

Turfgrass Environmental Research & Education

# Making the Grass Greener in North Carolina

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# Turf in North Carolina

### Transition zone

NC STATE UNIVERSITY



# Turf in North Carolina



#### Transition zone issues

#### Warm-season:



#### Cool-season:



## **NCSU Turf Breeding**



NC STATE

# St. Augustinegrass

- The Pros:
- Shade tolerance
- Tight canopy → somewhat resistant to weed infestation
- Suited for sod production, home lawns, commercial landscapes
- Relatively low inputs







Why?

## St. Augustinegrass

## The Cons

Gray leaf spot

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### Southern Chinch Bug

#### Winterkill

# Cold Tolerance

The Problem

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#### 'Raleigh'

North Carolina

Released in 1980's by NCSU

Large range of winter survivability in

- Industry standard for cold tolerance in St. Augustinegrass
- Can still incur injury in NC
- Could use improvement in TQ

Variable winters in North Carolina can make field evaluations of winter hardiness difficult



Raleigh, NC in 2011



Raleigh, NC in 2014

# Cold Tolerance



### What we have done about it

#### **1. Population Development**

- A. Using a diallel experimental design to estimate combining abilities of various cultivars as parents
- B. Breeding and selection

#### 2. Improving Selection Methods

- A. Freezing Protocol Development: Develop protocol that accurately illustrates range of freezing tolerance found in SA → expedited, less expensive alternative
- B. QTL Mapping: Markers linked to cold tolerance → marker-assisted selection



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## The Recipe

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### 2014 Advanced Trial

**Turf Quality 2015 vs Winterkill** 





### 2014 Advanced Trial

10/13/15 End of year two coverage at Laurel Springs (after significant winterkill 14-15)



## 2015 Advanced Trial

NC STATE





## 2015 Advanced Trial





XSA 11237

#### % Grey Leaf Spot Laurel Springs September 2015

XSA 10335

#### **Establishment** Lake Wheeler September 2015

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# Improve Selection Methods

4 Weeks Post

**6 Weeks Post** 

## **Freezing Protocol Development**

#### **Evaluation Temperatures**





#### **Evaluation Times**

CA



#### **Evaluation Methods**



Effect of 0.00 Acclimation 0.70 Treatments RG 6 WEEKS POST-FREEZE





# **Improve Selection Methods**

- Identification of areas in Raleigh's genome associated with cold tolerance
- Overlap across environments
- Overlap across traits (field and lab based data)

Good candidates for true gene locations





## St. Augustinegrass

## Ongoing work



## Acknowledgements I



## Collaborators

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## The NCSU Turf Breeding Gang



Carolina Zuleta Lab Manager



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