

An aerial photograph of a golf course, showing a grid-like pattern of green grass patches separated by brown, sandy areas. The text is overlaid on the top portion of the image.

# **Bermudagrass, Zoysiagrass, and Centipedegrass Breeding at the University of Georgia**

**Brian Schwartz**

**66<sup>th</sup> Annual Southeastern  
Turfgrass Conference**

# **Thank You**

- **UGA Tifton Campus Conference Center**
  - **ABAC Turf Team**
  - **UGA Turf Team**
  - **Our Sod Growers**
  - **2012 Turfgrass Conference Speakers**
- 
- **USDA-ARS**
  - **USGA**
  - **GGCSA**
  - **GTA**



# **Thank You - Sponsors**

- **GCIA & GSDC**
- **Pike Creek Turf**
- **The Turfgrass Group**
- **Patten Seed Company**
- **Everyone Attending**

# Thank You – Turf Crew





# Thank You – ABAC Students



# Pike Creek Tour and Dinner





# Pike Creek Tour and Dinner



# Pike Creek Tour and Dinner





# Pike Creek Tour and Dinner



# Brian Schwartz's Barn





# Pike Creek Tour and Dinner





# Pike Creek Tour and Dinner





# Bermudagrass Studies

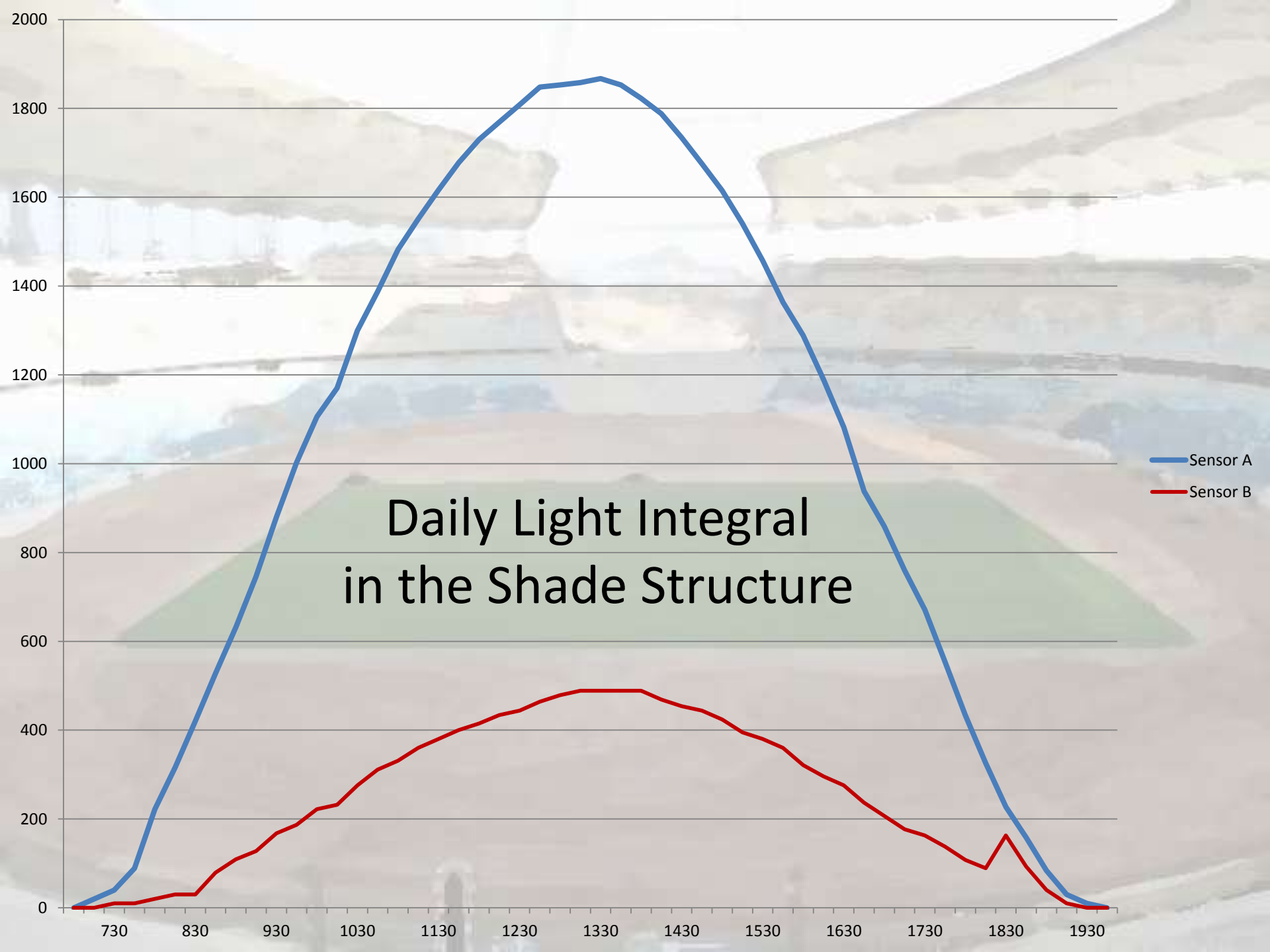
- Hanna, Braman, and Schwartz (2010)
- Release of TifGrand (ST-5) bermudagrass based on improved shade tolerance
- Shade screening, NTEP, and bermudagrass mite
- Selected after 5 years under 60-70% shade

Cultivar	Shaded Turf Quality	Mite Resistance
TifGrand	7.6	3.4
Tifway	4.5	5.2

# Shade







# Plant Response to Shade

- Photosynthesis is reduced
- Photomorphogenesis response
  - Longer, thinner, low density leaf blades
  - More vertical growth habit
  - Thinner cell walls and cuticle
  - Smaller chloroplast
  - Increased shoot to root ratio
  - Decreased lateral growth



# Plant Response to Shade



# Plant Response to Shade







# Tifway

TIFWAY



# Celebration

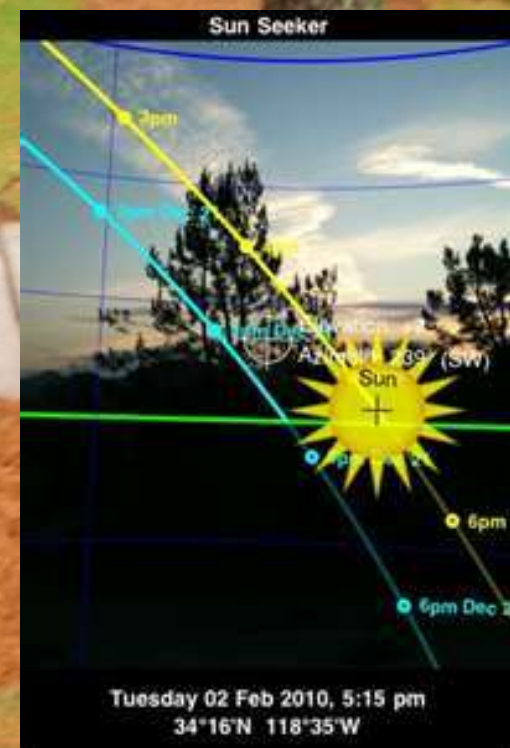
CELEBRATION



# TifGrand









A photograph of a golf course green. In the foreground, a large tree trunk is visible on the left, and a semi-transparent white box with the word "Shade" in bold black text is centered. The green is covered in grass, with some areas appearing bare or sandy. Pine needles are scattered across the grass. In the background, more trees and a golf course path are visible.

**Shade**



# TifGrand (2009)

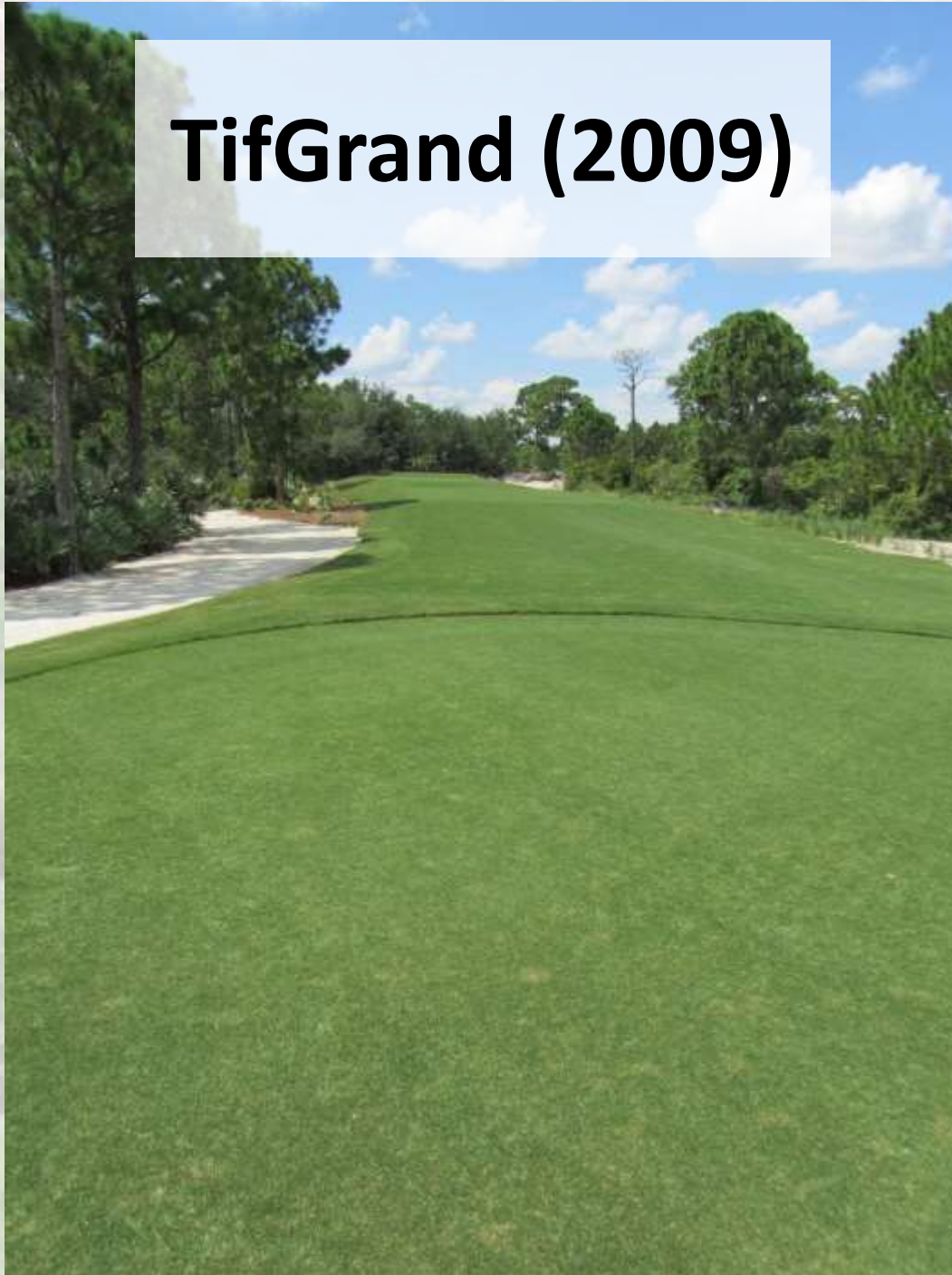




# TifGrand (2009)



# TifGrand (2009)









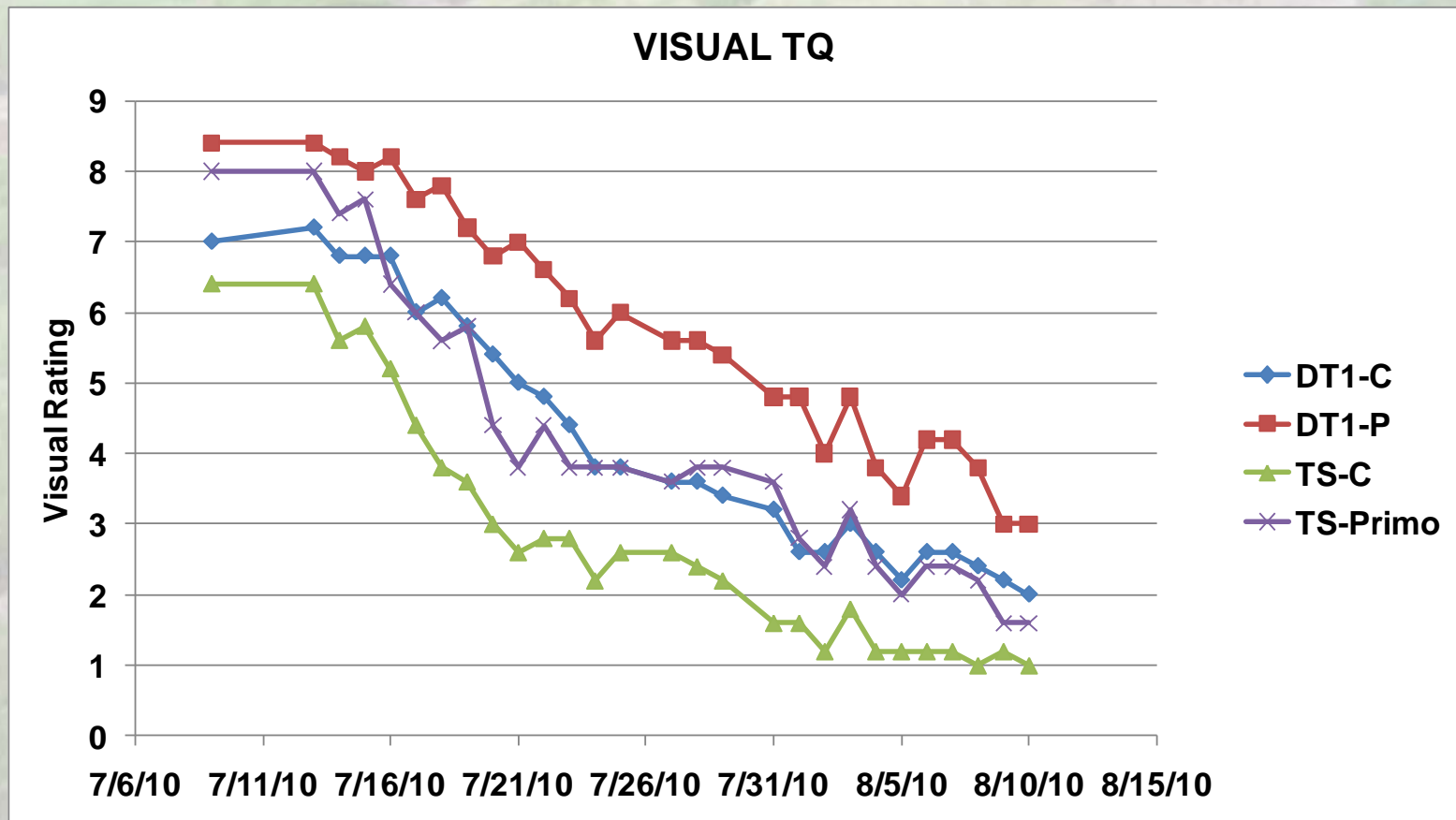
# Drought

- Rain Exclusion Structures



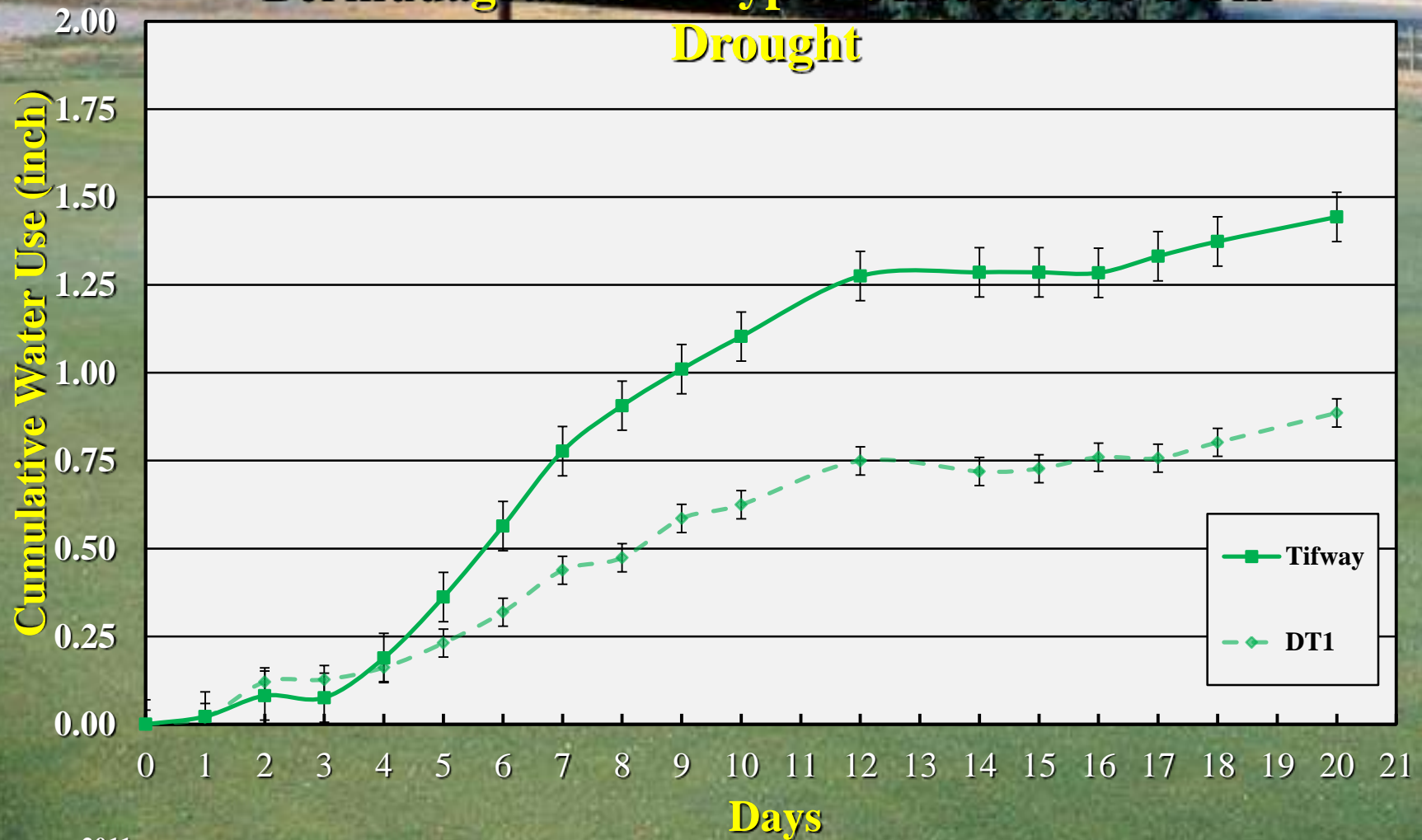


# DT-1 Bermudagrass



# New Technologies

## Bermudagrass Genotypes Under Short-Term Drought





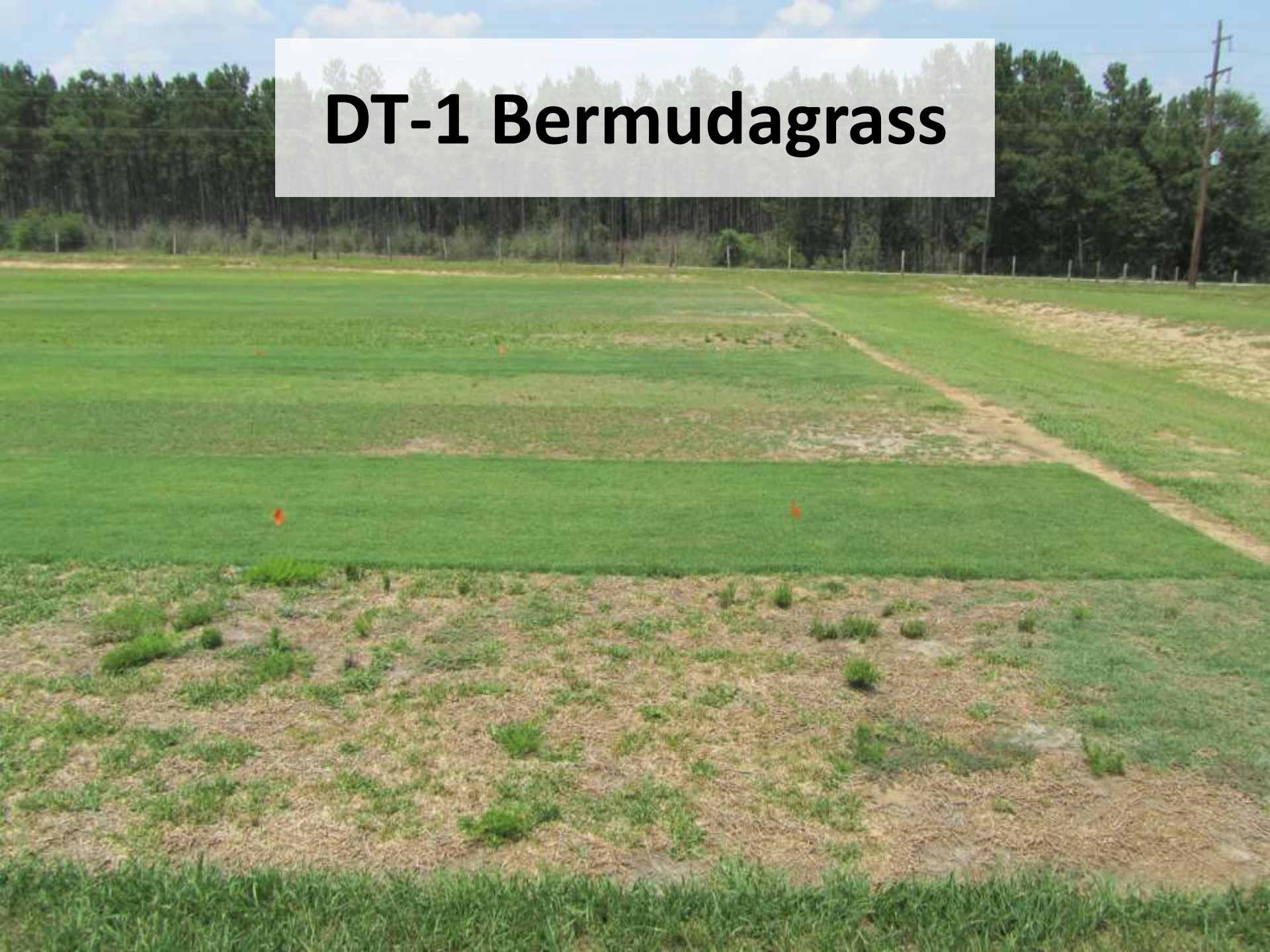
# Drought

- **LGIS (Linear Gradient Irrigation System)**





# DT-1 Bermudagrass





# **Wear Tolerance and “The Baldree”**





GA 30

# Wear Tolerance and “The Baldree”

RYAN  
By Jacobsen





# **Wear Tolerance and “The Baldree”**





# Digital Image Analysis and Spectral Reflectance





# Spectral Reflectance





# **USDA Specialty Crop Research**

- **Grant Funding (2010 – 2015)**
- **Plant Genetics and Genomics to Improve Drought and Salinity Tolerance for Sustainable Turfgrass Production in the Southern United States**
  - **Five Universities and 18 researchers**



# Bermuda Hybrid Screening





# St. Augustinegrass Screening



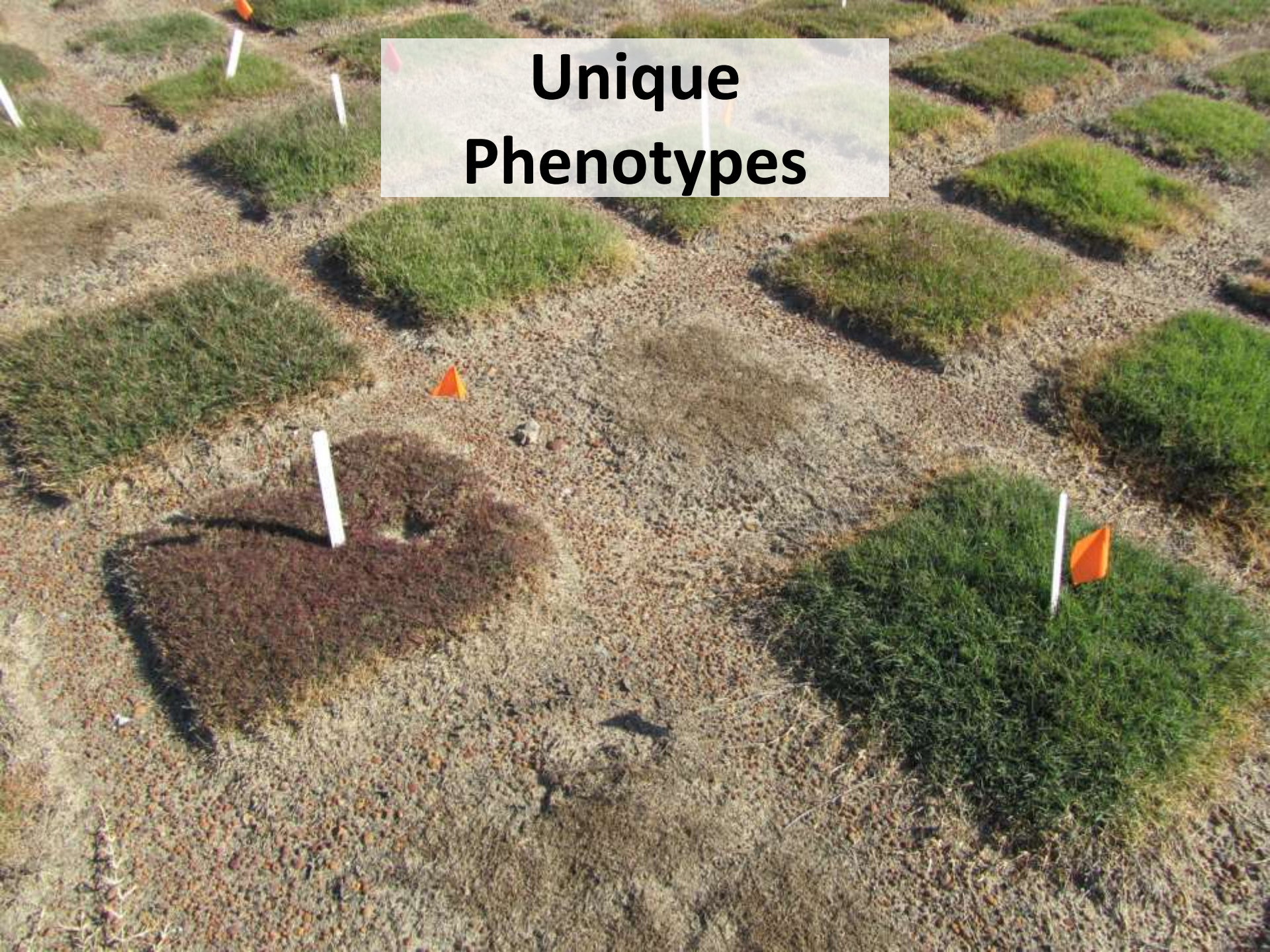


# Population Development





# Unique Phenotypes





# New Greens Grasses?





# 07-4 and Others

TifEagle 6 WAP



TifEagle 11 WAP



07-4 6 WAP



07-4 11 WAP





# Sprigging 07-4 in February???





# The Others





# The Others





# The Others





# Zoysiagrass Breeding

BA433



'Emerald'

'Diamond'



'Meyer'





# Zoysiagrass







# Zoysiagrass







# Zoysiagrass



- **L1F**
- **Low Rider 1**
- **Low Rider 2**
- **DR-12**
- **Y2**
- **Z7**
- **662**
- **29-2 B24**

- **10-TZ-74**
- **09-TZ-53-20**
- **09-TZ-50-14**
- **09-TZ-98-30**
- **10-TZ-572**
- **10-TZ-1254**
- **10-TZ-4014**
- **10-TZ-3536**





# Zoysiagrass



- **White Seeded**
  - Tall
- **White Seeded**
  - Short
- **Red Seeded**
  - Tall





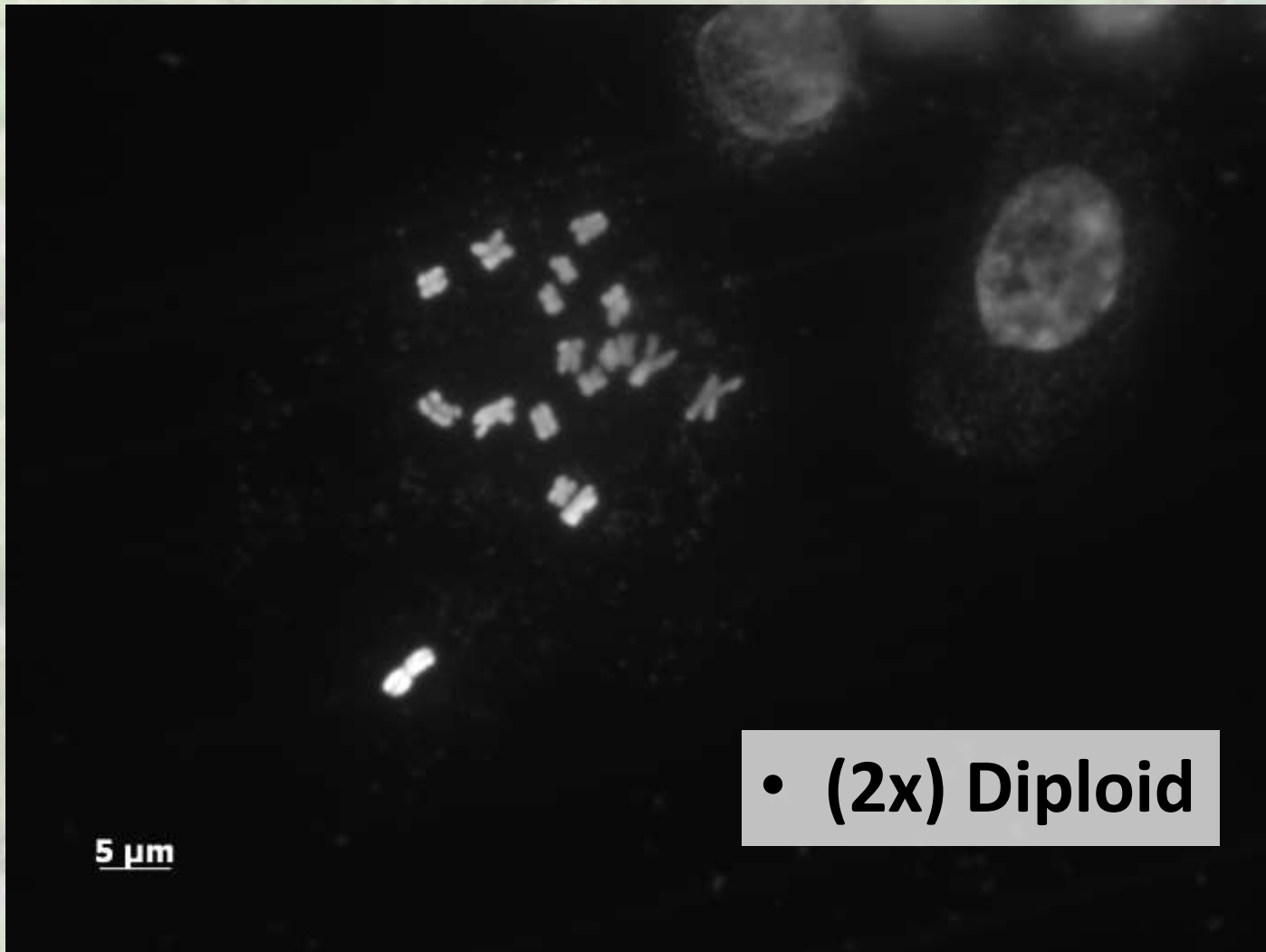
# **Ploidy Manipulation in Warm Season Turfgrass Species**

- **Increase Genetic Variation**
- **Improve Vigor**
- **Array of Phenotypic Variation in Crosses**
- **Sterility**
  - **Uniformity**
  - **Genetic Purity for Sod Producers**
  - **Energy NOT Used for Seed Development**



# Centipedegrass

## Ploidy Manipulation (2009)





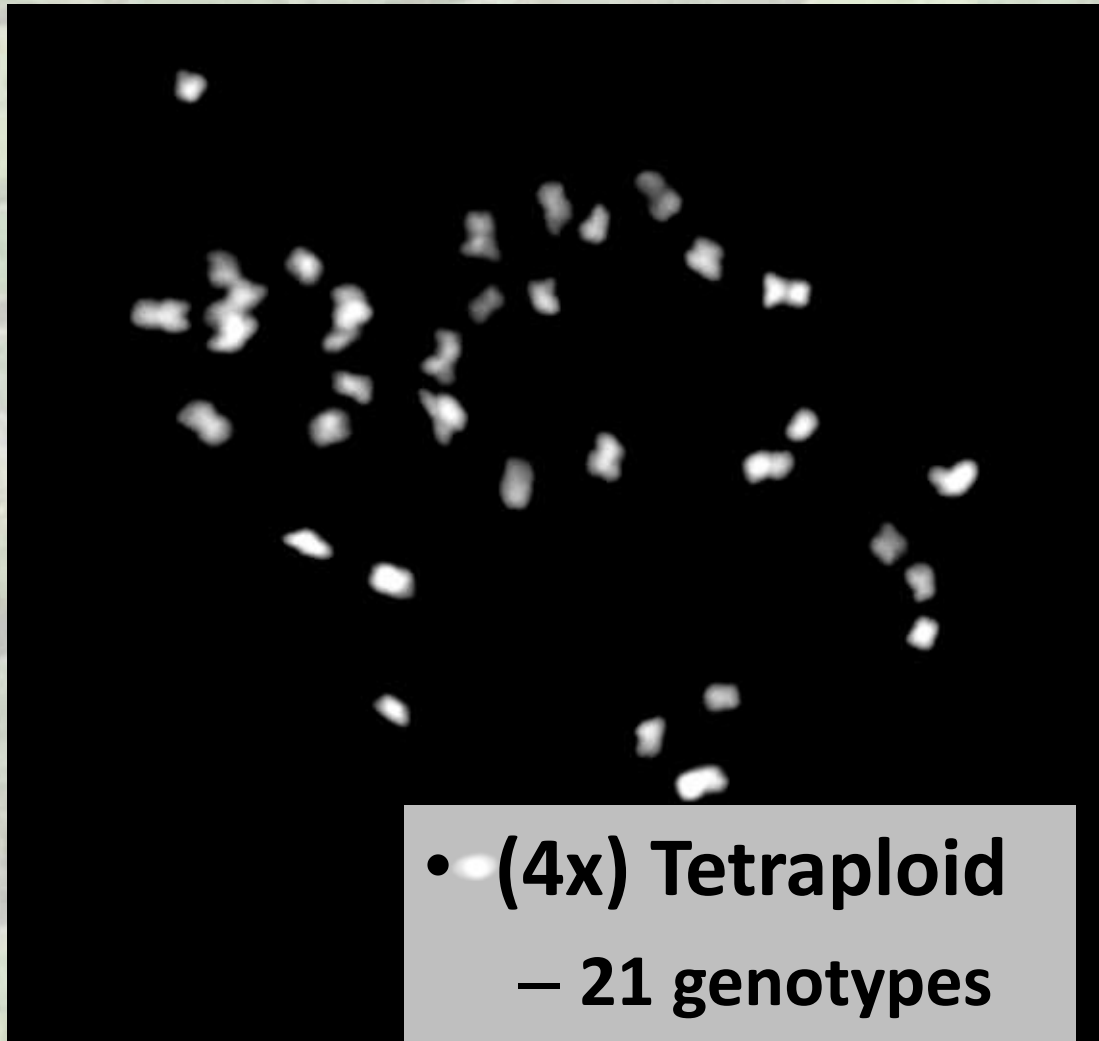
# **Centipedegrass**

## **Ploidy Manipulation (2009)**

- **(4x) Tetraploid**
  - 1 genotype
- **(2x + 4x) Cytochimera**
  - 1 genotype
- **Ploidy of the induced tetraploid became unstable during 2010**
  - Large crossing efforts during the summer of 2010 to stabilize ploidy in new seedlings

# Centipedegrass

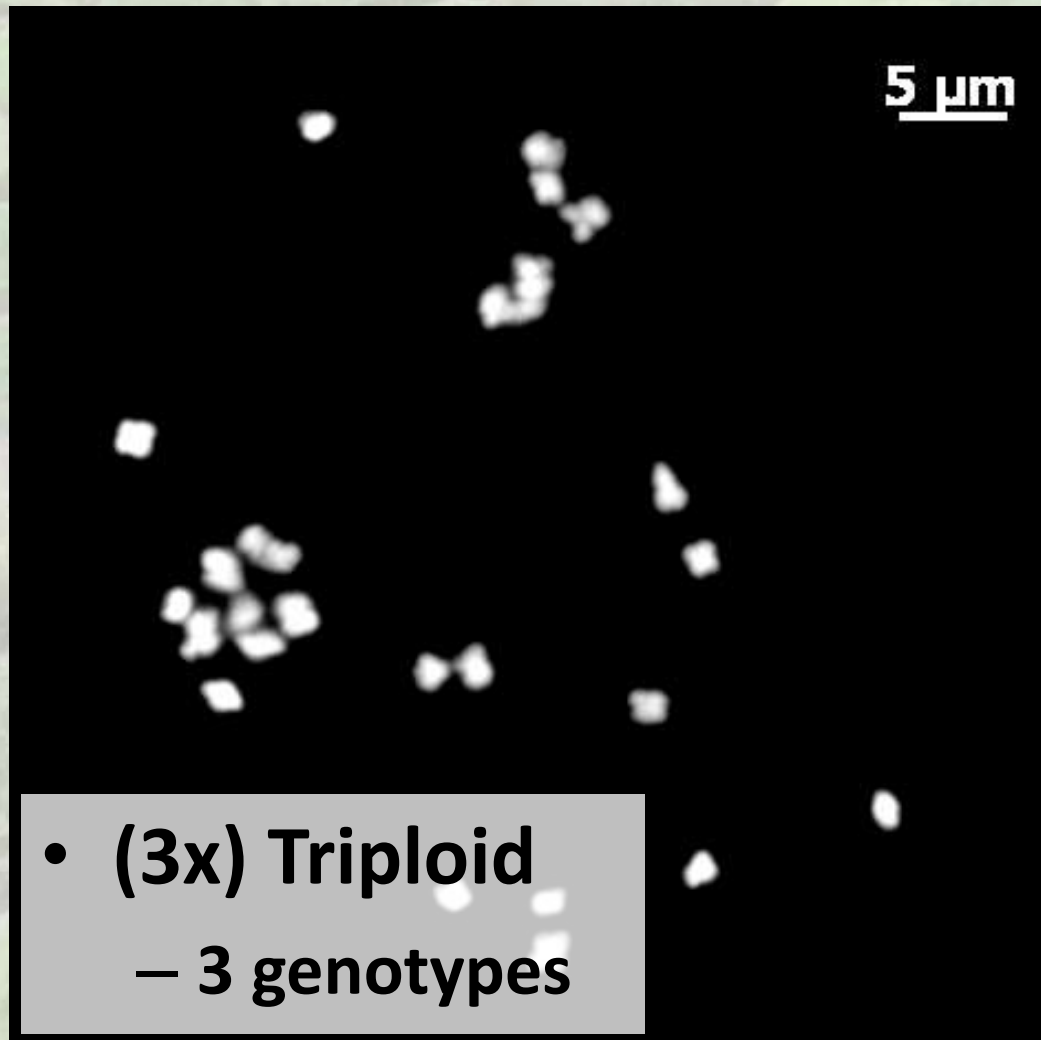
## Ploidy Manipulation (2011)





# Centipedegrass

## Ploidy Manipulation (2011)



# **Mr. Austin Grimshaw (MS Student)**

- **Further study of a naturally occurring sethoxydim-resistant bermudagrass mutant discovered in 2009**
- **Attempt to induce mutations which result in ACCase herbicide resistance using tissue culture**
- **Evaluate potential of nitrogen leaching from three fertilizers in four growing mediums**



# Bermudagrass

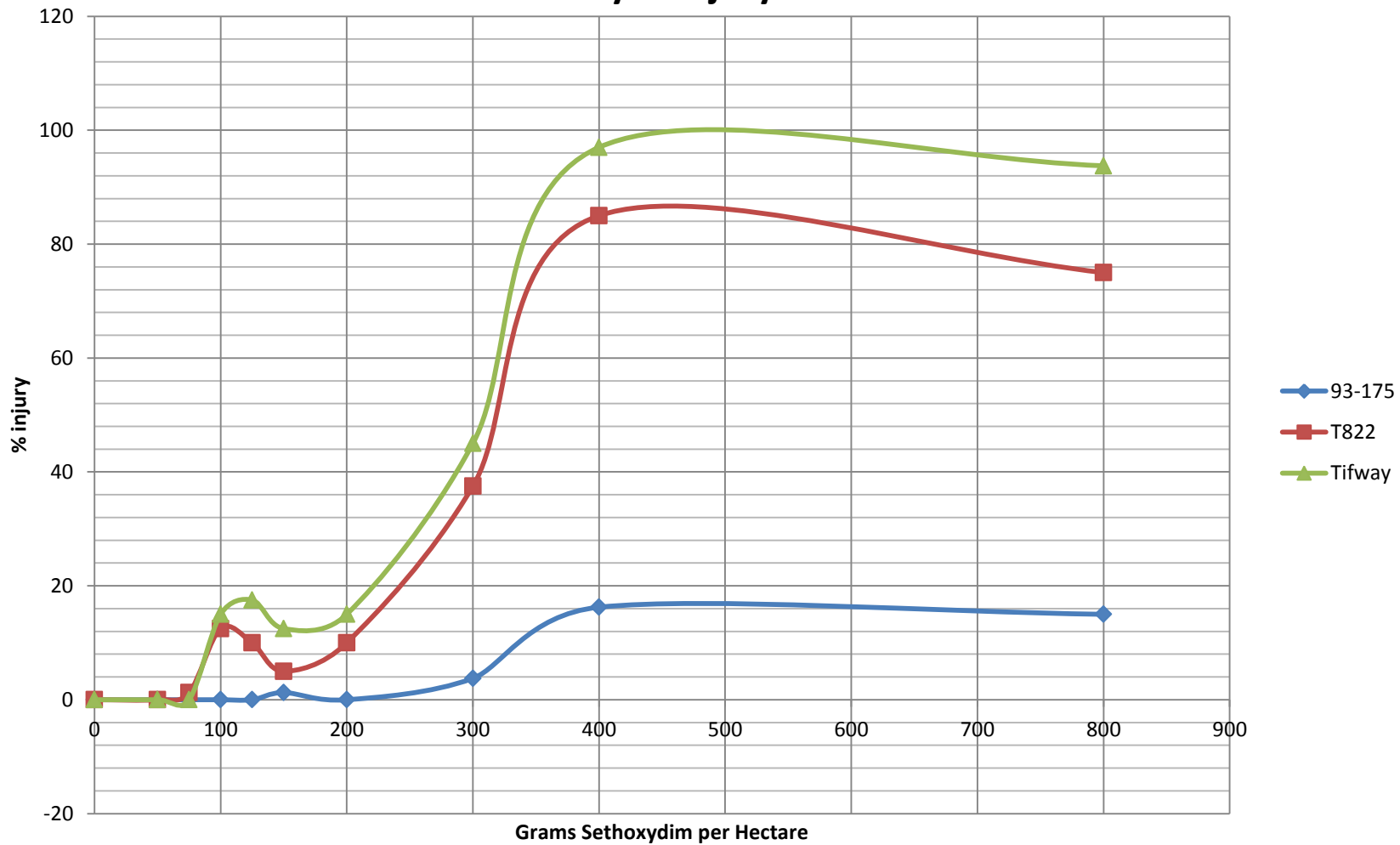








## 28 Day % Injury



# **Mr. Eric Elsner (MS Student)**

- **Study of self- and cross-compatibility of a diverse set of zoysiagrass genotypes using a full diallel crossing scheme**
- **Further study of inbreeding depression and inbred line development in *Zoysia* spp.**
- **Research of the mechanisms of drought tolerance exhibited by DT-1 bermudagrass, one of the most advanced hybrids in the Tifton turfgrass breeding program**



# Zoysiagrass





# DT-1 Bermudagrass





# Industry Partnership



**TEAM UGA**



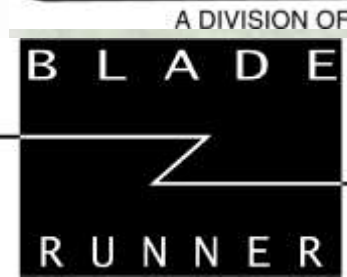
**USGA**



**USDA**



*Agri***LIFE RESEARCH**  
Texas A&M System



**SportsTurf**  
MANAGERS ASSOCIATION





# Questions???

**Brian Schwartz**

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