Phenotypic Diversity among Cogongrass Populations and Response to Glyphosate

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cogongrass
(Imperata cylindrica)

- One of top 10 weeds in the world
- Federal Noxious Weed
- Reduces growth of other plants
- Fire hazard
- Little wildlife value
- Spreads easily ... wind and equipment
- Difficult to control once established
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**
Cogongrass can be eradicated on individual sites, but ...

Some sites are easier to control than others, especially when using glyphosate.
• Morphological diversity
• Genetic diversity
Objective

Does cogongrass phenotype (morphology) play a role in its response to glyphosate treatment?
• Cogongrass populations from across the Southeast
• Grown in greenhouse
• Response to different rates of glyphosate
• Evaluate results in light of morphology and genetics
Morphological differences in cogongrass ... ...above and below ground.
Materials and Methods

55 different accessions, 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
At 6 months, plants were generally well established.
Pre-treatment data collection

- Number of tillers
- Maximum leaf height and width
- Leaf canopy cover
- Total leaf area
- Shoot biomass
- Root and rhizome biomass
Leaf areas measured with APS Assess 2.0 software (Lamari 2002)
Treatments

• Control - untreated (0X)
• Glyphosate at 1.5 lbs a.i. per acre (1X)
• Glyphosate at 3.0 lbs a.i. per acre (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

*pre-treatment and control plants at 60 DAT
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

Morphological clusters of cogongrass accessions

- All high
- All Avg
- Low shoot
- All Low
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 and ‘all avg’ cluster at Auburn.

• Glyphosate was not as effective on plants that were larger at time of treatment (AU greenhouse).
Questions??

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Cogongrass germinants