Cogongrass Control Update:

Influence of morphology on response to glyphosate

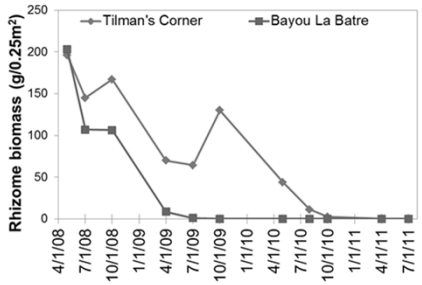
Nancy J. Loewenstein
School of Forestry and Wildlife Sciences
Auburn University

Stephen Enloe - University of Florida
Rima Lucardi - USDA Forest Service
Dwight Lauer - Silvic Analytic

Cogongrass Control with Herbicides

- **Glyphosate** (Accord, Roundup, Glypro, …)
  - 3-4 lb ai/A broadcast
  - 2-5% v/v spot
- **Imazapyr** (Arsenal, Arsenal AC, Chopper Gen 2, …)
  - 0.5-1 lb ai/A broadcast
  - 0.5-2% v/v spot
- **Glyphosate + Imazapyr**

Glyphosate (May and October each year)



- Cogongrass can be eradicated on individual sites, but …
- Some sites are easier to control than others, especially when using glyphosate.

Objective

To examine the role of cogongrass morphology in response to glyphosate treatment.

Study Outline

- Cogongrass populations from across the Southeast
- Grown in greenhouse
- Response to different rates of glyphosate
- Evaluate results in light of morphology (phenotype) and genetics

Morphological differences in cogongrass …

… above and below ground.

Materials and Methods

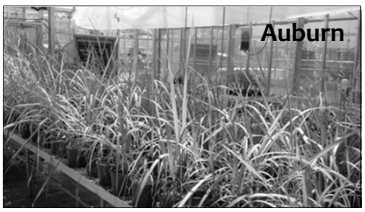
55 different populations, grown in stock pots at AU greenhouse

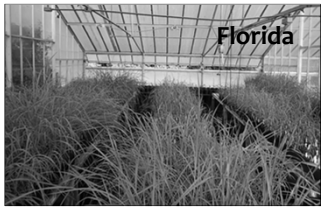
- Cogongrass rhizomes were fragmented into 5-6 inch cuttings
- Two cuttings per 6" pot containing standard potting media (n=36)
- Watered regularly
- Two greenhouses in Florida, one in Auburn, both with natural light

Plants grown in the greenhouse for 6 months

Auburn Florida

At 6 months, plants were well established.



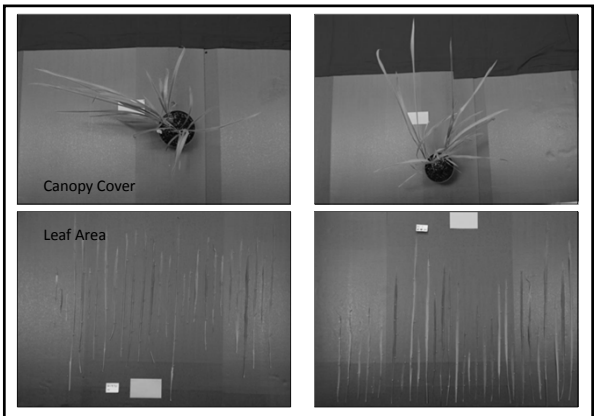


Above ground ….

… and below.

Pre-treatment data collection

- Number of tillers
- Maximum leaf height and width
- Leaf canopy cover
- Total leaf area
- Shoot biomass
- Root/rhizome biomass



Leaf areas measured with APS Assess 2.0 software (Lamari 2002)

Treatments

- Control - untreated (0X)
- Glyphosate at 1.7 kg a.i. per hectare (1X)*
- Glyphosate at 3.4 kg a.i. per hectare (2X)

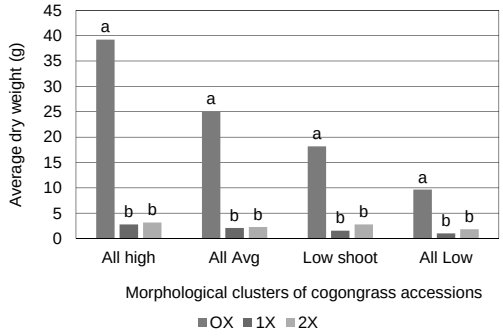
Post-treatment data collection

- Shoot biomass at 30 DAT
- Shoot and root biomass at 60 DAT

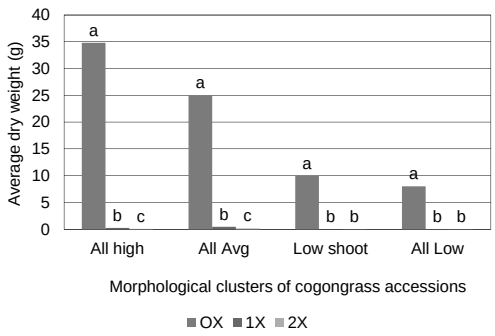
Plant Morphology

Cluster analysis

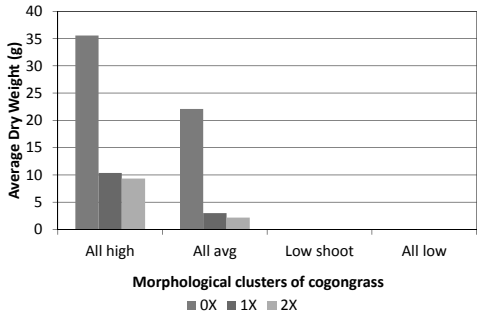
- All characteristics high
- All characteristics average
- Low shoot, others average
- All characteristics low



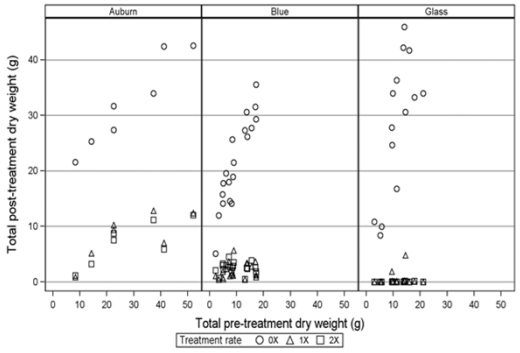
Comparison of average dry weight (g) by morphological cluster and glyphosate rates in Florida greenhouse-A



Comparison of average dry weight (g) by morphological cluster and glyphosate rates in Florida greenhouse-B



Comparison of average dry weight (g) by morphological cluster and glyphosate rates in Auburn greenhouse



Conclusions

- Both glyphosate rates were effective in controlling all cogongrass morphological clusters in both Florida greenhouses.
- Glyphosate was not as effective on plants that were larger at time of treatment (AU greenhouse).
- The 2X treatment did not improve control.
- Still a lot of questions ….

Funding: **USDA Forest Service Cooperative Agreement with Dr. Rima Lucardi**

Invasive Plant Listing

- Still working on ASTM standard for invasive plant listing.
- North Carolina Invasive Plant Council (Tony Koop with APHIS) is starting work on a status assessment/evaluation tool for NCIPC (and others) to use for creating/revising lists.
  - A technical tool, probably without the procedural aspects of the ASTM standard.