The Use of Cold Tolerant Bermudagrasses on Northern Golf Courses

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My Background

- Ohio State Program Coordinator – 2007 Present
- Crew Stadium Head Groundskeeper – 2003 – 2007
- Cincinnati Reds, Assistant Groundskeeper 2001 -2003

Today Topics

- Introduction to Bermudagrass
- Advantages
- Challenges
- OSU/USGA Study
- Preliminary Results
- Questions

Introduction

- *Cynodon ssp.*
  - A collection of warm-season grasses know as bermudagrasses
- Native to Africa and Eurasia
- Introduced to the US about 600 years ago
- Best adapted to warm arid and warms humid climates

Distribution

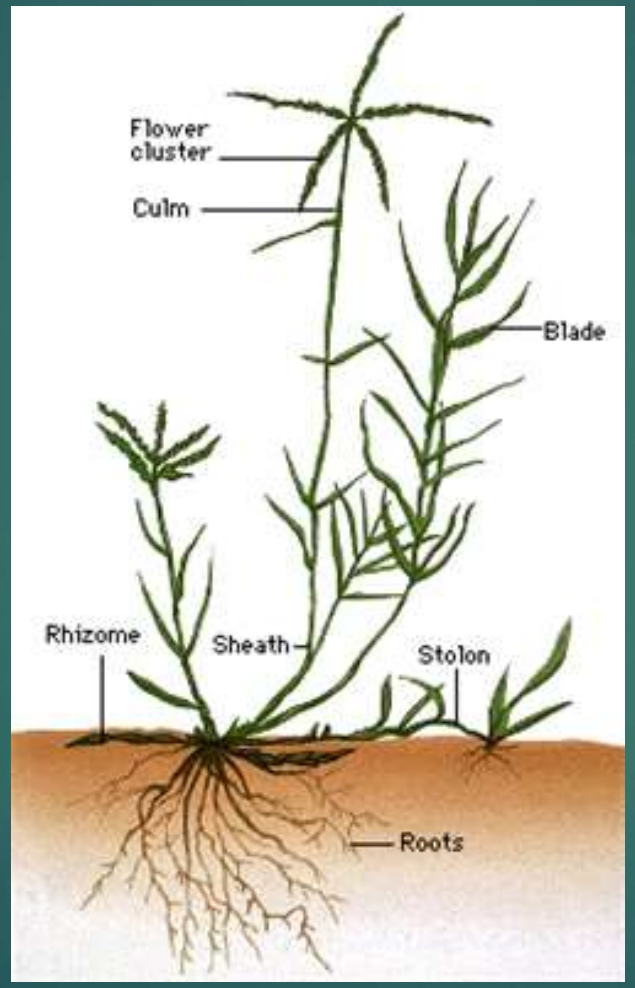
Plant Characteristics

- Common Bermudagrass -- *Cynodon dactylon*
  - Sahara, Yukon, Princess 77, Rivera
- Hybrid Bermudagrass – *Cynodon dactylon* X *Cynodon ssp.*
  - *Latitude 36, Patriot, Northbridge*

Plant Characteristics

- Prostrate growth habit
- Deep fibrous root system
- Has both stolons and rhizomes

Plant Characteristics



Advantages

- High quality turf surface
- High wear tolerance and recuperative potential
- Excellent heat and drought tolerance
- Low summer disease vulnerability

Challenges

- Short growing season
- Some increased maintenance
  - Topdressing / Verticuttting
- Increased Nitrogen needs
  - 1 pound a month

Challenges

- Low shade tolerance
- Poor cold and freeze tolerance
- Susceptible to Spring Dead Spot

Photosynthesis

$CO_2 + H_2O + \text{Light} \rightarrow CH_2O + O_2$

Two Major Photosynthetic Pathways

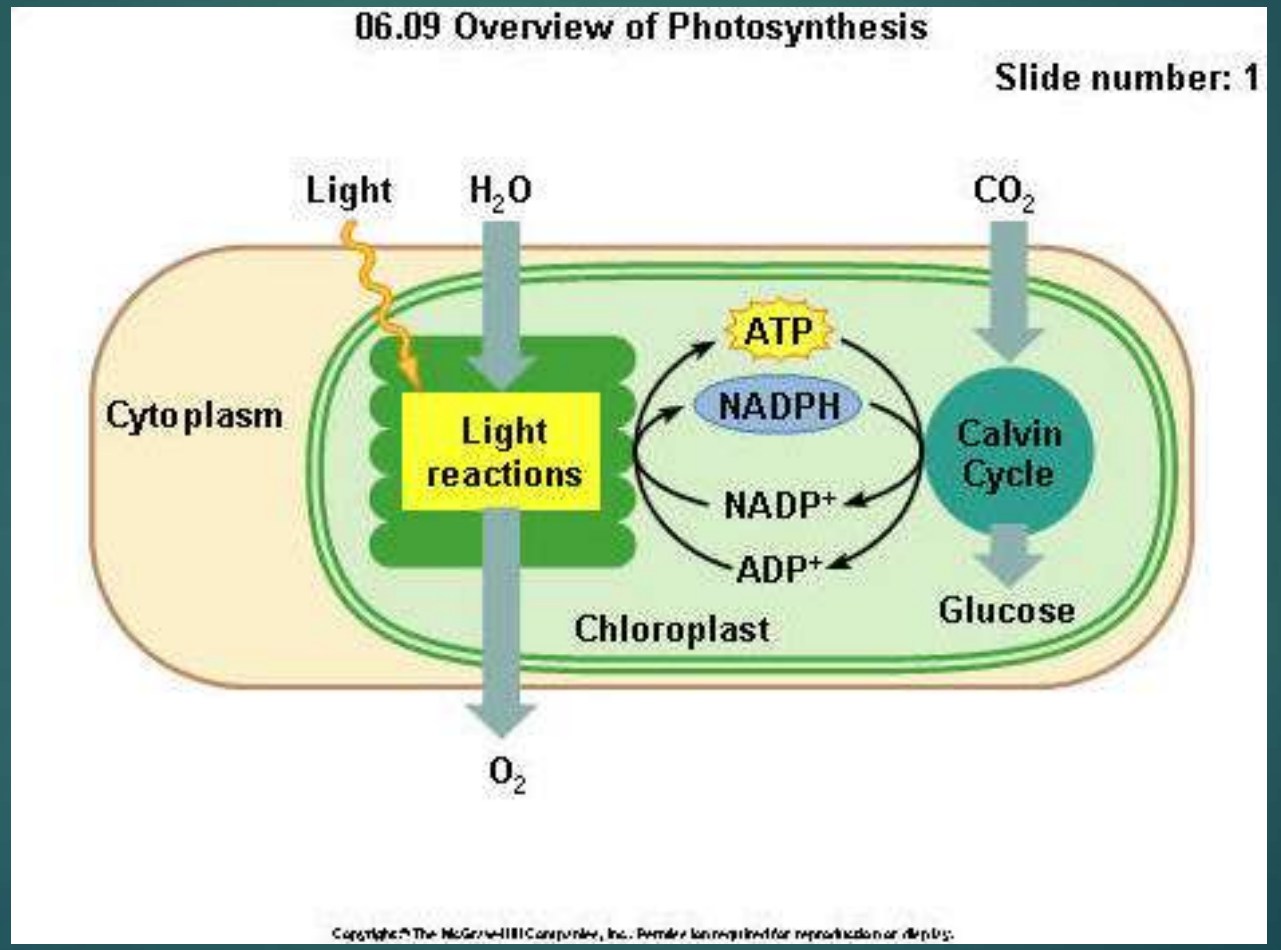
C3 Pathway

- First sugar produced has 3 Carbons
- Productivity is reduced as temperature increases
- Productivity Increases as CO_2 Increases

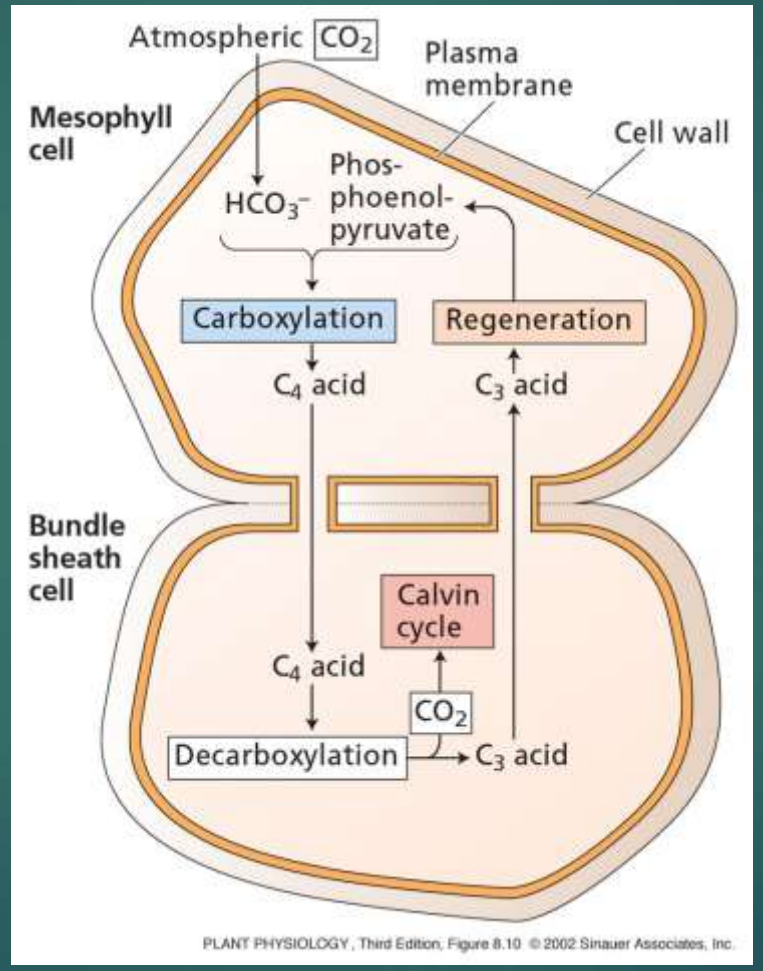
C4 Pathway

- First sugar produced has 4 Carbons
- Productivity increases as temperature increases
- Productivity is unaffected by CO_2

C3 Photosynthesis



C4 Photosynthesis



USGA Pilot Study

Research Objective:

To evaluate the suitability of new bermudagrass cultivars as a golf tee, fairway or athletic playing surface and to document turf quality, color retention, divot recovery and cold tolerance in response to good management practices.

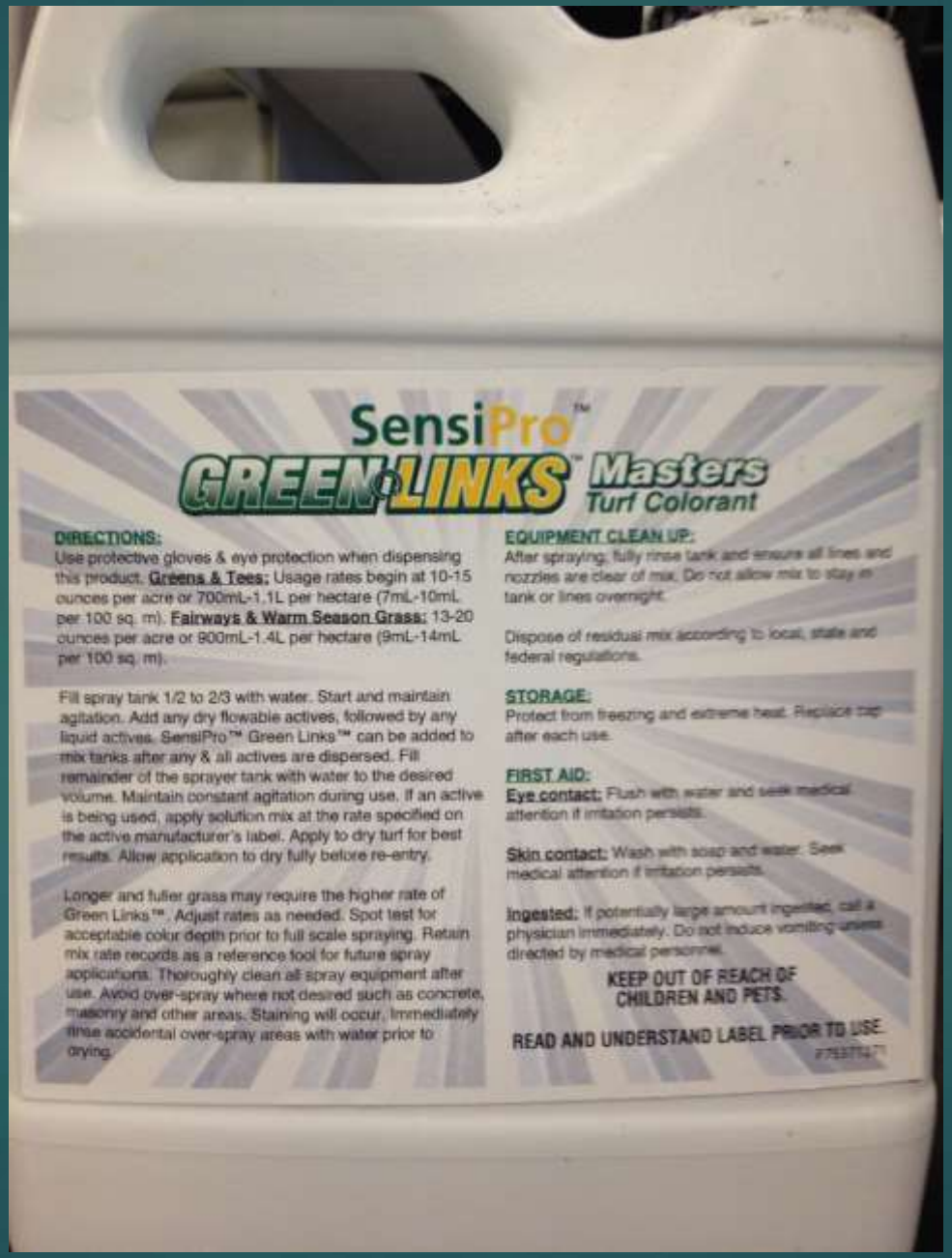
USGA

OTF
OHIO TURFGRASS FOUNDATION

OAKWOOD
SOD FARM
Delmar, Maryland

USGA Study Design

- Split Plot Randomized Complete Block Design
- Main plot factor: Variety
  - Riviera, Patriot, Latitude 36, Northbridge
- Subplot Factor: Chemical Treatment
  - Untreated, Primo Maxx, GreenLinks Masters, Primo Maxx + GreenLinks Masters


SensiPro™
GREEN LINKS™ Masters
Turf Colorant
DIRECTIONS:
Use protective gloves & eye protection when dispensing this product. Greens & Tees: Usage rates begin at 10-15 ounces per acre or 700mL-1.1L per hectare (7mL-10mL per 100 sq. m). Fairways & Warm Season Grass: 13-20 ounces per acre or 900mL-1.4L per hectare (9mL-14mL per 100 sq. m).
Fill spray tank 1/2 to 2/3 with water. Start and maintain agitation. Add any dry flowable actives, followed by any liquid actives. SensiPro™ Green Links™ can be added to mix tanks after any & all actives are dispersed. Fill remainder of the sprayer tank with water to the desired volume. Maintain constant agitation during use. If an active is being used, apply solution mix at the rate specified on the active manufacturer's label. Apply to dry turf for best results. Allow application to dry fully before re-entry.
Longer and fuller grass may require the higher rate of Green Links™. Adjust rates as needed. Spot test for acceptable color depth prior to full scale spraying. Retain mix rate records as a reference tool for future spray applications. Thoroughly clean all spray equipment after use. Avoid over-spray where not desired such as concrete, masonry and other areas. Staining will occur. Immediately rinse accidental over-spray areas with water prior to drying.
EQUIPMENT CLEAN UP:
After spraying, fully rinse tank and ensure all lines and nozzles are clear of mix. Do not allow mix to stay in tank or lines overnight.
Dispose of residual mix according to local, state and federal regulations.
STORAGE:
Protect from freezing and extreme heat. Replace cap after each use.
FIRST AID:
Eye contact: Flush with water and seek medical attention if irritation persists.
Skin contact: Wash with soap and water. Seek medical attention if irritation persists.
Ingested: If potentially large amount ingested, call a physician immediately. Do not induce vomiting unless directed by medical personnel.
KEEP OUT OF REACH OF CHILDREN AND PETS.
READ AND UNDERSTAND LABEL PRIOR TO USE.

Plot Plan

Northbridge	Riviera	Latitude 36	Patriot
Untreated	Primo Maxx	GREENLINKS + Primo Maxx	Untreated
GREENLINKS + Primo Maxx	GREENLINKS	Untreated	GREENLINKS
Primo Maxx	GREENLINKS + Primo Maxx	Primo Maxx	GREENLINKS + Primo Maxx
GREENLINKS	Untreated	GREENLINKS	Primo Maxx

Maintenance

- Daily walk mowing at ¾”
- 1 lb. of Nitrogen per month
- De-thatching every 2 weeks

Fall Data Collection

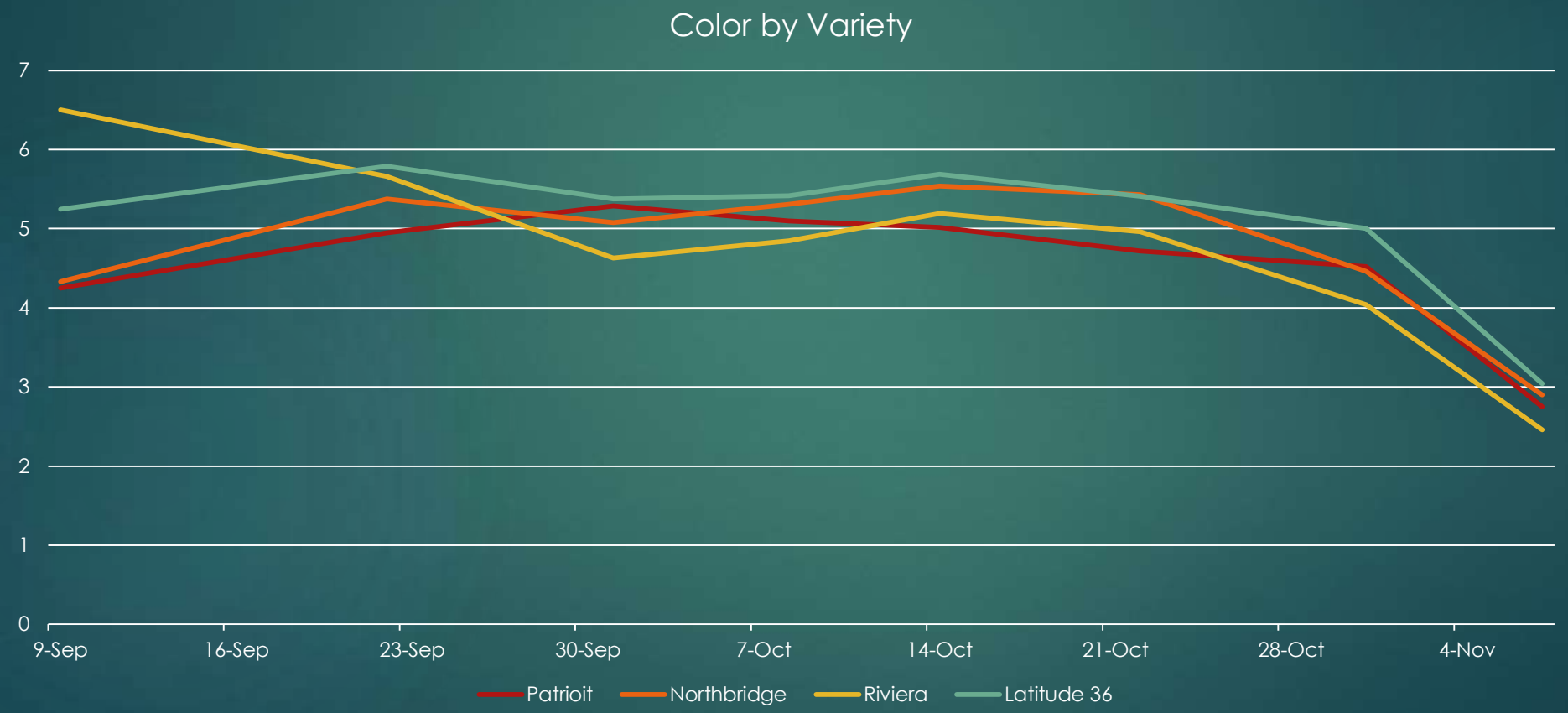
- Color (1-9)
- Temperature
  - Soil at 3”
  - Canopy
  - Surface
- Divot Recovery (%)

Winter/Spring Data Collection

- Weed Encroachment (%)
- Spring Green-up (1-9)
- Winter Kill (%)
- Spring Dead Spot (%)
- Divot Recovery (%)


Bobcat
T190

Preliminary Results



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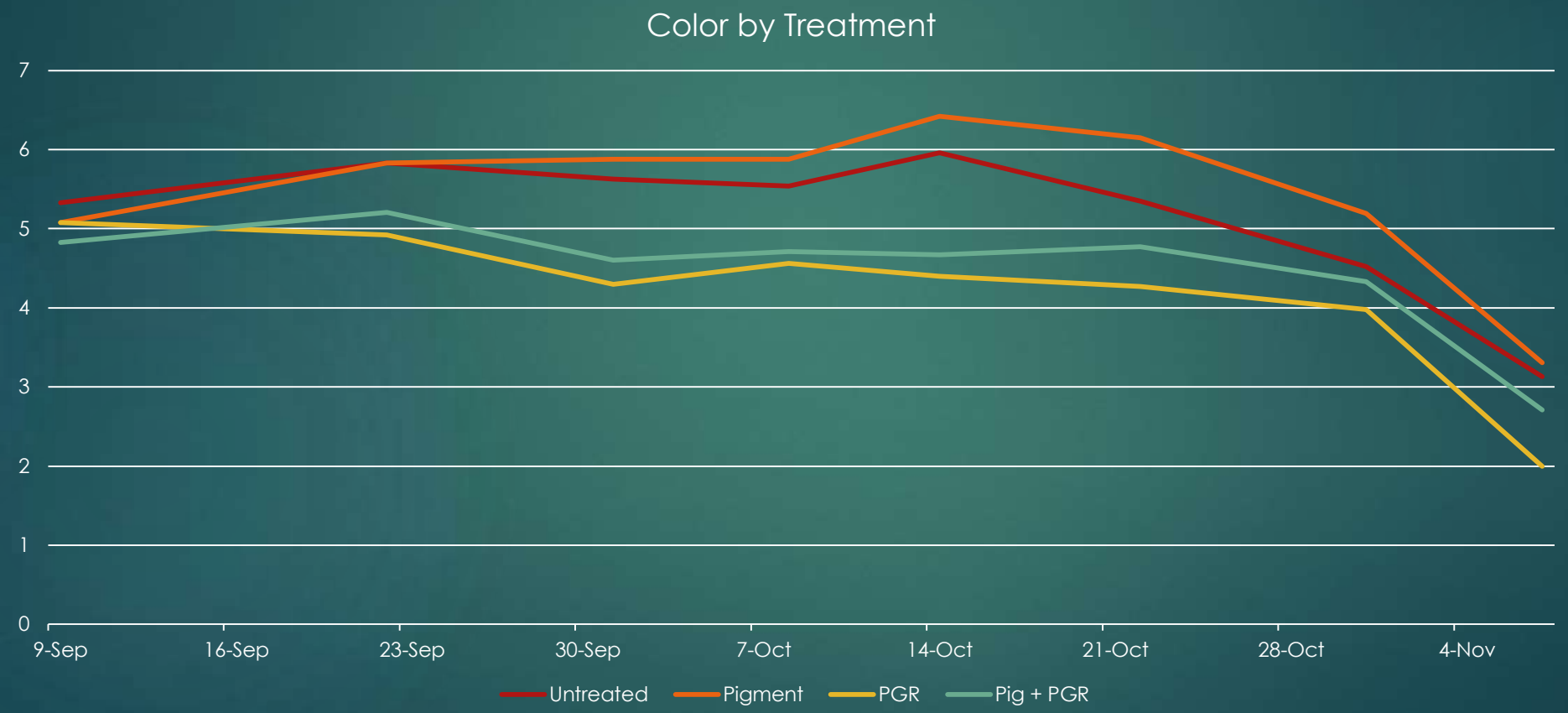
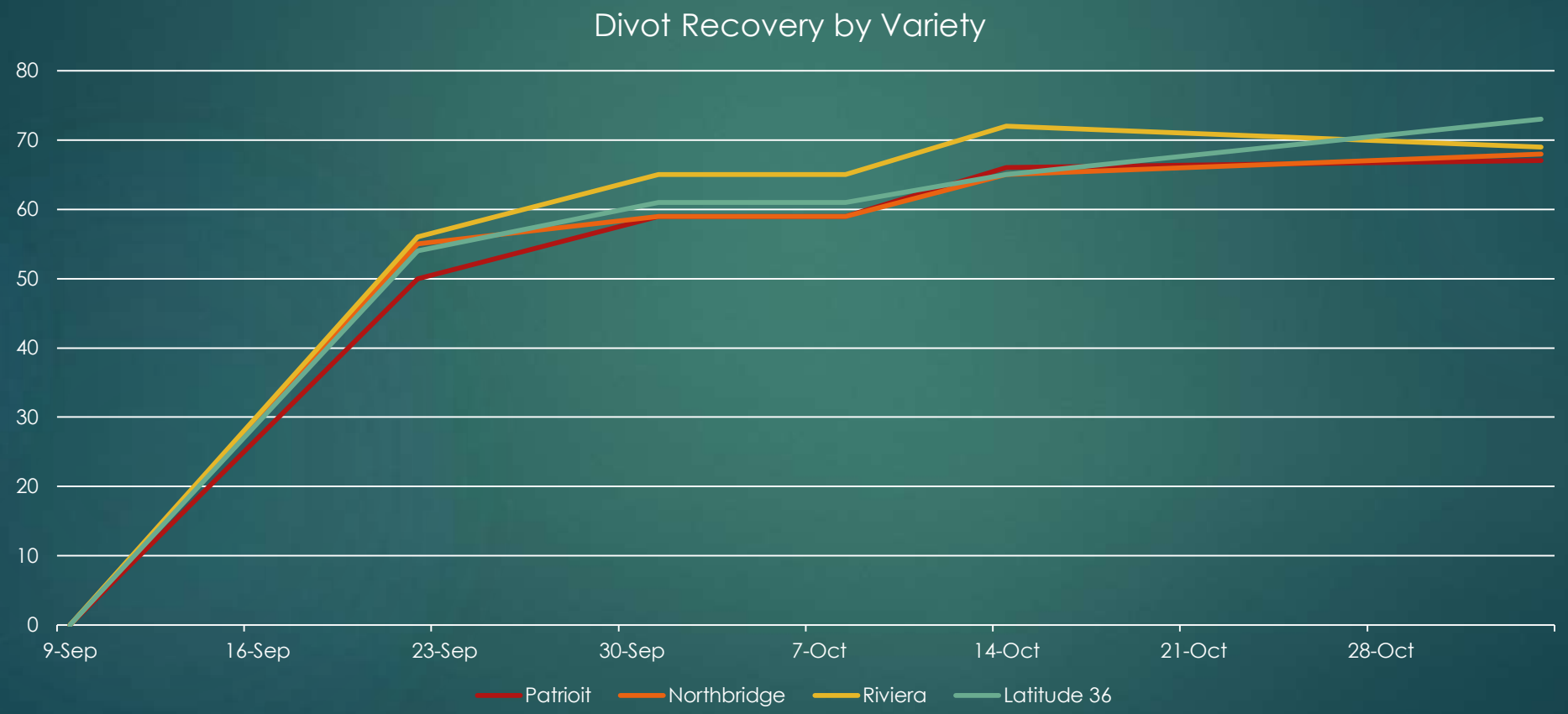



Northbridge
Riviera
Latitude 36
Patriot
November 3rd

Preliminary Results



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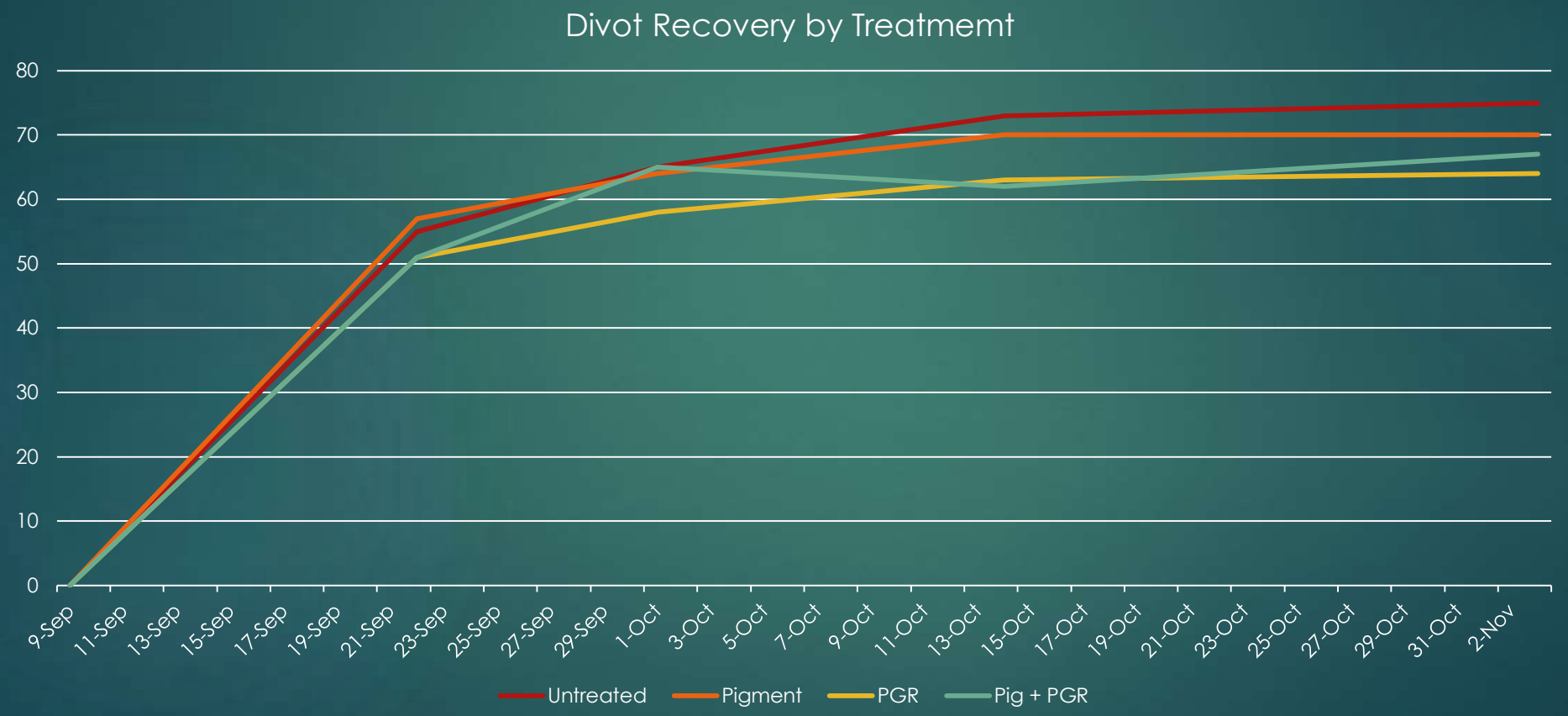

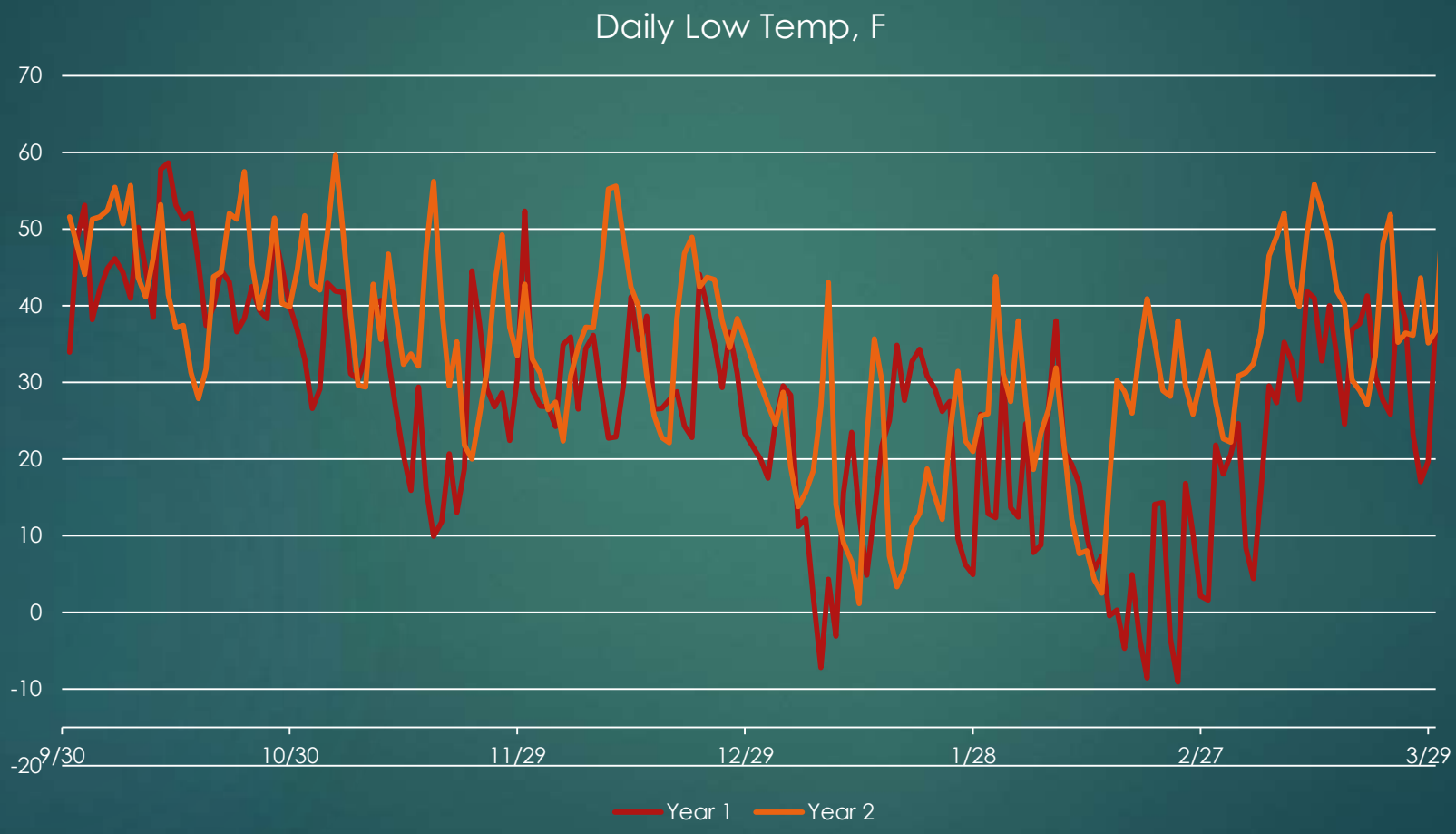
Daily Low Temp, F
70
60
50
40
30
20
10
0
-10
-20
9/30
10/30
11/29
12/29
1/28
2/27
3/29
Year 1
Year 2

Preliminary Results

- All varieties maintained acceptable color ratings through October 15th
- Pigment applications aided in extending fall color
- Primo Applications had a negative affect on color and divot recovery
- Temperature measurements were unaffected by treatment or variety

References

1. Beard, J.B. 1973. Turfgrass: Science and Culture. Prentice Hall, Englewood Cliffs, NJ.

2. Christians, N.E. 1998. Fundamentals of Turfgrass Management. Ann Arbor Press, Chelsea, Mi.

3. Taliaferro, C. M. 2003. Bermudagrass. in Casler, M. D. and R. R. Duncan, eds. Turfgrass Biology, Genetics, and Breeding. John Wiley and Sons, Inc., Hoboken, NJ.

Questions?