herbicide treatments are decreasing rhizome energy reserves at different levels at different treatment timings

ANOVA - Rhizome biomass 12 MAT

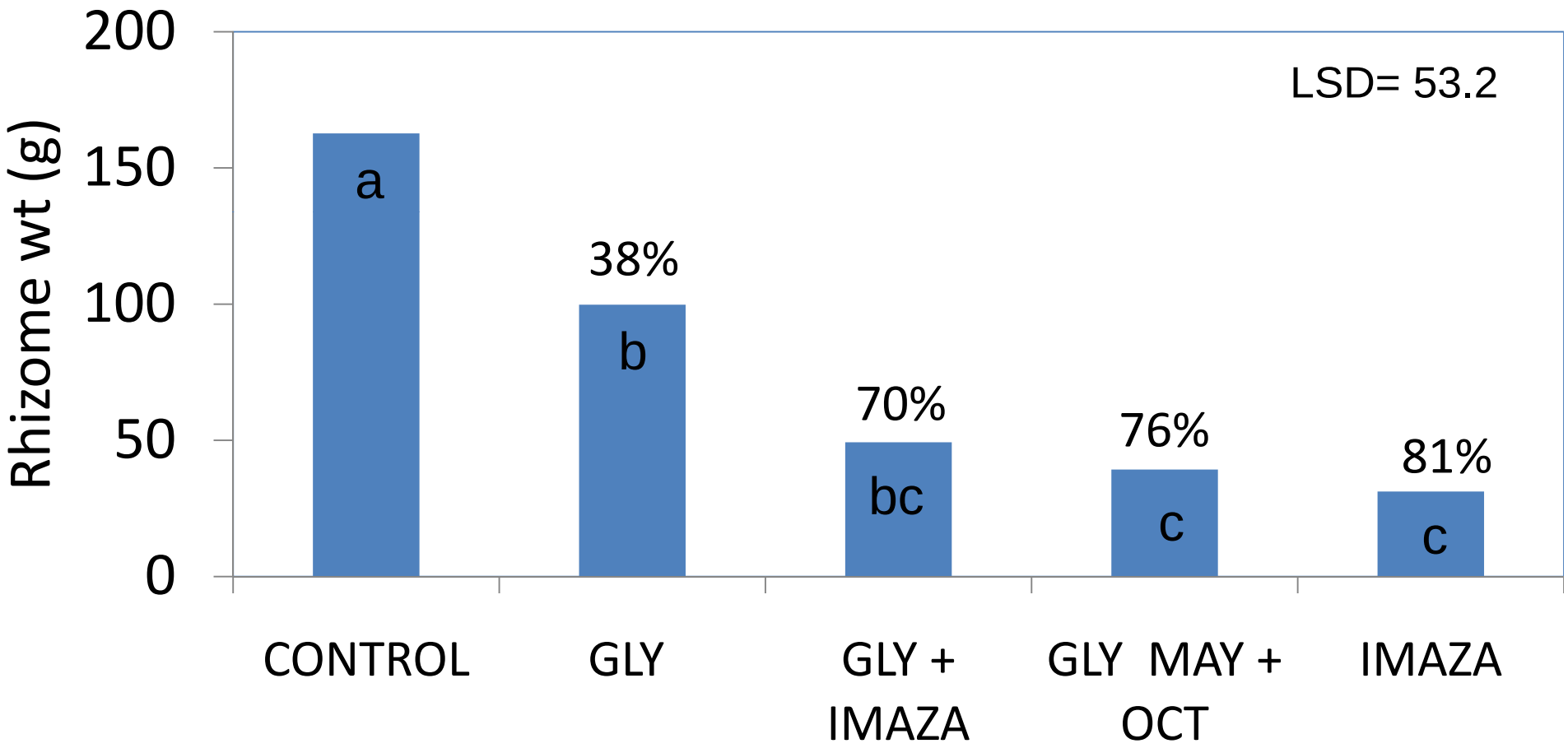
Variable	Num DF	Den DF	F Value	Pr > F
Location	1	54	18.48	<0.0001
Herbicide	3	9	22.77	0.0002
Location*Herbicide	3	54	1.49	0.2298
Timing	2	6	0.34	0.7224
Location*Timing	2	54	0.28	0.7546
Herbicide*Timing	6	54	2.23	0.0546
Location*Herbicide*Timing	6	54	0.49	0.8104


Location effect
120
100
80
60
40
20
0
RHIZOME WT (G)
102
a
59
b
LSD=41
TILMAN'S CORNER
BAYOU LA BATRE

Why a Location Effect?

- Its not an issue of rhizome depth or total rhizome biomass
- It may be a soil texture issue
  - Tillman's Corner site is a heavier soil texture with higher clay content
  - Bayou La Batre is a sandier soil texture
- It may be a genotype issue
  - We are testing this to find out…
- WHAT DOES THIS MEAN FOR YOU?

Herbicide effect



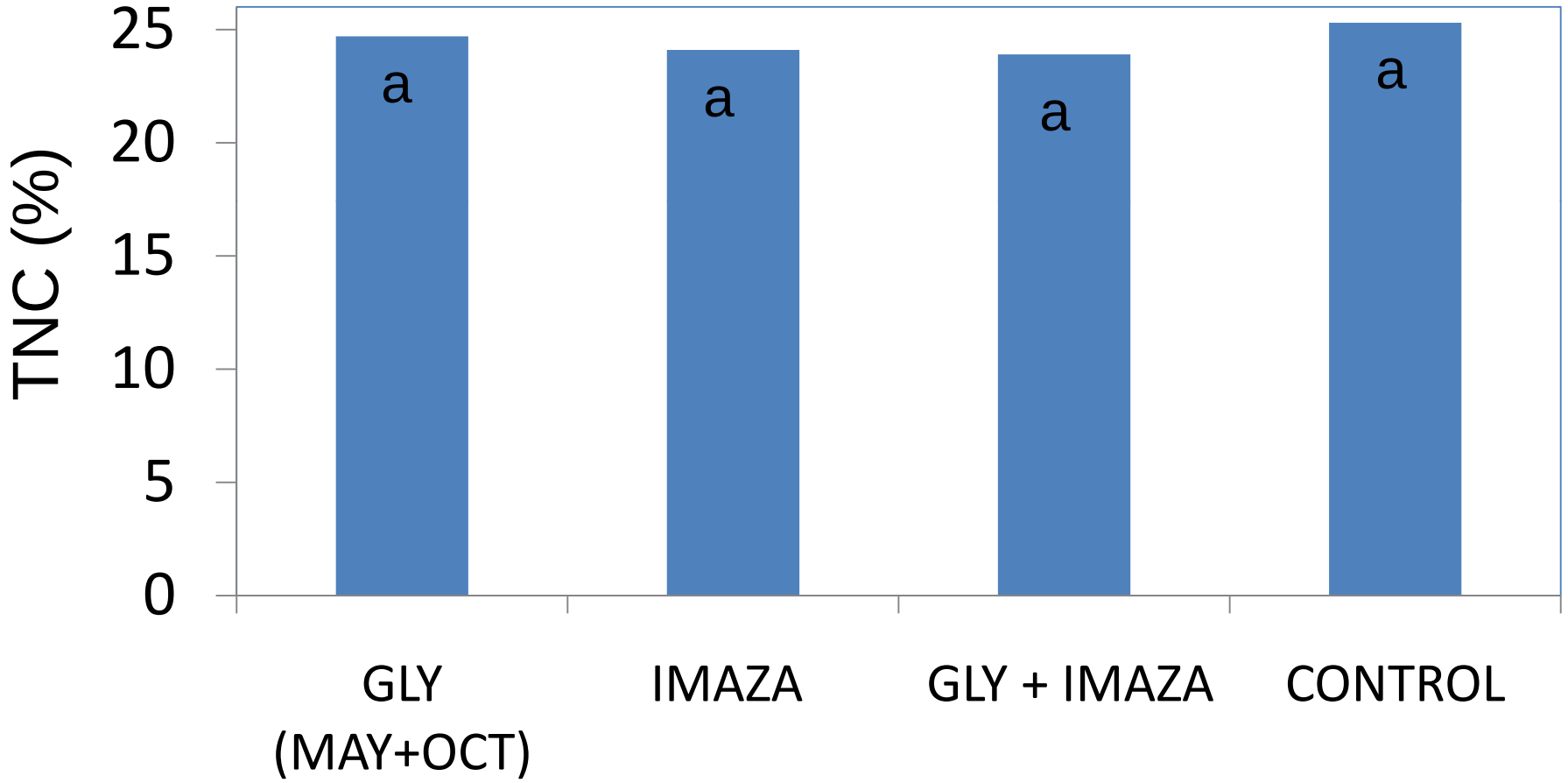
Why a herbicide effect?

- Glyphosate is clearly weaker than imazapyr on cogongrass
- A single glyphosate treatment per year will not cut it
- You can still start treating with glyphosate in summer and fall. Just don’t wait 12 months to go back!
- Multiple (2) glyphosate treatments per year is comparable to imazapyr rhizome kill

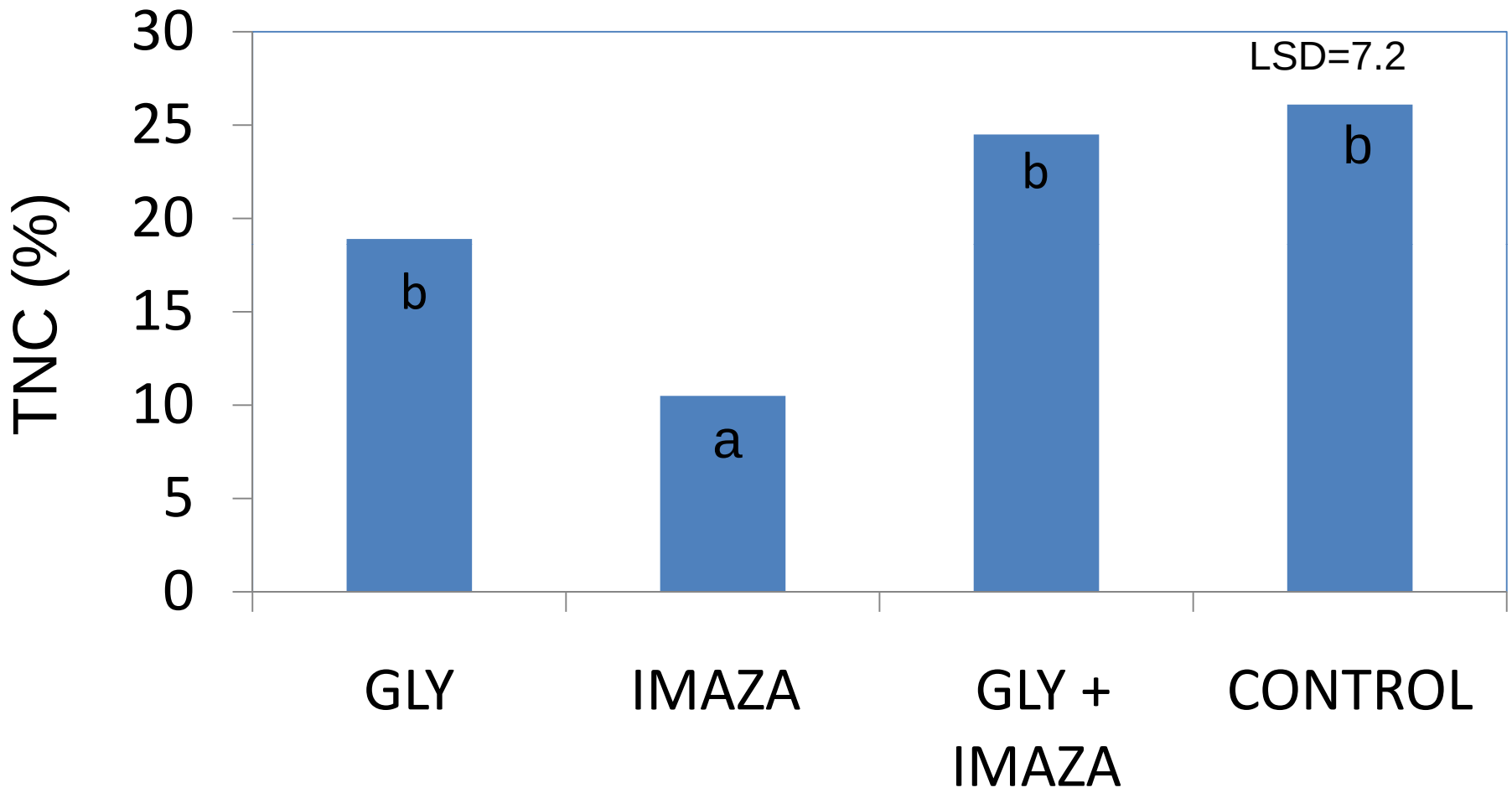
ANOVA-TNC Reserves 12 MAT

Variable	Num DF	Den DF	F Value	Pr > F
Location	1	46	3.07	0.0866
Herbicide	3	9	7.57	0.0078
Location*Herbicide	3	46	2.04	0.1213
Timing	2	6	8.03	0.0201
Location*Timing	2	46	1.07	0.3527
Herbicide*Timing	6	46	2.38	0.0438
Location*Herbicide*Timing	6	46	0.94	0.4745

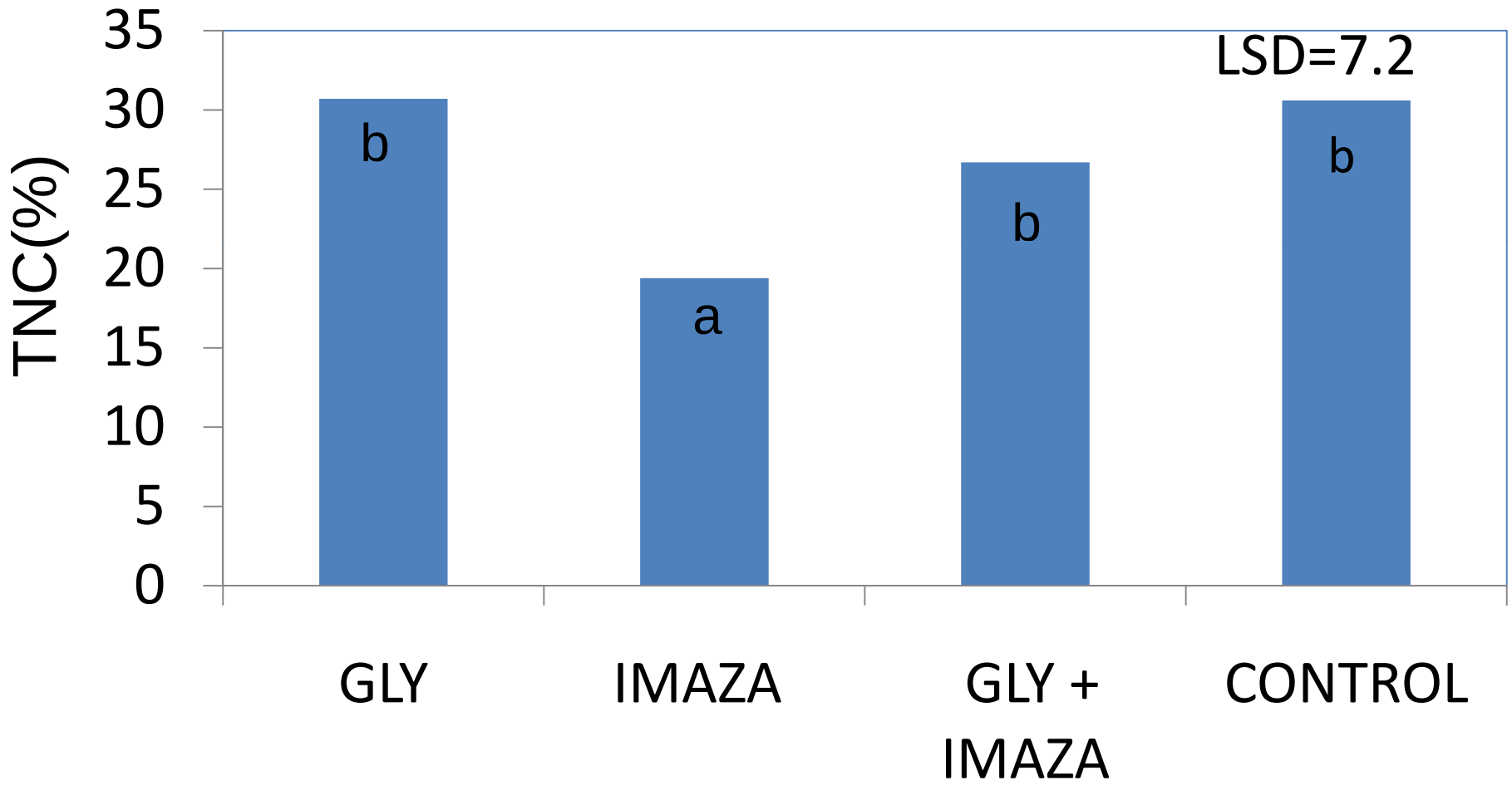
Herbicide x Timing (May)



Herbicide x Timing (August)



Herbicide x Timing (October)



What does this mean?

- We do not yet know!
- Lower energy reserves may:
  - Strongly limit regrowth
  - Delay regrowth
  - May or may not be as important as we thought as we are seeing complete rhizome kill in some plots

Rhizome absence data for each quadrat sampled out of the 4 reps at each site

Treatment	Tilman's Corner 12 MAT	Bayou La Batre 12 MAT
May + Oct (Gly)	0/4	0/4
May (Imaza)	0/4	1/4
May (Gly + Imaza)	0/4	1/4
July (Gly)	0/4	0/4
July (Imaza)	0/4	2/4
July (Gly + Imaza)	0/4	2/4
Oct (Gly)	0/4	0/4
Oct (Imaza)	0/4	1/4
Oct (Gly + Imaza)	0/4	1/4

Where we are headed

- We retreated plots in 2009
- Will collect data in 2010 and keep going until the cogongrass is gone

Special Thanks to:

- USDA Forest Service and the Alabama Agricultural Experiment Station for funding this research

Questions?