



Assessment of itchgrass biodiversity for improved management

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Itchgrass

- ▶ Worst weed in sugarcane
- ▶ Severe infestations cause significant yield loss
- ▶ Annual weed
- ▶ Prolific seed producer



Control Methods

- ▶ Pre-emergence
 - ▶ Planting
 - ▶ Pendimethalin (2 to 3 lb/A)
 - ▶ Clomazone (1 to 1.25 lb/A) with Diuron or Metribuzin
 - ▶ Spring
 - ▶ Pendimethalin (2 to 3 lb/A)
 - ▶ Clomazone (1 to 1.25 lb/A) with Diuron or Metribuzin
 - ▶ Layby
 - ▶ Pendimethalin (2 to 3 lb/A)
- ▶ Post-emergence
 - ▶ Asulox (3 qt/A)
 - ▶ Asulox with Envoke (2 qt/A and 0.2 oz/A)
- ▶ Ditchbank
 - ▶ Pendimethalin (2.5 to 3.3 lb/A)
 - ▶ Glyphosate (1 to 5 lb/A)

Prowl® H20 Herbicide

For Use in Selected Crops

(See Table 1, Crop Uses)

Active Ingredient*:	
pendimethalin: N-(1-ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamine	38.7%
Other Ingredients:	61.3%
Total:	100.0%

*1 gallon contains 3.8 pounds of pendimethalin formulated as an aqueous capsule suspension.

EPA Reg. No. 241-418

EPA Est. No.

GROUP 18 HERBICIDE

CHILDREN CAUTION

si alguien para que se la explique a usted en el label, find someone to explain it to you in detail.)

Precautionary Statements, Directions For Use, and state-specific crop and/or use site restrictions. **For information regarding the safety of this product, call 1-800-424-9300.**



**FOR AGRICULTURAL OR COMMERCIAL USE ONLY
NOT FOR USE BY HOMEOWNERS**

**For Postemergent Weed Control in Sugarcane, Turf, Ornamentals,
Christmas Tree Plantings and Non-Cropland**

ACTIVE INGREDIENT:	
Sodium salt of asulam (methyl sulfanilylcarbamate)*	36.2%
OTHER INGREDIENTS:	63.8%
TOTAL:	100.0%

*Equivalent to 33.1% asulam or not less than 3.34 lbs. per gallon.

EPA Reg. No. 70506-139

**KEEP OUT OF REACH OF CHILDREN
CAUTION**

FIRST AID	
IF ON SKIN OR CLOTHING:	<ul style="list-style-type: none"> • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.
IF IN EYES:	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing. • Call a poison control center or doctor for treatment advice.

Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact the Rocky Mountain Poison Center at 1-866-673-6671 for emergency medical treatment information.

FOR CHEMICAL EMERGENCY: Spill, leak, fire, exposure, or accident, call CHEMTREC 1-800-424-9300.

How else can we manage itchgrass?

- ▶ Limited herbicides for control
- ▶ Weed biology and ecology
- ▶ “Know thy enemy”

Itchgrass biodiversity



- ▶ How diverse are our populations?
- ▶ Different biochemical profiles
- ▶ Different rates of seed production
- ▶ Different morphologies
- ▶ What else?

How to distinguish populations

- ▶ Started as a league project
- ▶ In collaboration with Dr. Al Orgeron and Dr. Matt Foster
- ▶ Using DNA to track and distinguish itchgrass populations



What are microsatellites?

- ▶ Repeats of 2 to 3 bases

- ▶ Ex. 1: ACGATATATATATATATATATCCTGA

- ▶ Ex. 2: CGGTACTACTACTACTACTACGGAT

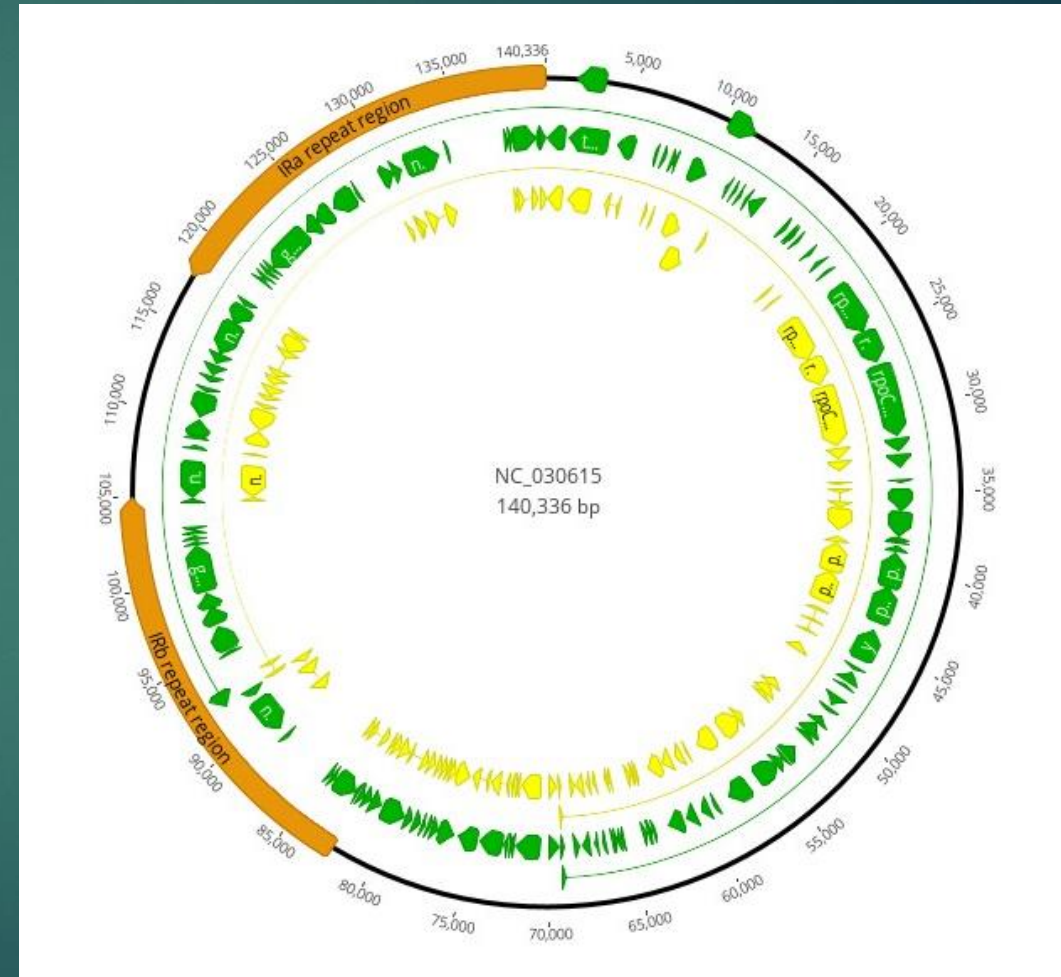
- ▶ Can vary between populations

- ▶ Population 1: CGGTACTACTACTACGGAT

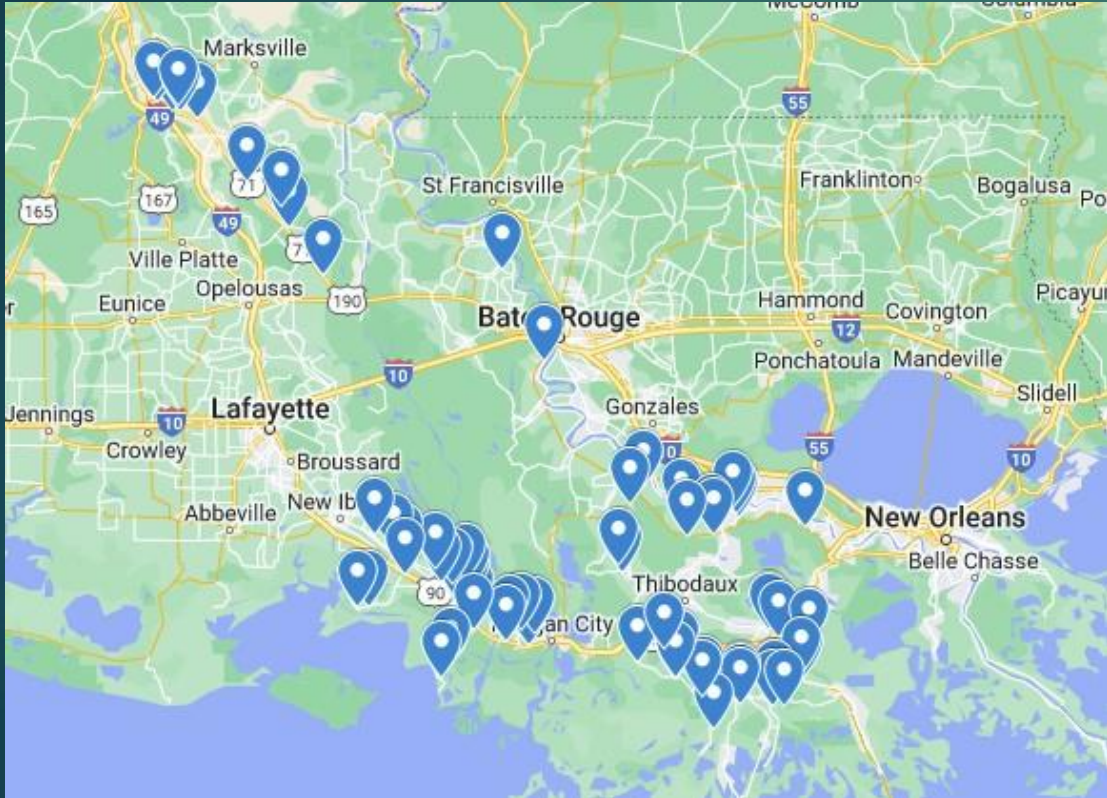
- ▶ Population 2: CGGTACTACTACTACTACTACTACGGAT

Challenges

- ▶ Limited genomic resources
- ▶ Tried developing chloroplast microsatellites – not enough diversity
- ▶ Currently working with Dr. Brian Scheffler in Stoneville, MS to sequence itchgrass genome
- ▶ Will use that data to develop nuclear microsatellites



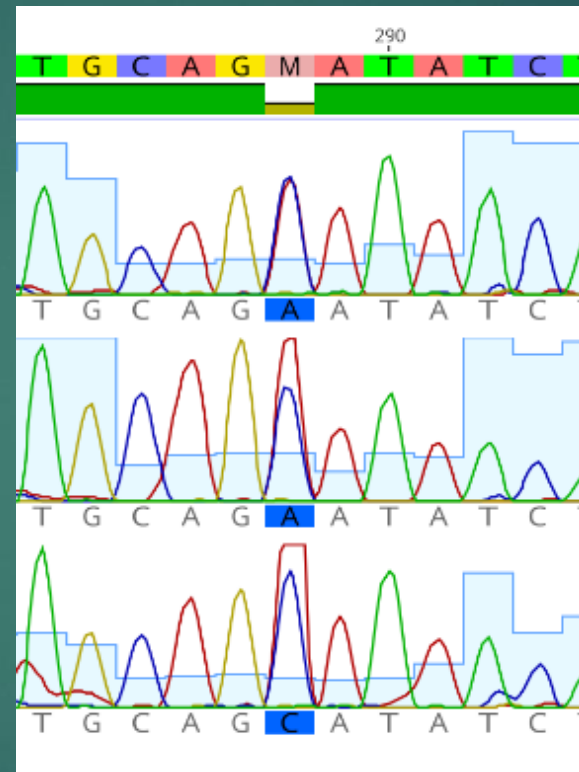
2023 goals



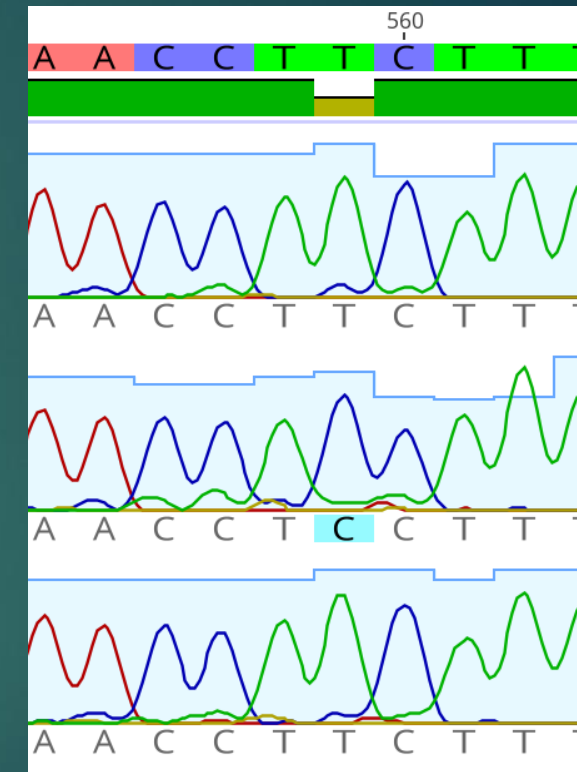
- ▶ Collect from multiple locations throughout the sugarcane growing region
- ▶ Use SNPs in EPSPS and ACCase to distinguish populations

SNP sequencing

- ▶ Single nucleotide polymorphism
- ▶ Targeted non-coding regions of EPSPS and ACCase
- ▶ Identified three SNPs
 - ▶ 1 in ACCase
 - ▶ 2 in EPSPS

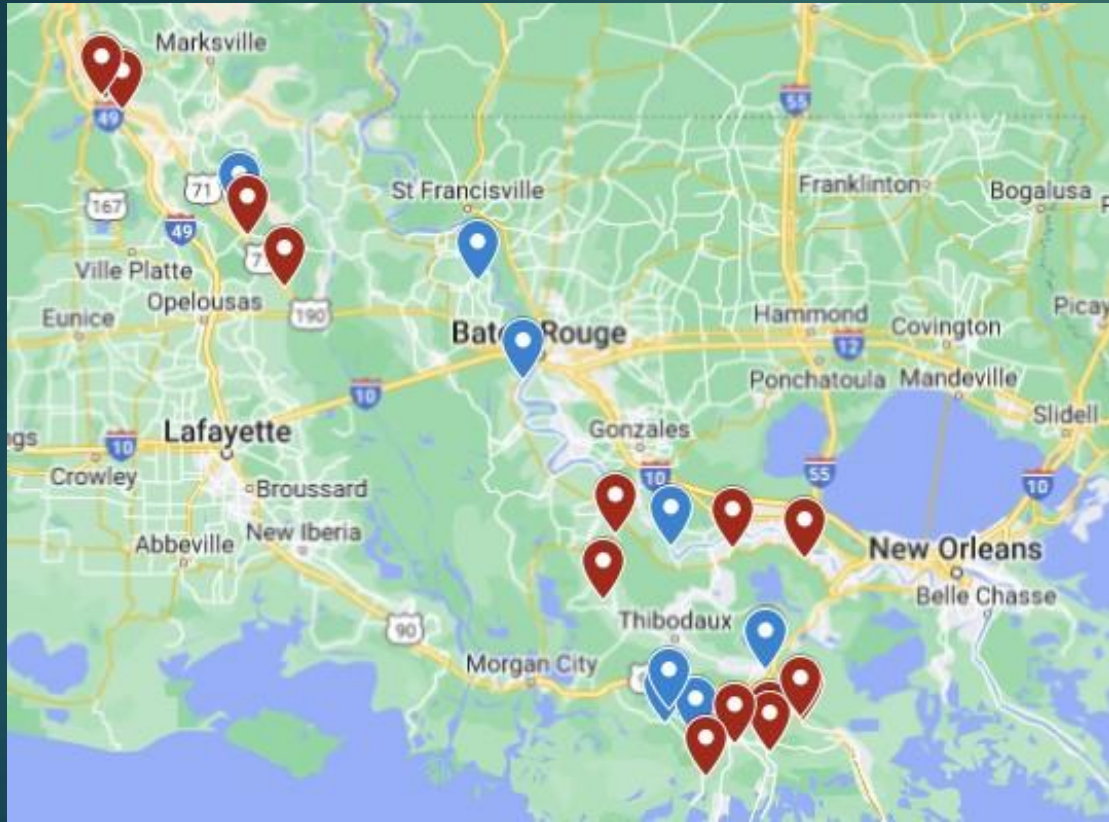


ACCcase

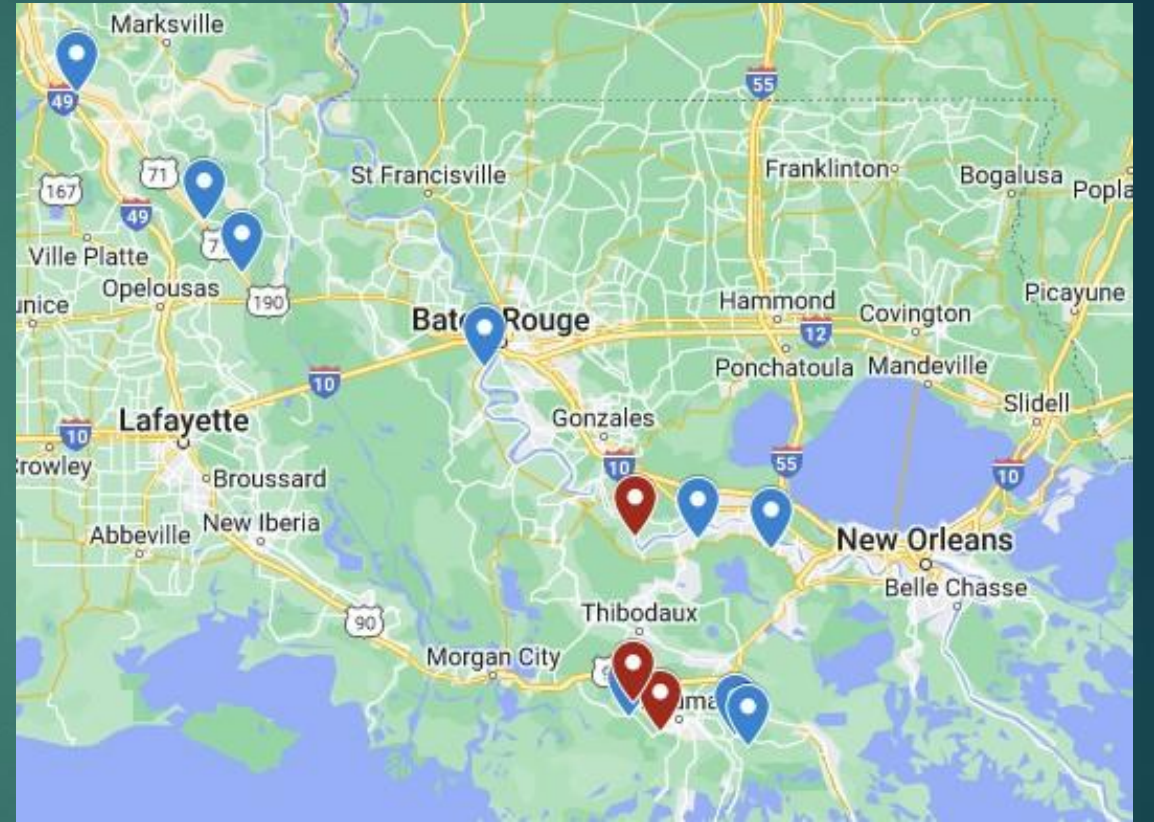


EPSPS

SNP distribution



EPSPS SNP 1



EPSPS SNP 2

Progress on genome sequencing

- ▶ Rough size estimate of genome
- ▶ Samples taken to Stoneville for nuclei extraction
- ▶ Will sequence transcriptomes for annotating genome
- ▶ Second genome to identify polymorphic microsatellites



PacBio Sequel IIe system
Pacbio.com

What's next?

- ▶ Collect seed from specific populations based on microsatellite data
- ▶ Examine traits between specific populations
- ▶ How do different populations respond to herbicides?
- ▶ How do populations correspond to what growers are seeing?
- ▶ How are these populations localized/moving?



What populations do we most need to be concerned about?

- ▶ Herbicide resistance?
- ▶ Aggressive growth?
- ▶ Interactions with sugarcane?



Take me to your itchgrass

- ▶ Are there populations that you are concerned about?
 - ▶ Are there populations that have become difficult to manage?
 - ▶ Call me or Matt and we will include them in this study
- ▶ Ali Wright
 - ▶ Alice.wright@usda.gov
 - ▶ 985-772-0374
 - ▶ Matt Foster
 - ▶ MFoster@agcenter.lsu
 - ▶ 601-334-0354

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