

Turfgrass Colorants: It's More Than Just Green Color



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K-STATE
Research and Extension



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Lawn spray-painting business booming in drought-stricken California



By Dylan Stableford
 September 2, 2014 11:25 AM
 Yahoo News



The historic drought that has scorched California and forced residents to conserve water or face stiff fines has also created a business opportunity for a unique subset of entrepreneurs: lawn spray-painters.



Darker winter color



Imperfections

Photo by Ross Braun



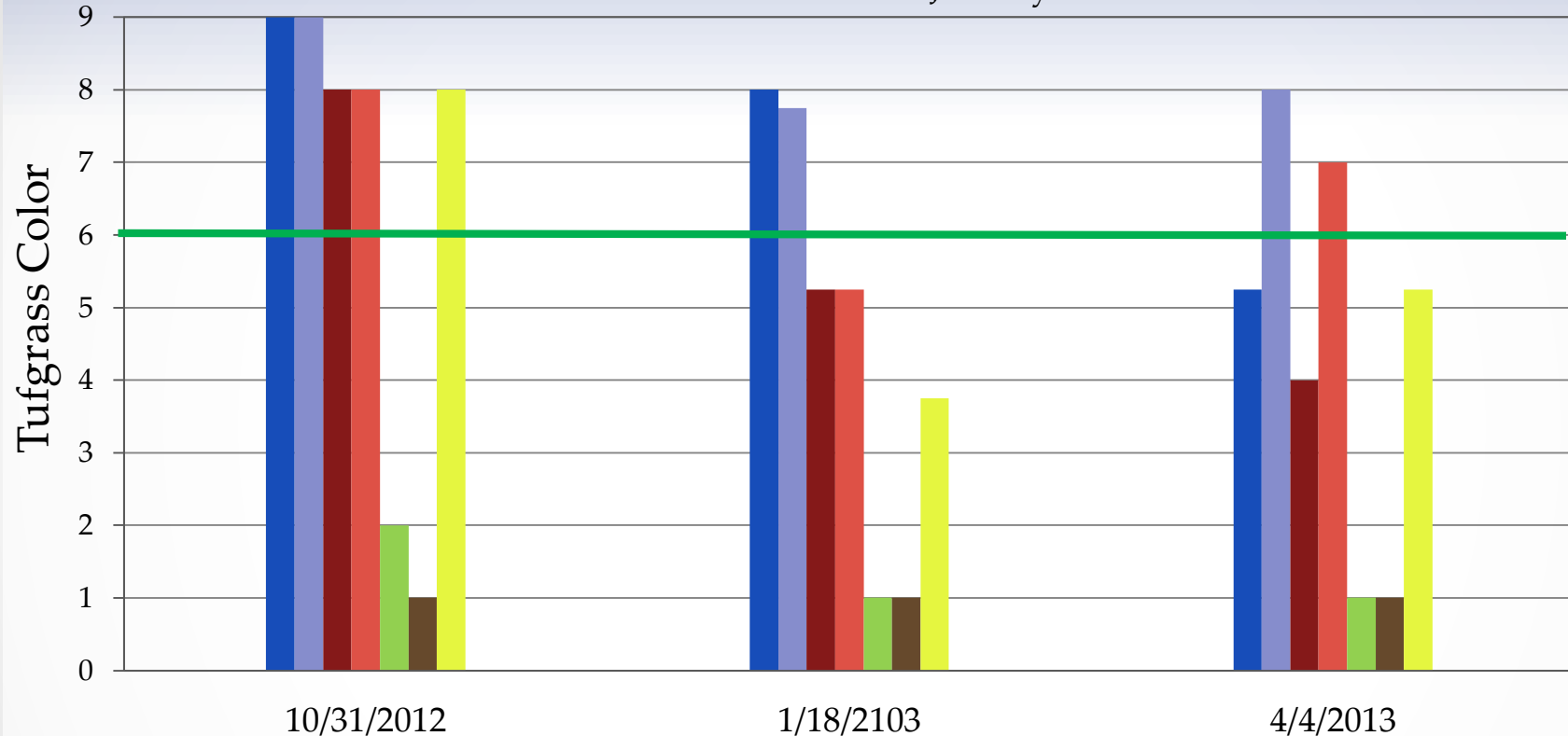
Imperfections

Photo by Ross Braun

K-State Research

Visual Color of Dormant Zoysiagrass Treated with Colorants

Ross Braun & Dr. Jack Fry



- Green Lawngr
- Green Lawngr (2 Application)
- Ultradwarf Super
- Ultradwarf Super (2 application)
- Annual Ryegrass Overseed
- Untreated
- Tall Fescue

(1st application 10/31/12; 2nd application 2/5/13).

Example of Label

DIRECTIONS

Before applying Green Lawngr, cut turf to desired height. One gallon (3.78 liters) of Green Lawngr will cover 4,000-12,000 square feet (370-1115 m²) of turf. Use at a rate of 1-2 gallons (3.78-7.56 ltrs) of spray solution per 1,000 square feet (41-82 ml/m²). The area covered will vary with the rate of Green Lawngr used, type and condition of grass being treated, and turf color desired. Green Lawngr may also be tank mixed with fungicides and herbicides. Check manufacturer's label for appropriate usage rates.

Dormant Application

Dilute one gallon (3.78 liters) of Green Lawngr with 7 to 9 gallons (26-34 liters) of water. For a darker turf color, reduce the volume of water. Some experimentation may be required with the water to colorant ratio to obtain the exact color desired. Green Lawngr's color will last the entire dormant season.

Non-Dormant Application

Dilute one gallon (3.78 liters) of Green Lawngr with 15 to 20 gallons (56-75 liters) of water and apply over 9,000-12,000 square feet. (8 oz Green Lawngr with 120 to 160 oz of water per 1,000 sq. ft.) Again, the application rate depends on the desired color. For best results on any discolored area, two applications of a higher dilution are recommended to blend the colored area in with the surrounding healthy turf.

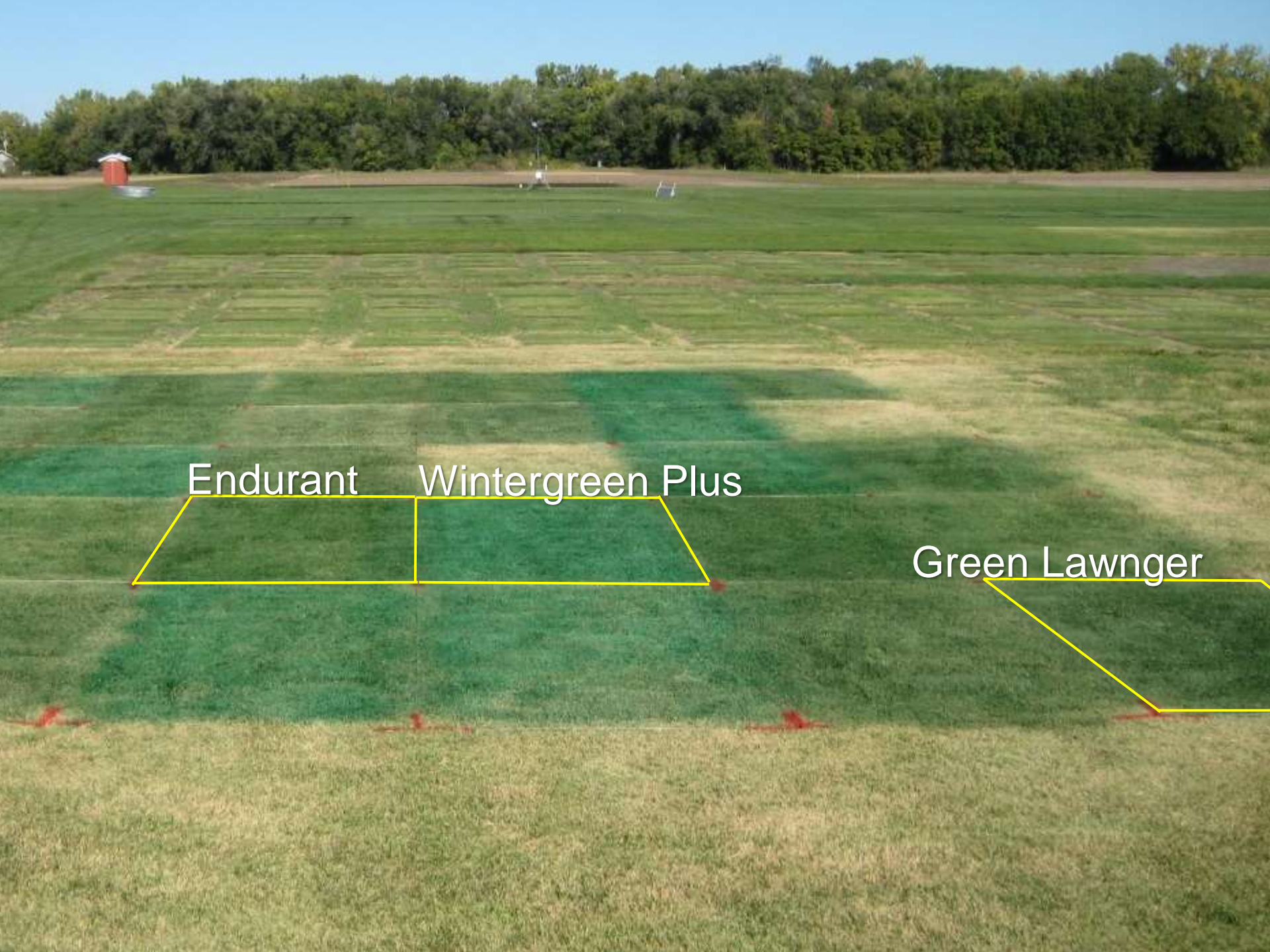
What's the correct spray volume?

- **Colorants**

- **Green Lawnger** (BASF Corp, Florham Park, NJ)
- **Endurant** (Geoponics Corp, Naples, FL)
- **Wintergreen Plus** (Precision Laboratories, Inc., Waukegan, IL)

Application Volume	Dilution (<i>colorant:water</i>)	Total Colorant Applied
748 L/ha (80 GPA)	1:6	124.7 L/ha (13 GPA)
1497 L/ha (160 GPA)	1:6	249.4 L/ha (26 GPA)
2245 L/ha (240 GPA)	1:6	374.1 L/ha (39 GPA)

- Untreated zoysiagrass control
- Tall fescue (C3) control

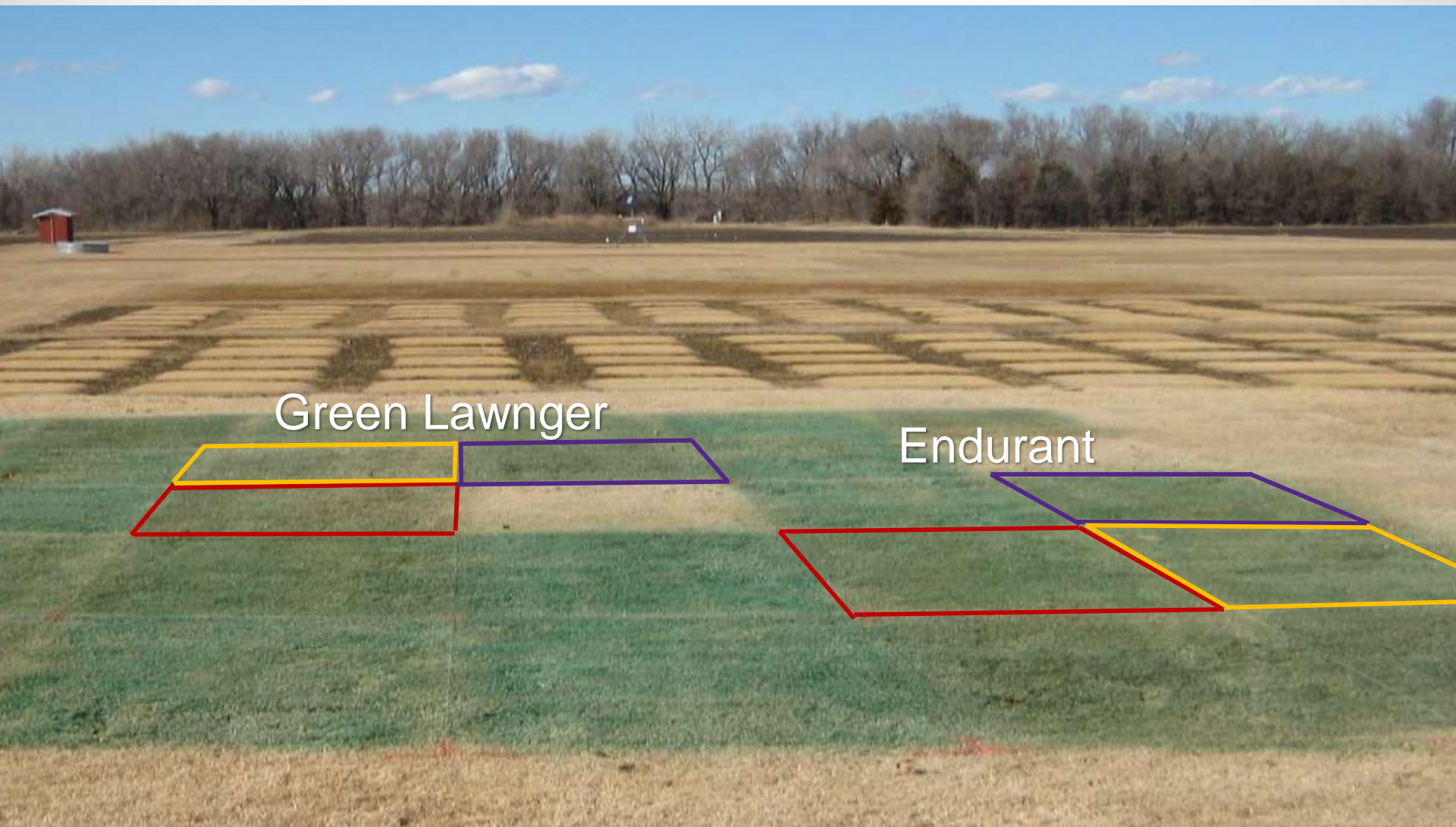


Endurant

Wintergreen Plus

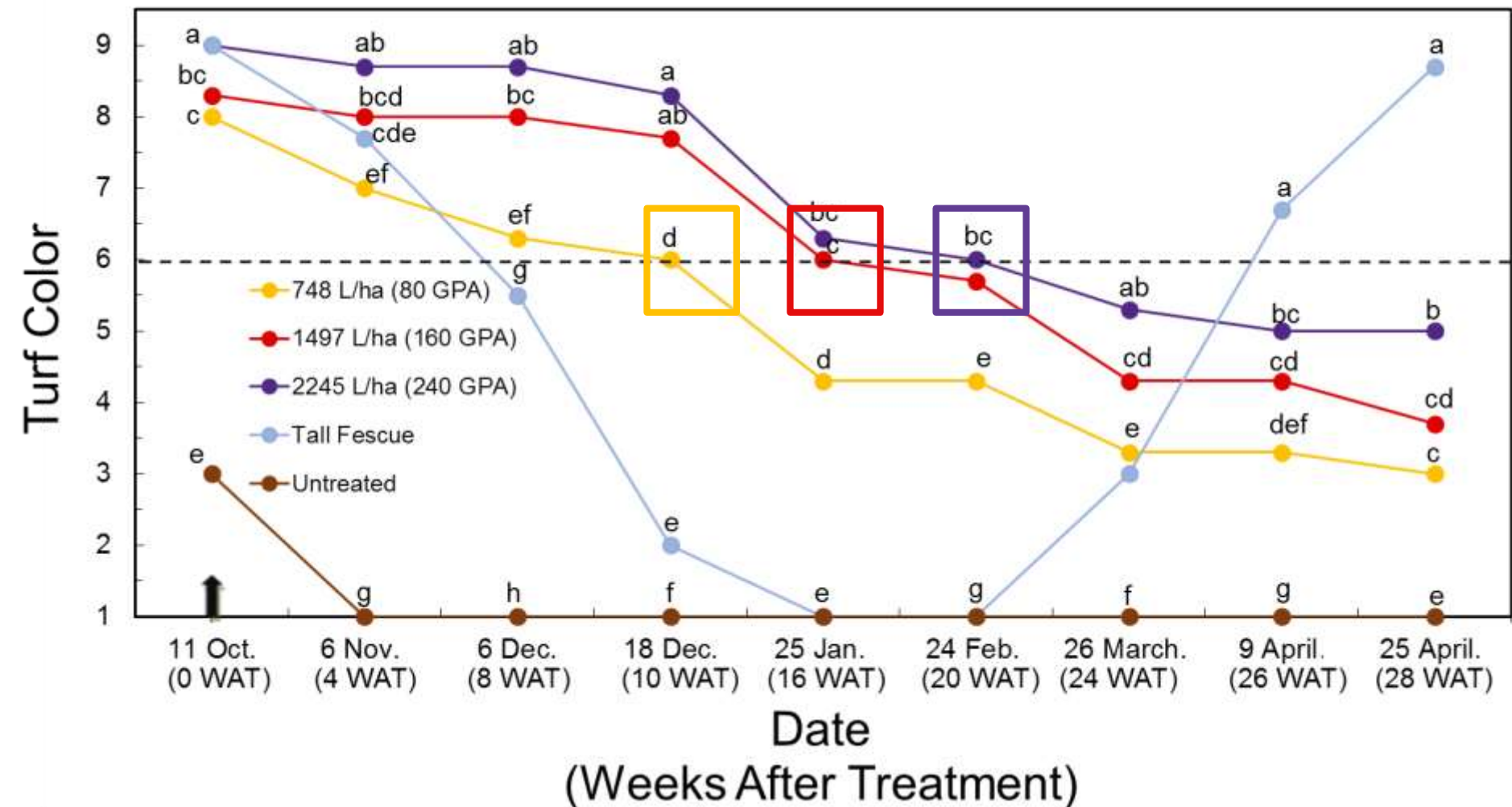
Green Lawnger

February 24, 2014 (20 WAT)



Effect of Colorant Application Volumes on Turf Color

Endurant



Summary

- Visual differences in type of “green” color among products.
- Acceptable turf color duration for each application volume was similar among colorants
- **Application Volumes**
 - 748 L/ha (80 GPA): 10 to 14 weeks of acceptable color
 - 1497 L/ha (160 GPA): 10 to 18 weeks of acceptable color
 - 2245 L/ha (240 GPA): 20 to 24 weeks of acceptable color

Turfgrass Colorants



- Applying turf colorants will give dormant turf green color during the winter months
 - Visually appealing for golfers
 - Less intensive than overseeding
- **Questions**
 - Can turfgrass colorants withstand winter golf cart traffic?
 - In less intensive management systems, can turf colorants be applied at lower rates?
 - Can we mix with herbicide applications?

- **Turfgrass Colorants provide acceptable green color throughout the winter months.**
- **Ten passes/week of traffic with a Club Car for eight weeks has shown to reduce turfgrass cover.**
- **Traffic on dormant turf will need to be managed to reduce the potential for injury and reduced spring green up** (Danneberger, 2012)

Determine the influence of simulated golf cart traffic on turfgrass colorant longevity.



Winter Color Treatments

- **Turfgrass Colorants**

- Endurant
- Endurant Premium
- GreenLawnger

- **Colorants were mixed and applied at a 1:6 dilution**

- 1 gal/1,000 ft²

- **Application Dates**

- 24 October 2014
- 5 November 2015

- **Overseeded Perennial Ryegrass**

- Champion GQ perennial ryegrass blend
- Slit seeded at 10 lb/1,000 ft²
- A starter fertilizer (18-24-12) was broadcast to the overseeded plots after seeding

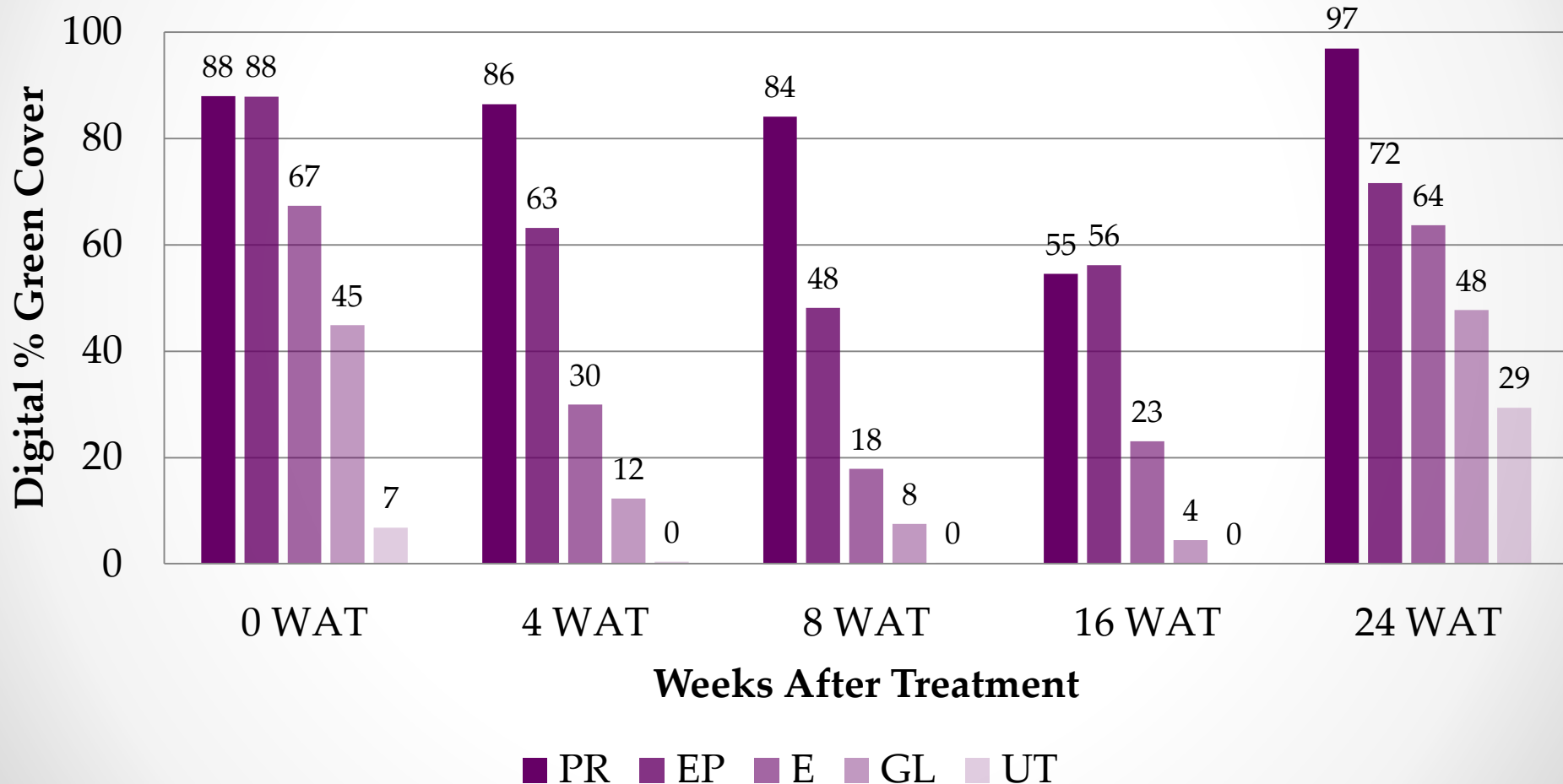
- **Perennial Ryegrass Removal**

- Katana – 0.034 oz product/1,000 ft²
 - 24 April 2015
 - 8 April 2016

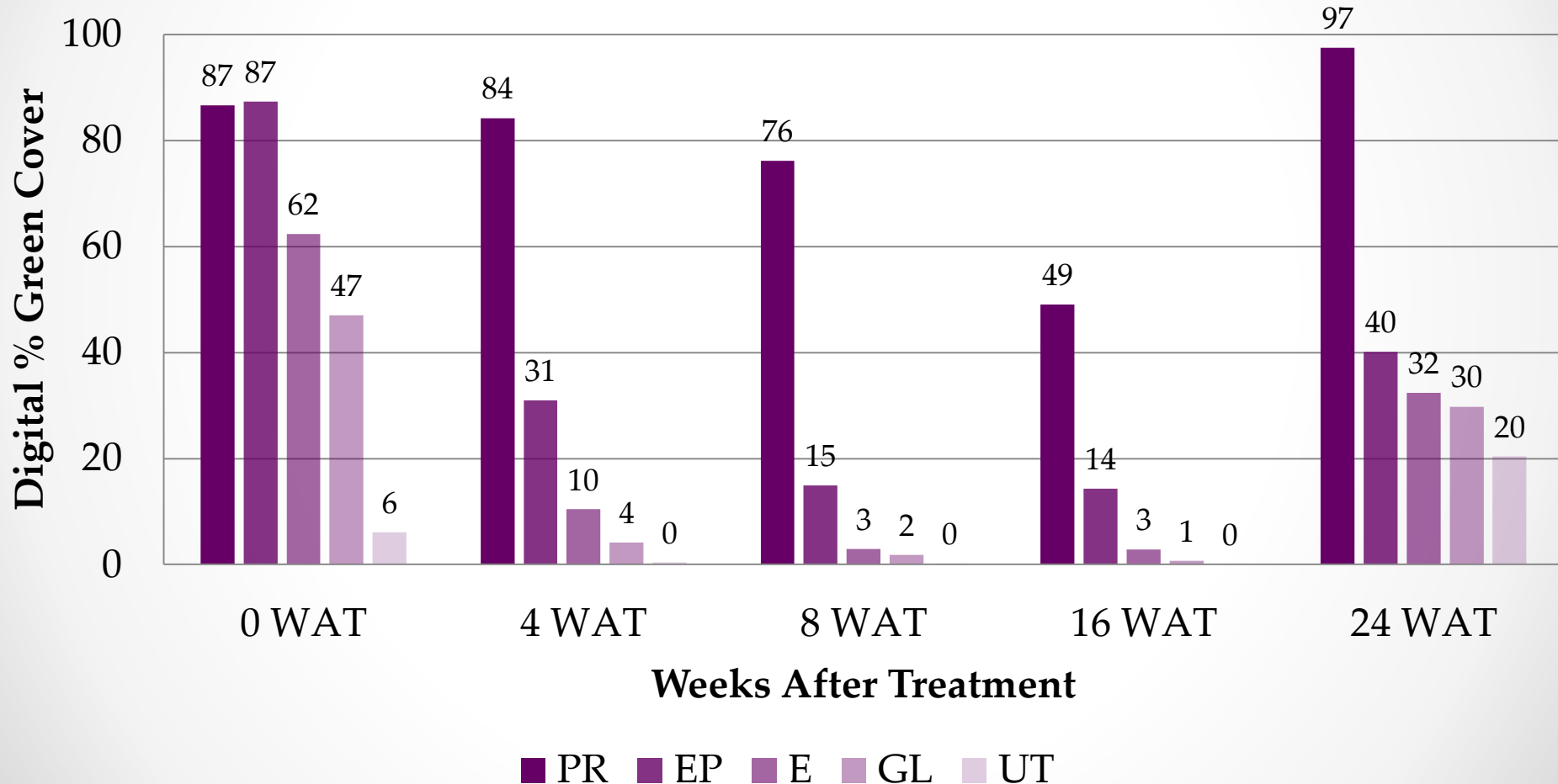
- Traffic was applied once per week
 - 0, 2, 4, 8 passes/week
- Two custom built trailers to be pulled behind turf utility vehicle.
 - Trailer loaded with water weighs 1,000 lbs
- Traffic was not applied when:
 - There was snow cover
 - Temperatures did not achieve above 38 °F



2015 Digital Percent Green Cover for Winter Color and Traffic Rate (0 passes/week)



2015 Digital Percent Green Cover for Winter Color and Traffic Rate (8 passes/week)

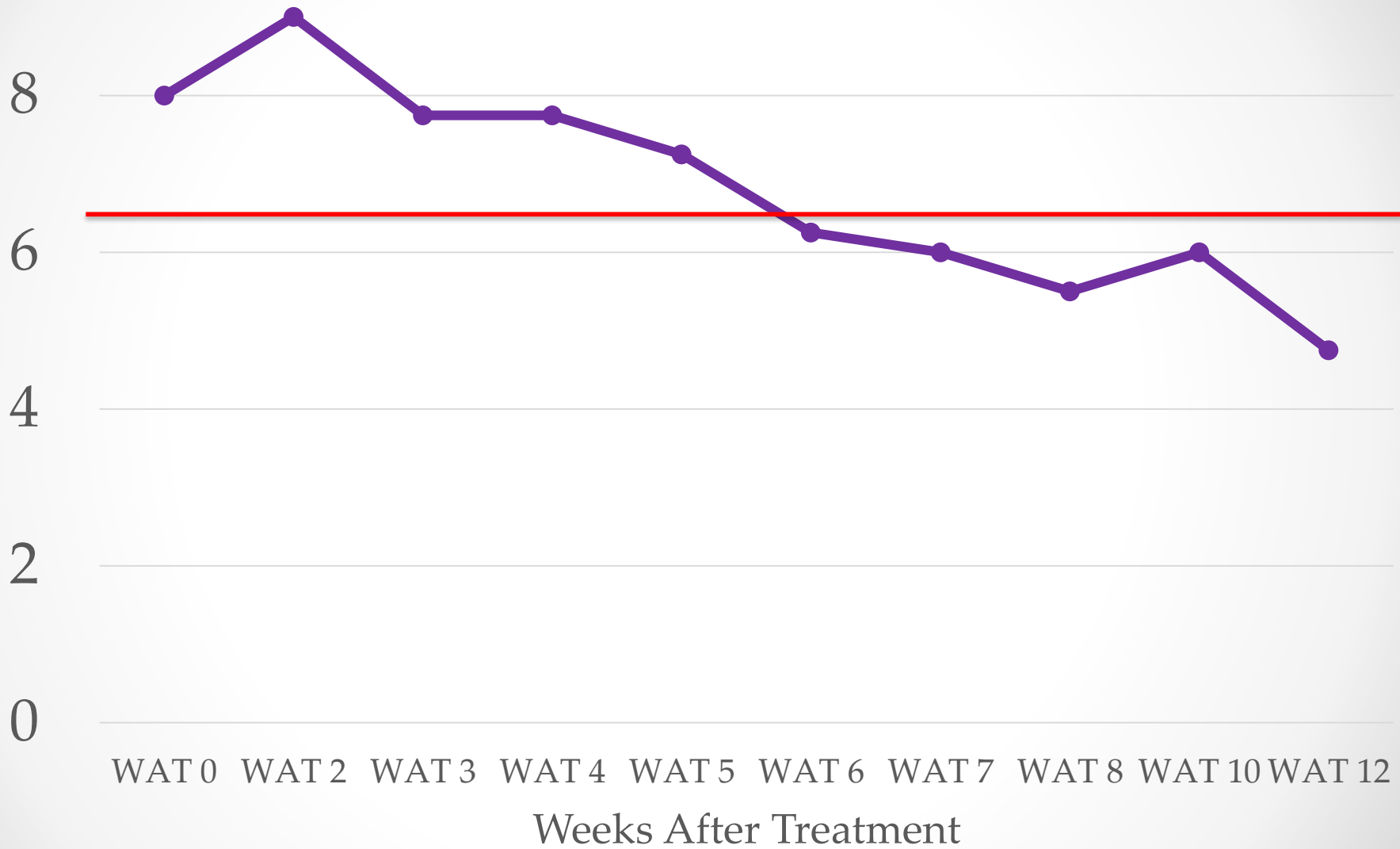


Interaction Between Colorant and Traffic (0 passes/week) on

Color

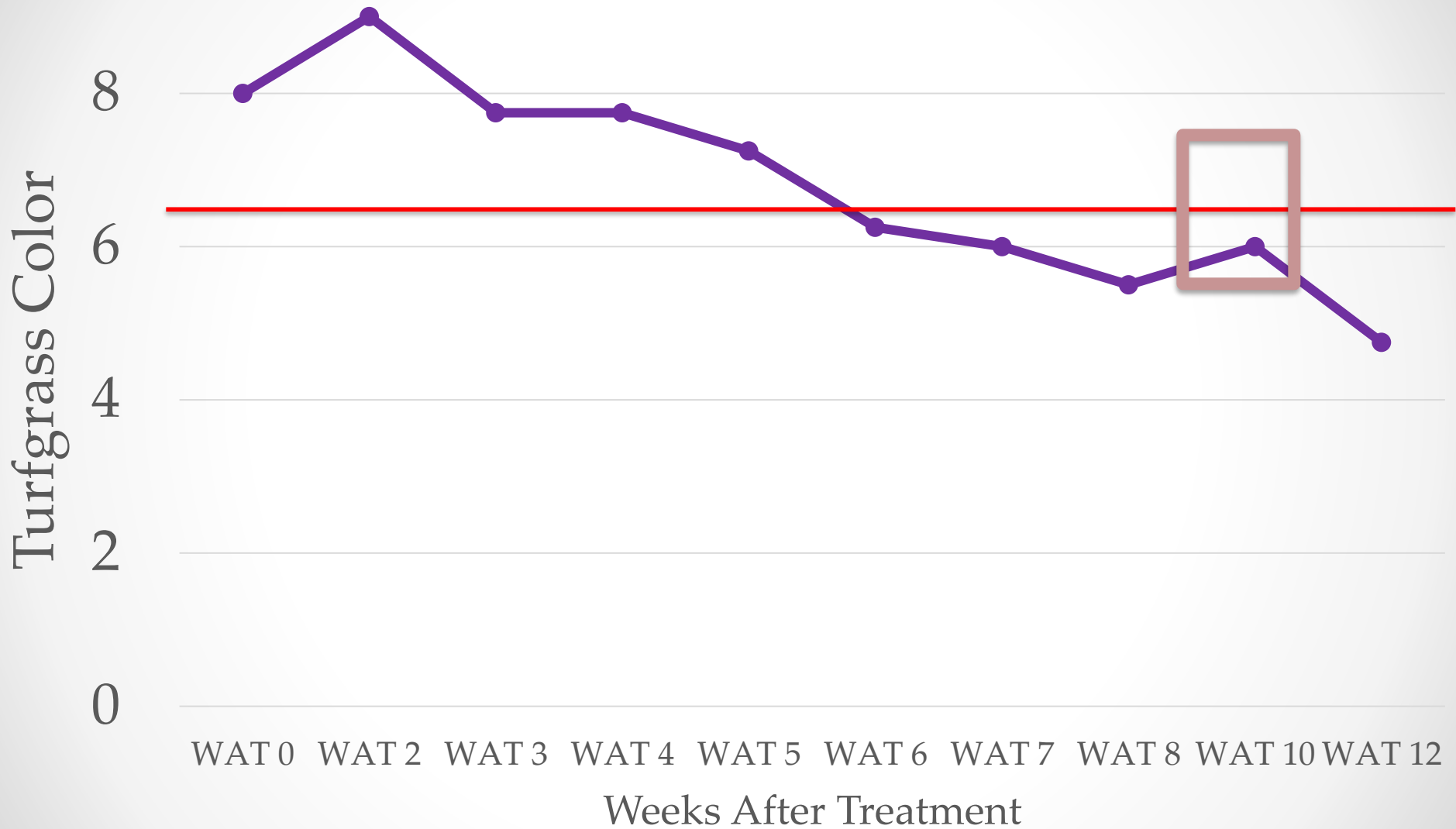
Application - Oct 24, 2014

Turfgrass Color



Endurant Prem - 0

Interaction Between Colorant and Traffic (0 passes/week) on
Color Application - Oct 24, 2014



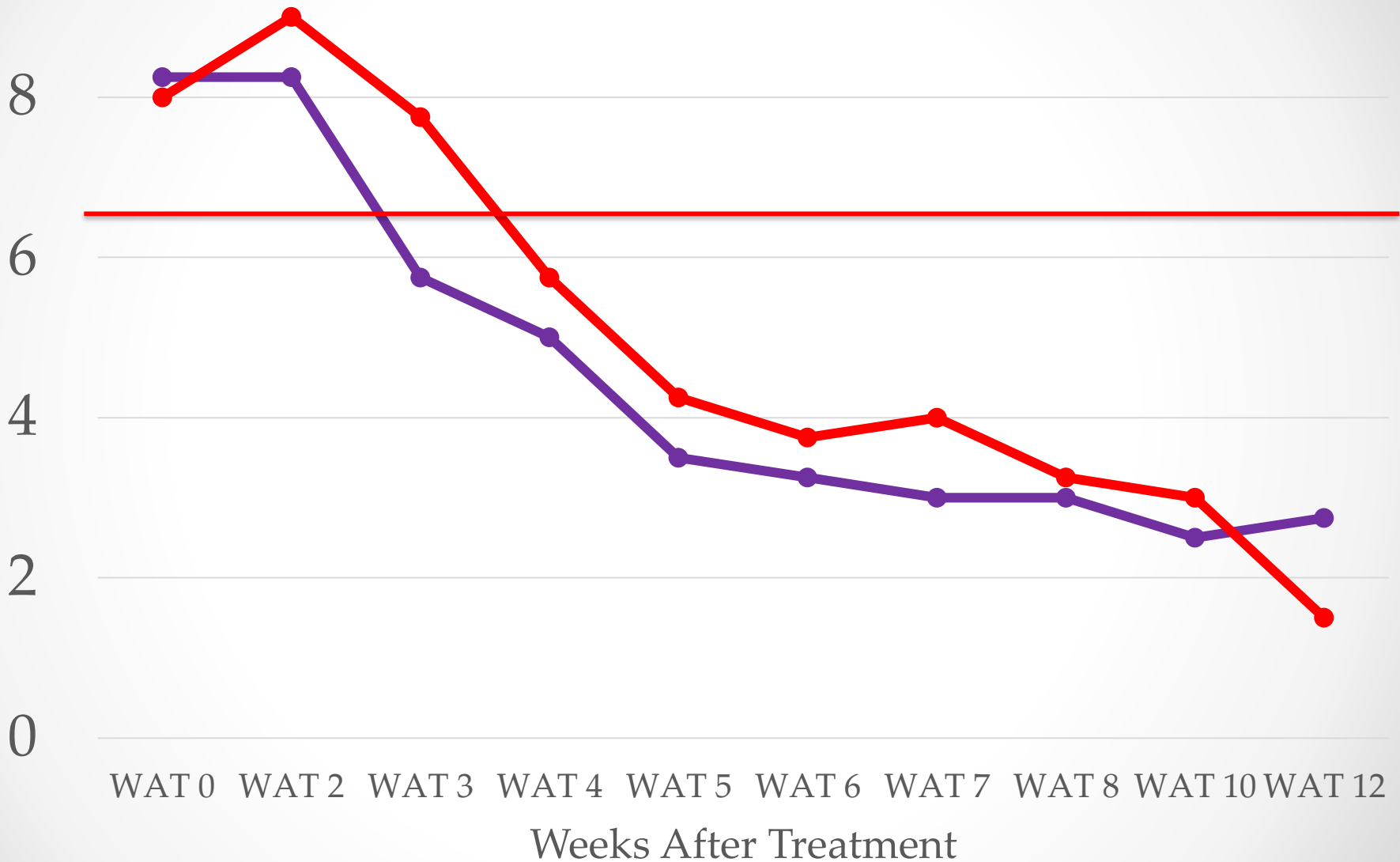
—●— Endurant Prem - 0

Interaction Between Colorant and Traffic (4 passes/week) on

Color

Application - Oct 24, 2014

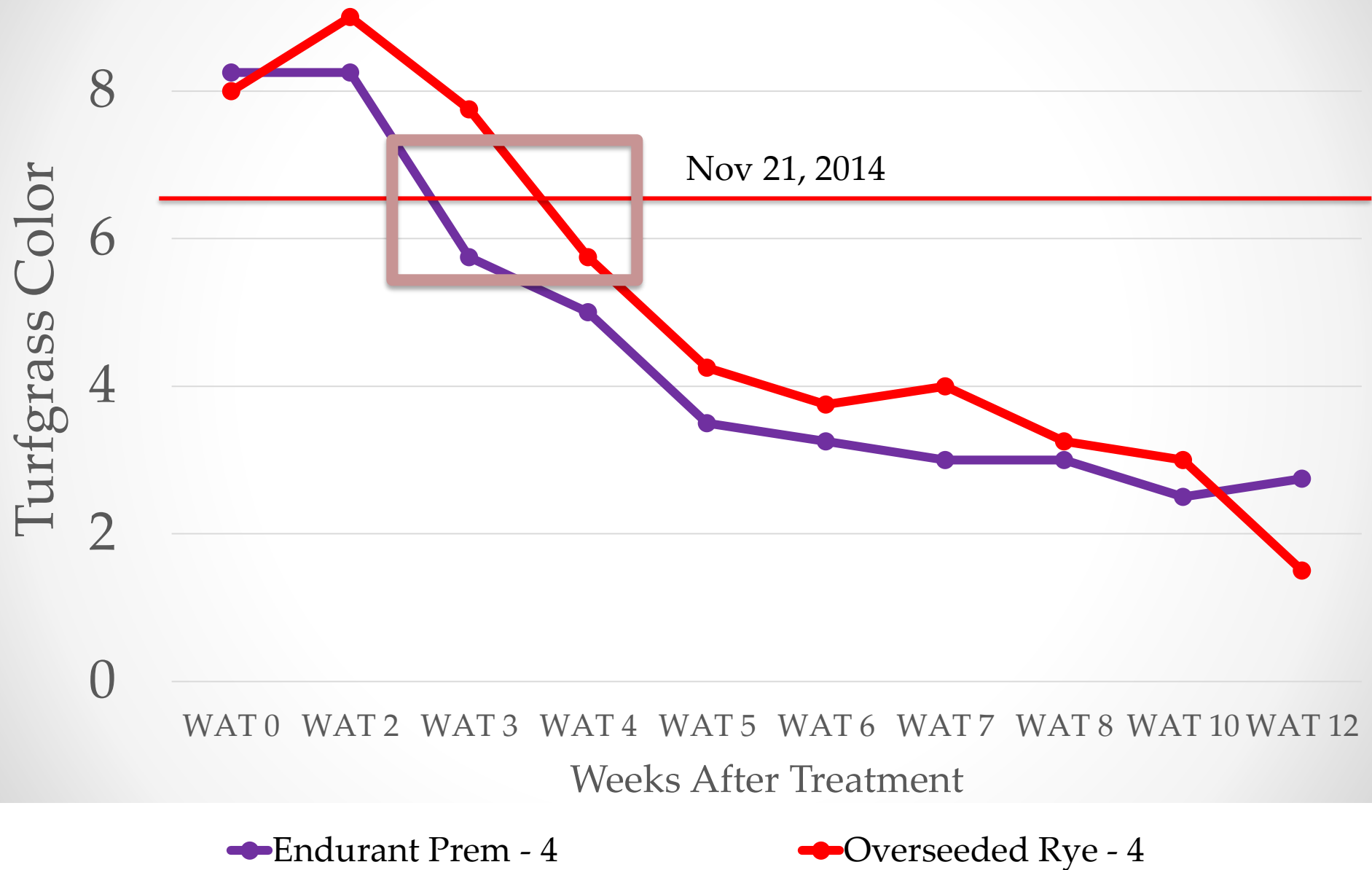
Turfgrass Color



Endurant Prem - 4

Overseeded Rye - 4

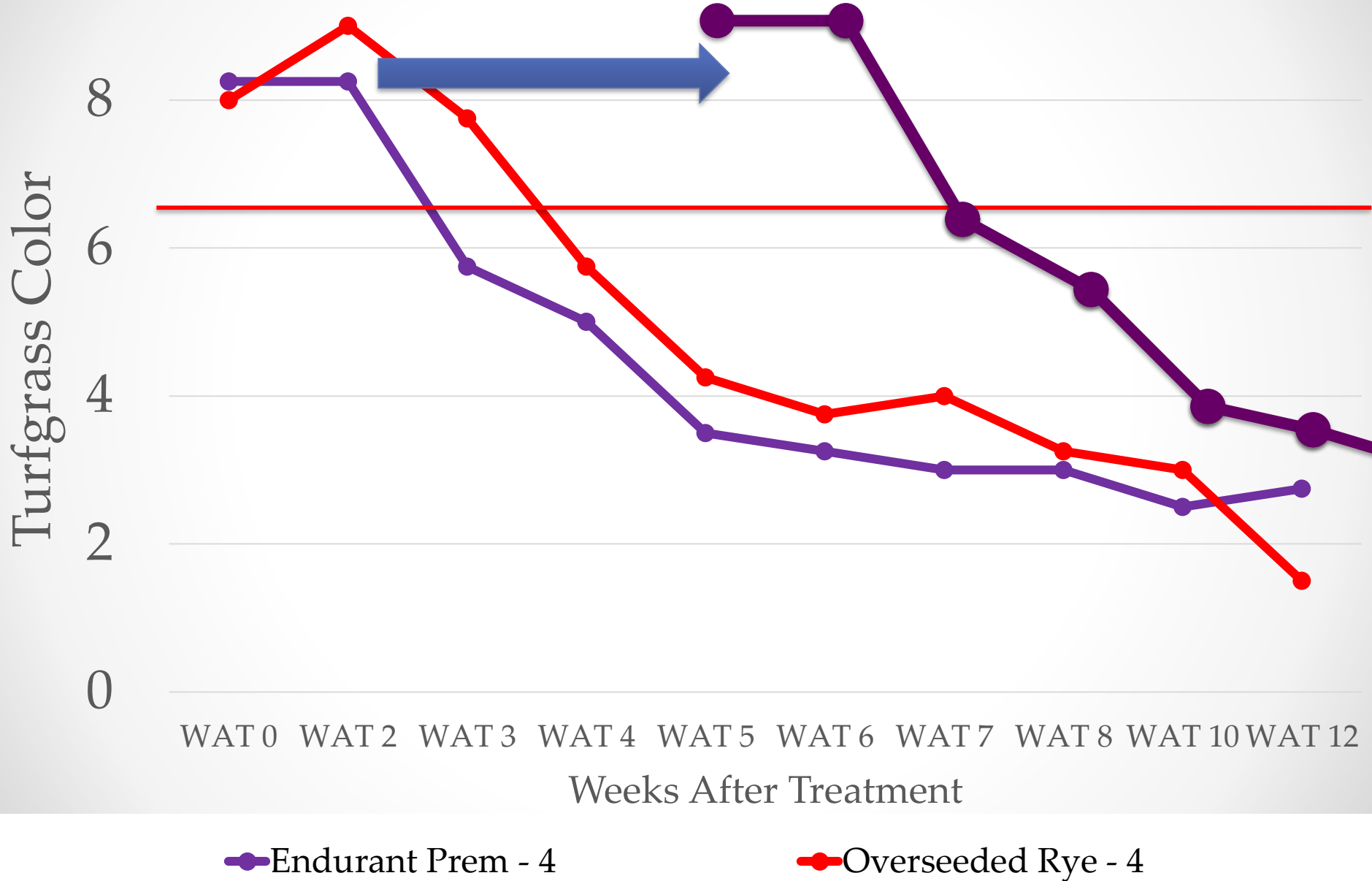
Interaction Between Colorant and Traffic (4 passes/week) on
Color Application - Oct 24, 2014



Interaction Between Colorant and Traffic (4 passes/week) on

Color

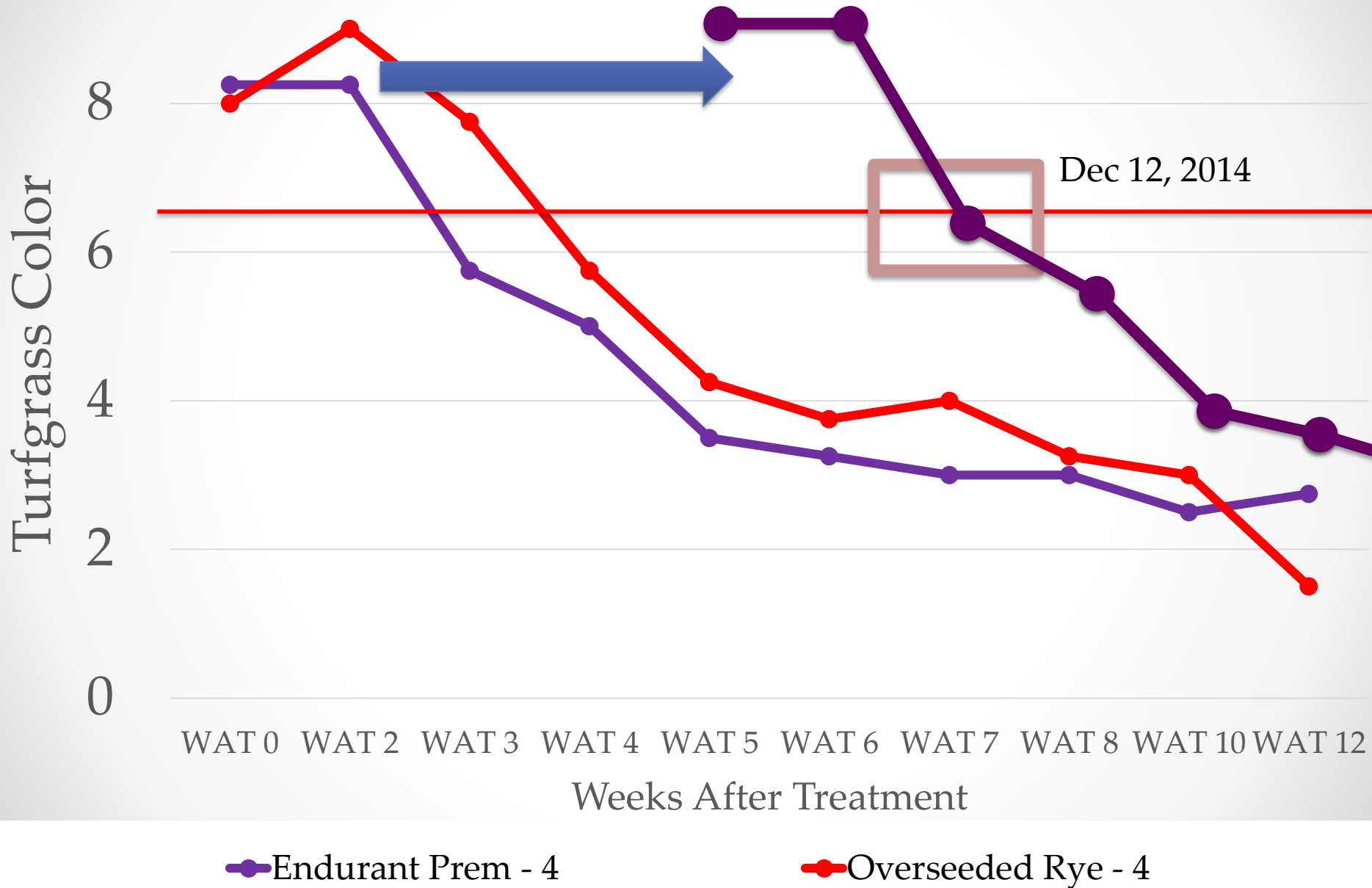
Application - Oct 24, 2014



Interaction Between Colorant and Traffic (4 passes/week) on

Color

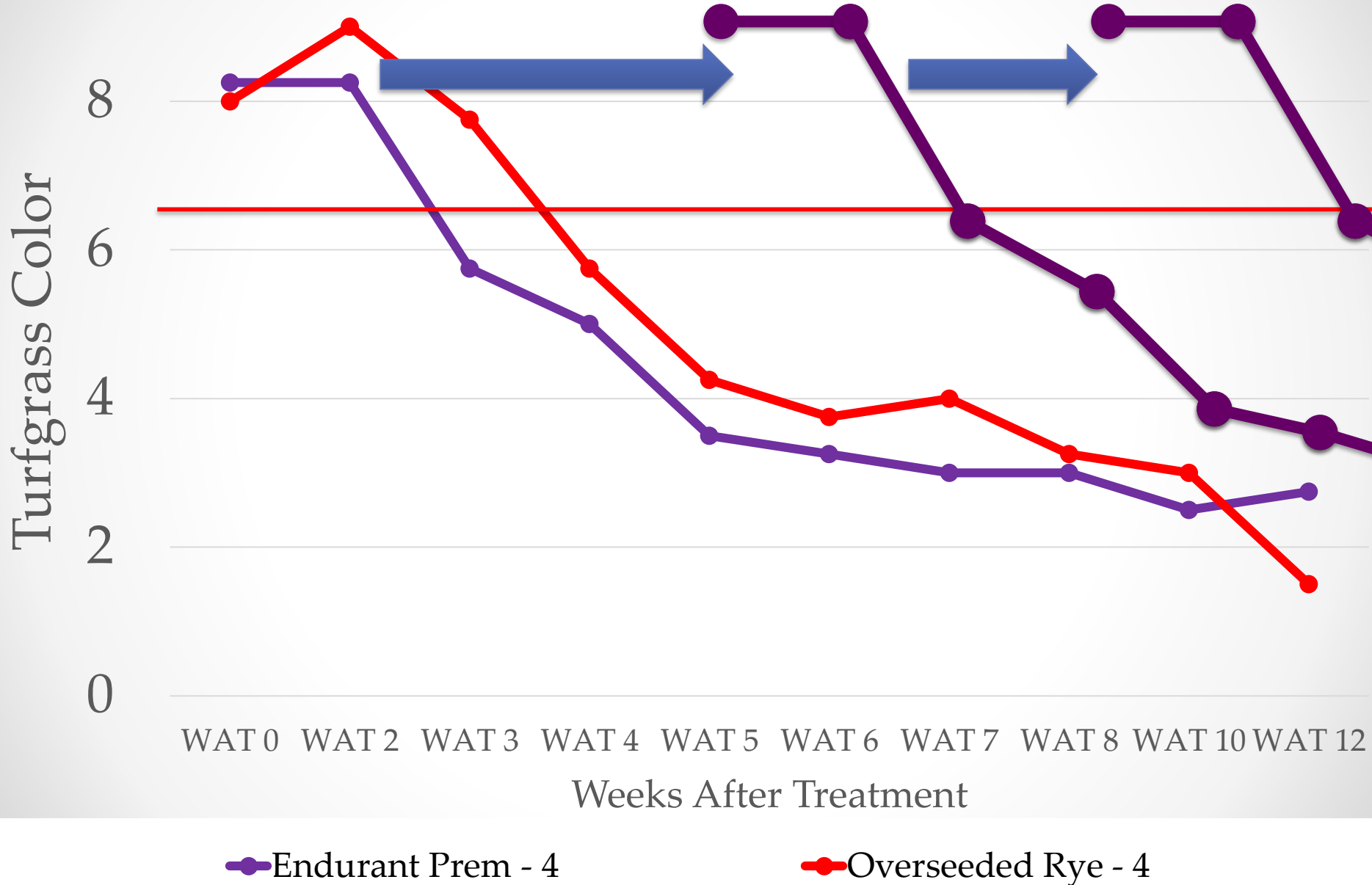
Application - Oct 24, 2014



Interaction Between Colorant and Traffic (4 passes/week) on

Color

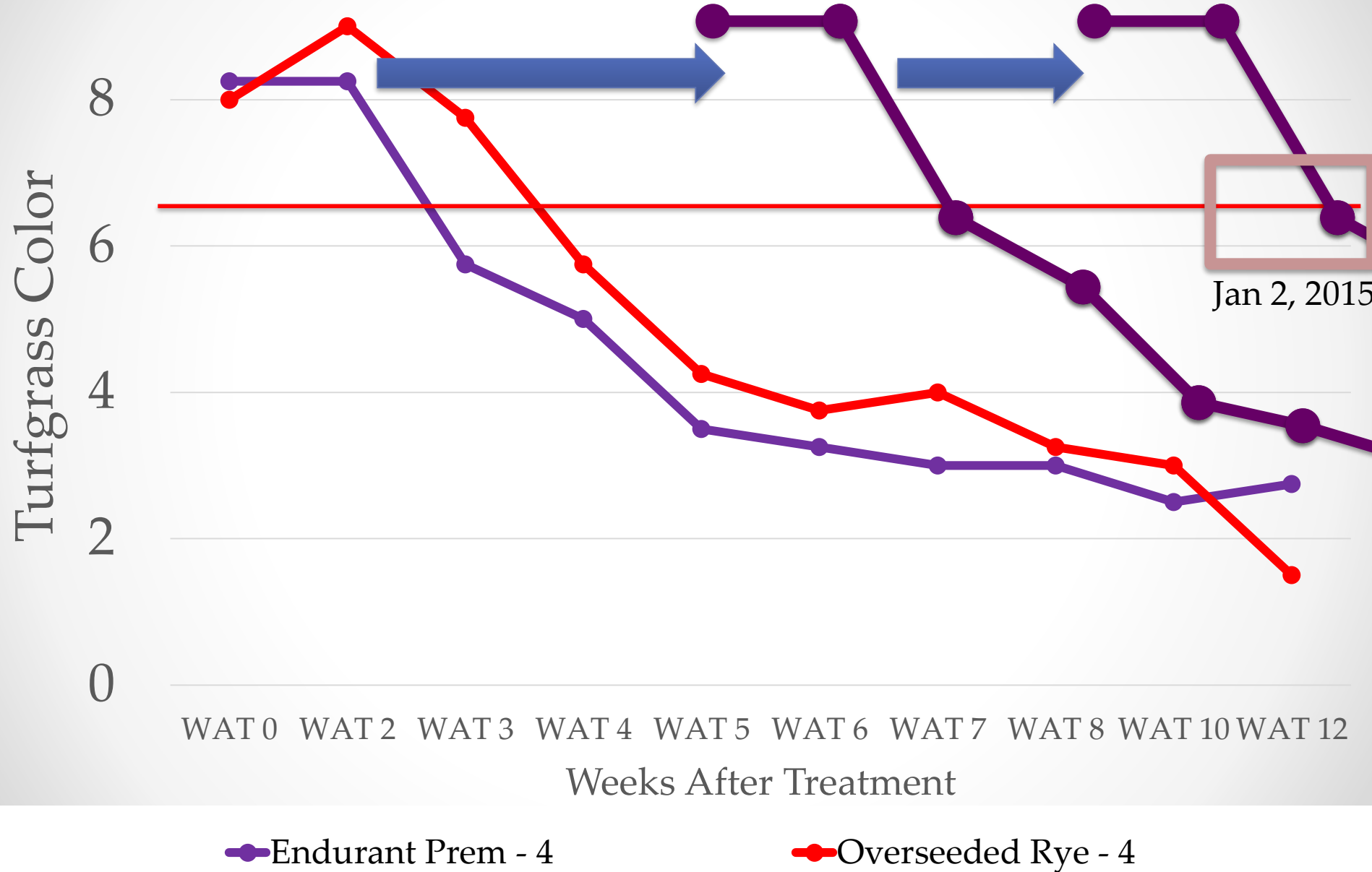
Application - Oct 24, 2014



Interaction Between Colorant and Traffic (4 passes/week) on

Color

Application - Oct 24, 2014

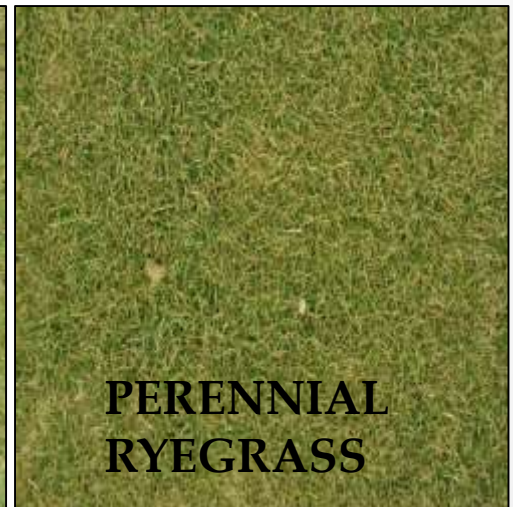


The Effect of Different Traffic Rates on Turfgrass Colorants

0
Passes/
Week



8
Passes/
Week



Digital images of no paint, Endurant Premium, and Perennial Ryegrass treatments 8 WAI in 2014 at 0 and 8 passes/week.

- **Endurant Premium performed best of all colorant applied in this study**
- **Overseeding buffalograss can be highly destructive to the density and uniformity of the turfgrass stand**
 - 34 WAT (2014) – PR avg. = 12.37%; All other treatments avg. = 54.13%
 - 28 WAT (2015) - PR avg. = 44.18%; All other treatments avg. = 77.59%

Take Home Message

- **Golf cart traffic will ultimately decrease the longevity of turfgrass colorant**
- **Overseeding into buffalograss will result in poor spring density and recovery**
- **When trafficked during the winter months, buffalograss has the ability to fully recover once growth has been initiated**

2013 KSU Turfgrass Field Day

- Turfgrass Colorants
 - Dormant 'Meyer' zoysiagrass
 - October/February applications





Can I add glyphosate to the paint?

- **annual bluegrass and perennial grassy weed control**

Paint & Glyphosate Applications

Plant Growth Regulators + Turfgrass Paint

- Trinexapac-ethyl increased longevity of turfgrass paints (Kruse and Fry, *In Press*)



Paint & Glyphosate Applications

- One of the concerns ... possible/potential delay of spring greenup (Johnson, 1977; Johnson and Burns, 1985; Johnson and Ware, 1978; Wiong et al. 2013).



Implications

Paint Applications

- $\approx 20\%$ green canopy
- October (fb February)
- 80-240 GPA



Glyphosate Applications

- Fully dormant
- February ($> 45^{\circ}$ F)
- 40-80 GPA



Locations

Colbert Hills GC (Manhattan, KS) - CH

- 'Meyer' Zoysiagrass
 - 0.5" mowing height
 - 50% Tall Fescue



Stagg Hill GC (Manhattan, KS) - SH

- 'Meyer' Zoysiagrass
 - 0.75" cm mowing height
 - 35% Annual Bluegrass



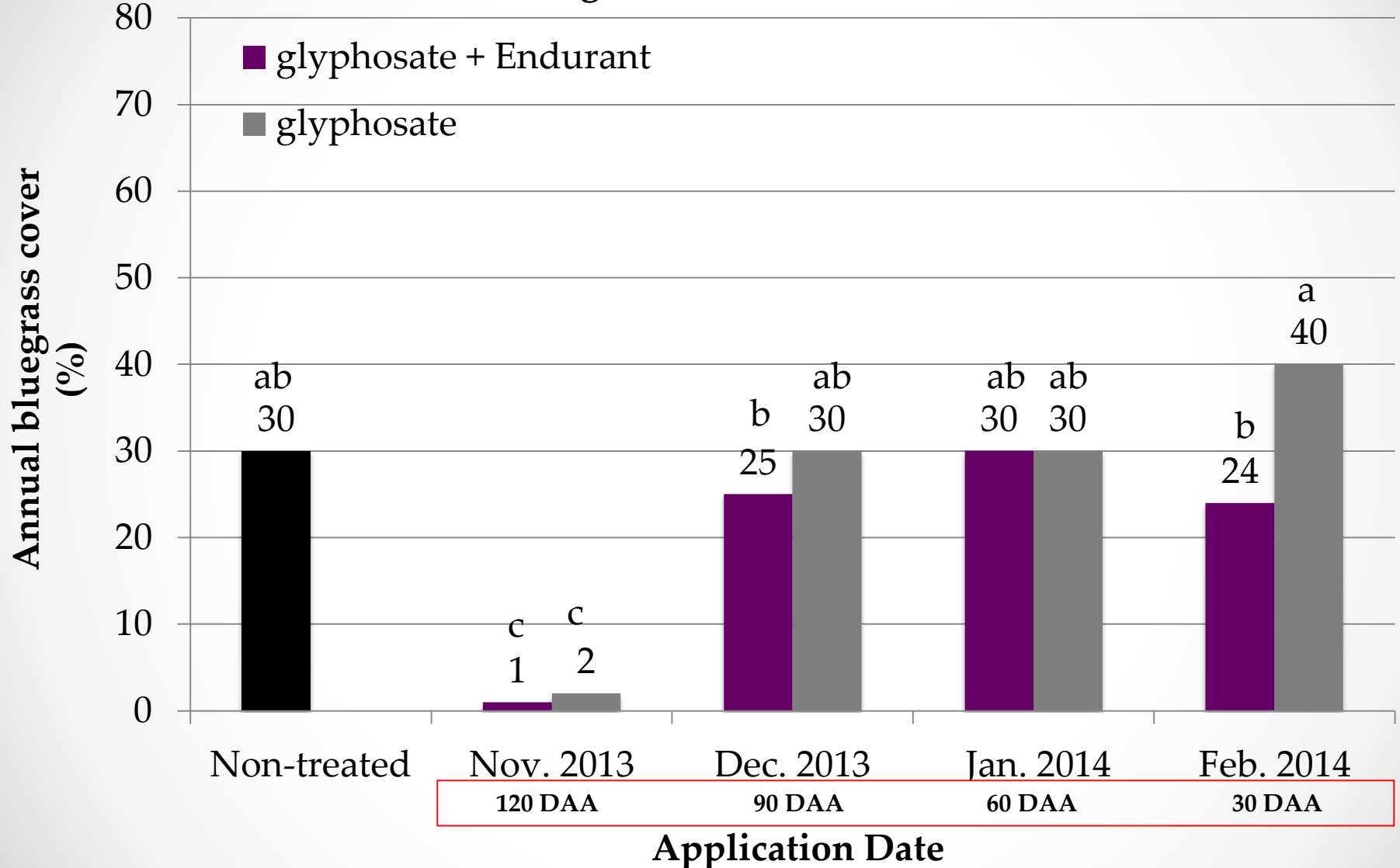
Treatments

Treatments

- 2 herbicide combinations
 - Glyphosate
 - Glyphosate+ Endurant
- 4 application timings
 - Nov, Dec, Jan, Feb
- Non-treated



Effect of Dormant Glyphosate and Paint Applications on Annual Bluegrass Populations Rating Date: 20 March 2014



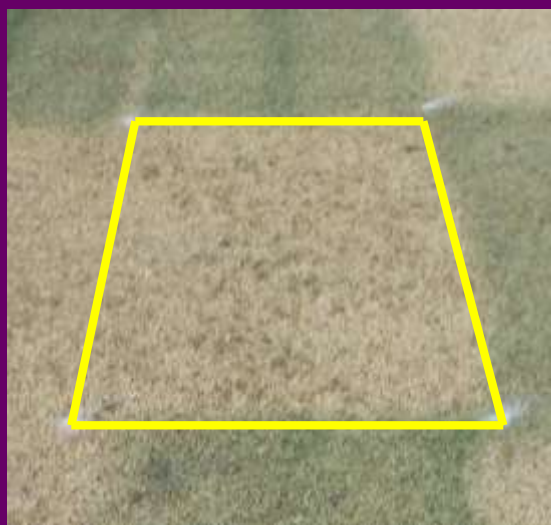
Abbreviations: days after application, DAA.

● Glyphosate applied at 1.1 kg ha⁻¹; Endurant applied at 16.6% v/v

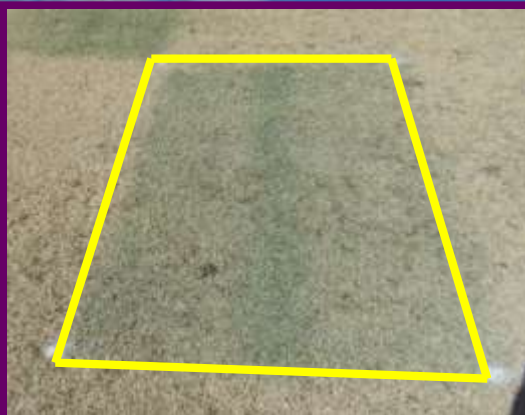
Means separated according to Fisher's Protected LSD at P=0.05.

20 March 2014

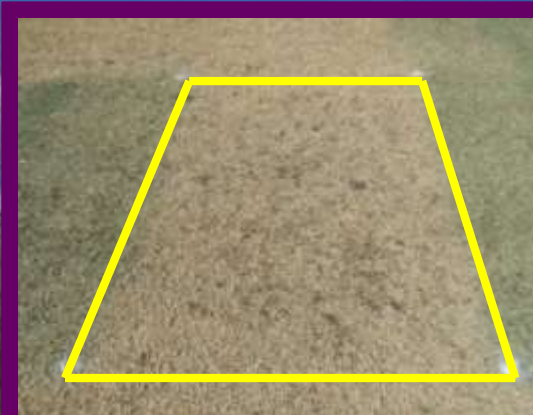
Glyphosate applied at 1.1 kg ha⁻¹;
Endurant applied at 16.6% v/v



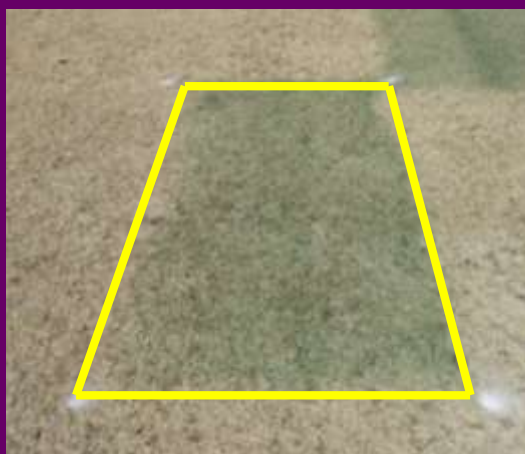
Non-treated



November (120 DAA)
Glyphosate + Endurant



November (120 DAA)
Glyphosate

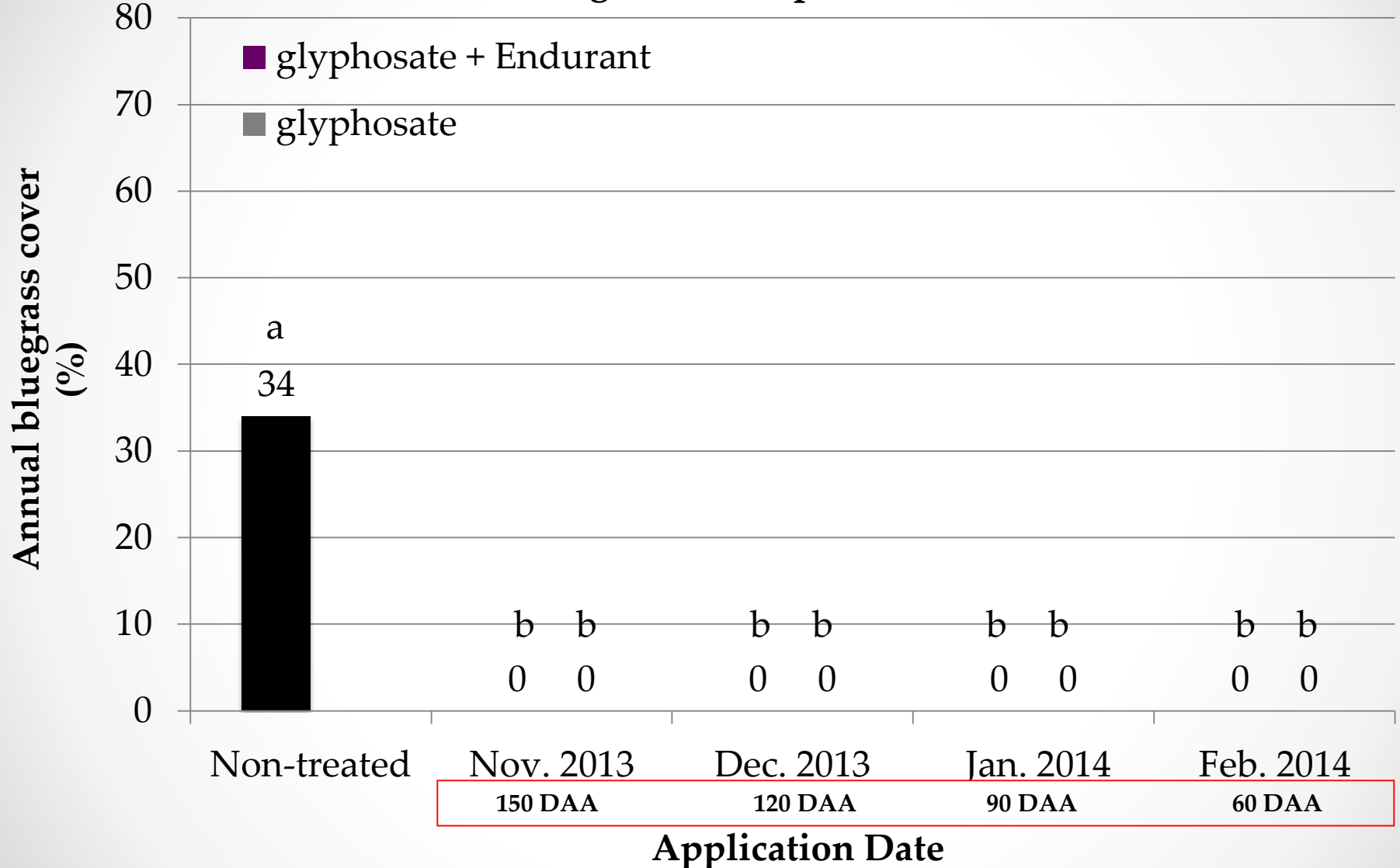


February (120 DAA)
Glyphosate + Endurant



February (120 DAA)
Glyphosate

Effect of Dormant Glyphosate and Paint Applications on Annual Bluegrass Populations Rating Date: 18 April 2014



Abbreviations: days after application, DAA.

● Glyphosate applied at 1.1 kg ha⁻¹; Endurant applied at 16.6% v/v

Means separated according to Fisher's Protected LSD at P=0.05.

18 April 2014 – 150 Days After Trial Initiation

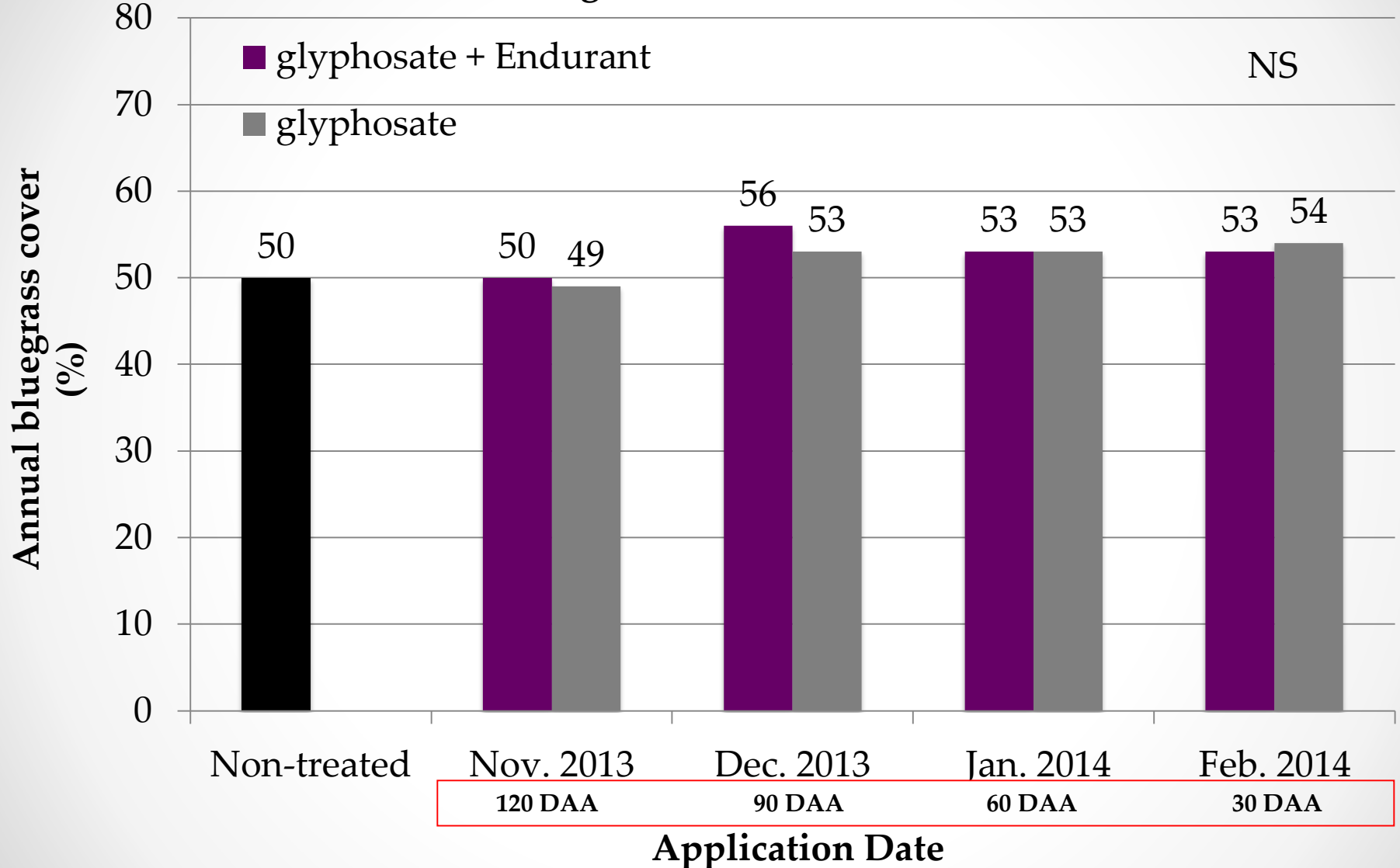
November (150 DAA)
Glyphosate

January (90 DAA)
**Glyphosate +
Endurant**

February(60 DAA)
Glyphosate

February (60 DAA)
**Glyphosate +
Endurant**

Effect of Dormant Glyphosate and Paint Applications on Tall Fescue Populations Rating Date: 20 March 2014



Abbreviations: days after application, DAA.

● Glyphosate applied at 1.1 kg ha⁻¹; Endurant applied at 16.6% v/v

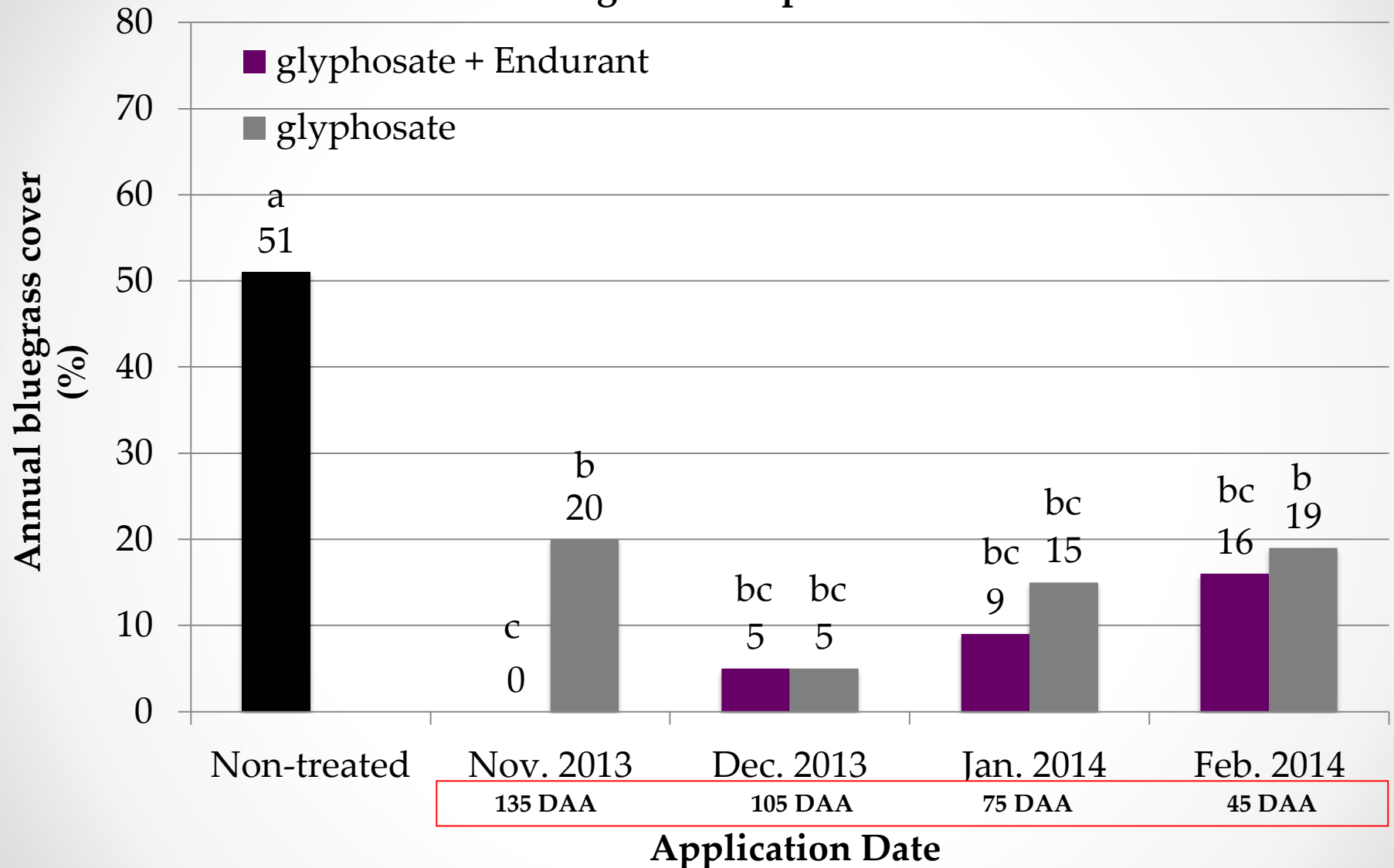
Means separated according to Fisher's Protected LSD at P=0.05.

20 March 2014 – 120 Days After Trial Initiation



Uniform Tall Fescue Cover (49-65%)

Effect of Dormant Glyphosate and Paint Applications on Tall Fescue Populations Rating Date: 3 April 2014

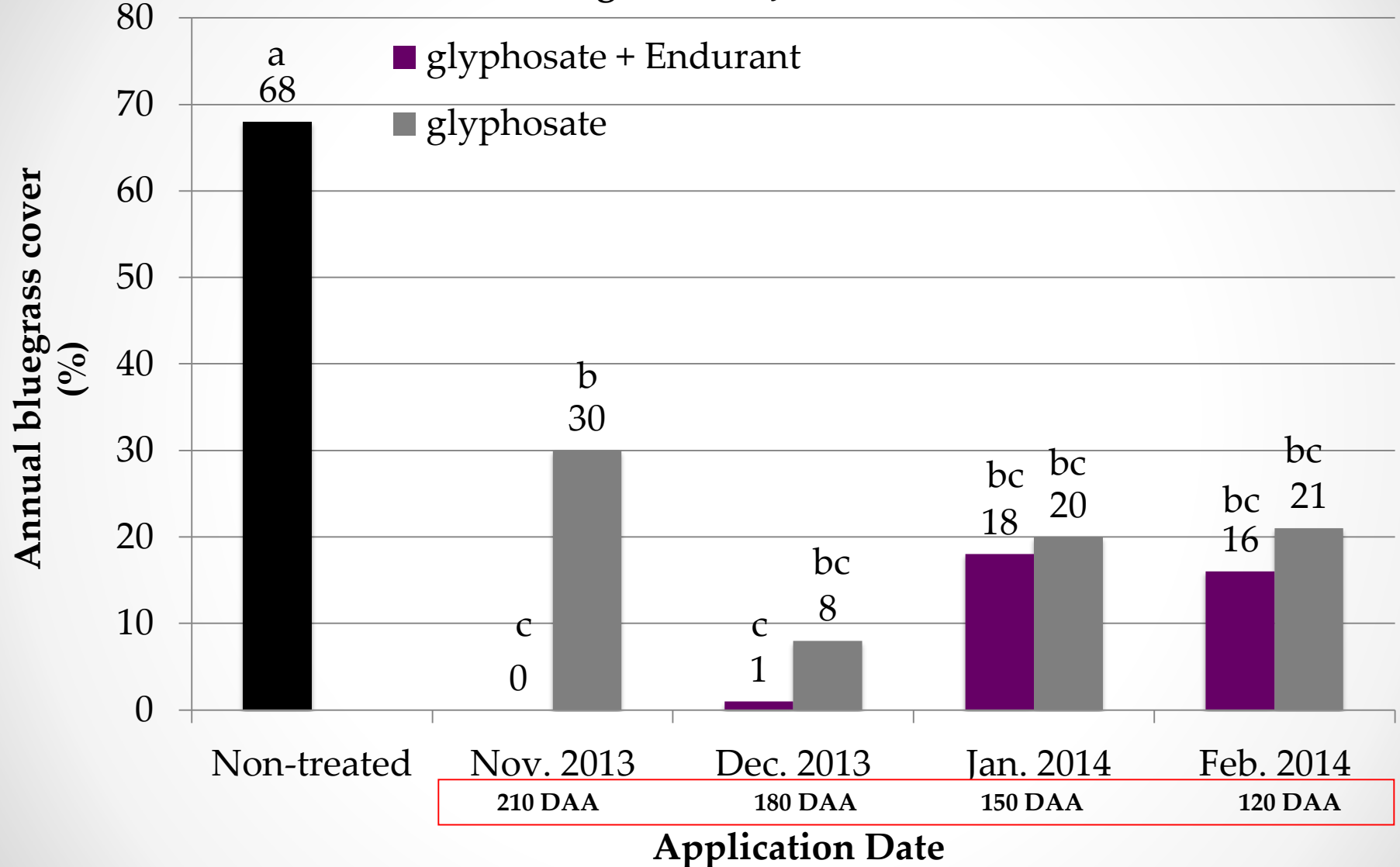


Abbreviations: days after application, DAA.

● Glyphosate applied at 1.1 kg ha⁻¹; Endurant applied at 16.6% v/v

Means separated according to Fisher's Protected LSD at P=0.05.

Effect of Dormant Glyphosate and Paint Applications on Tall Fescue Populations Rating Date: 16 June 2014



Abbreviations: days after application, DAA.

● Glyphosate applied at 1.1 kg ha⁻¹; Endurant applied at 16.6% v/v

Means separated according to Fisher's Protected LSD at P=0.05.

16 June 2014

Glyphosate applied at 1.1 kg ha^{-1} ;
Endurant applied at 16.6% v/v



Non-treated



November (210 DAA)
Glyphosate + Endurant



November (210 DAA)
Glyphosate

Results

Spring Green-up

- No delay in zoysiagrass spring green-up was observed across all treatments relative to the non-treated. (All zoysiagrass was dormant at application)
- All treatments resulted in 60% and 100% green zoysiagrass cover by 18 April 2014 and 21 May 2014.



Summary and Conclusions

- Zoysiagrass spring green-up was unaffected by all application timings of glyphosate and glyphosate + Endurant.
- The addition of Endurant to glyphosate applications did not increase annual bluegrass control.
 - Glyphosate and glyphosate + Endurant applications reduced annual bluegrass populations more rapidly.
- Ultimately, all applications effectively controlled annual bluegrass by 15 April 2014.

Summary and Conclusions

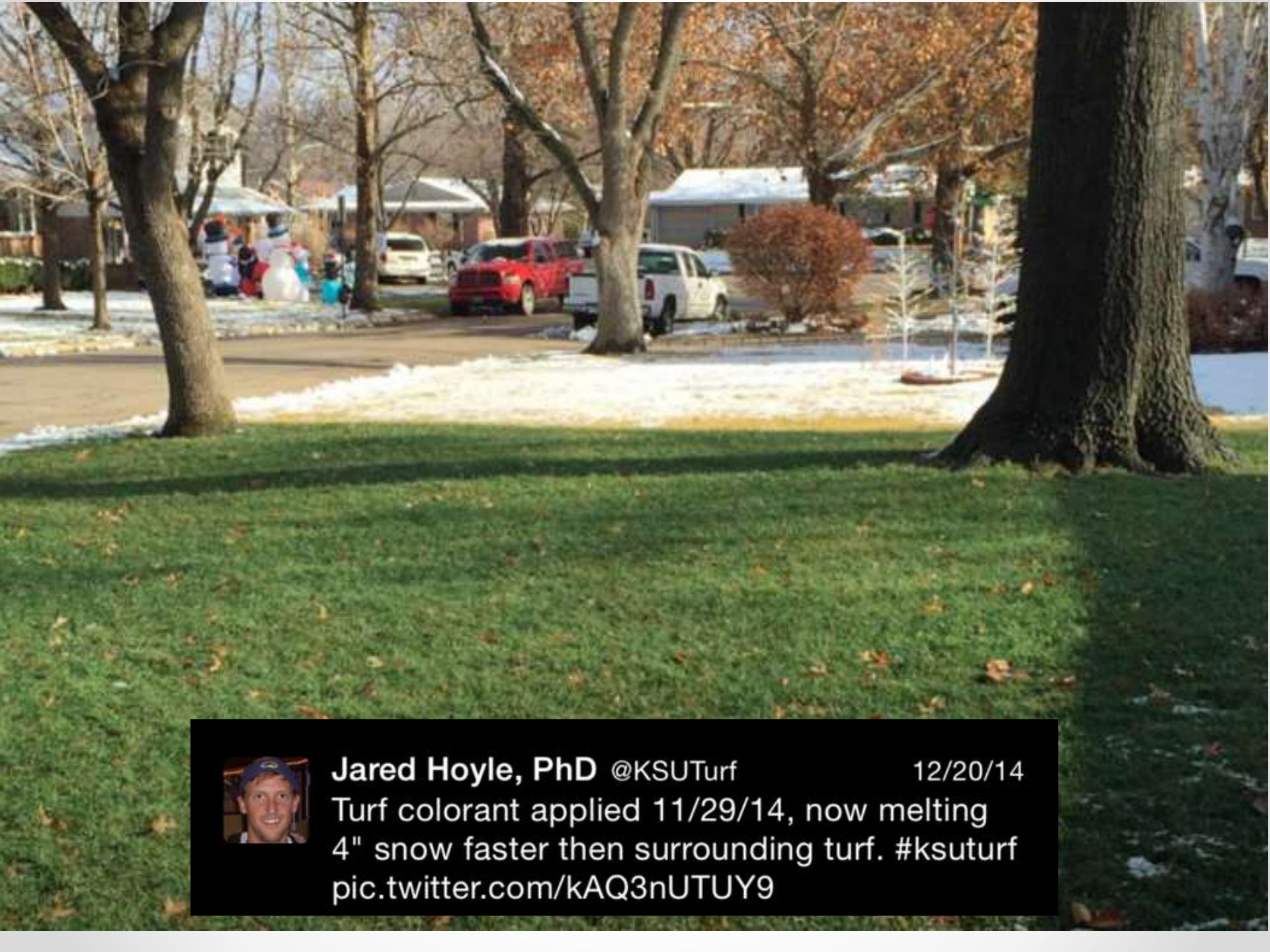
- The addition of Endurant to November glyphosate applications increased tall fescue control.
- Results conclude that the addition of a turfgrass paint (Endurant) at early dormant zoysiagrass applications can increase perennial grassy weed control (tall fescue).
- Addition of Endurant to Glyphosate applications do not inhibit efficacy.

It's more than just paint...



Influence of turfgrass paint on IR surface temperature

Canopy Temperature (F)					
Treatment	11 March	26 March	11 April	25 April	9 May
Green Lawngrer	73.4 a	83.5 b	100.4 a	94.5 ab	104 b
Endurant	73.7 a	87.9 a	101.8 a	95.9 a	107 a
Wintergreen Plus	72.1 b	82.6 b	97.5 b	92.6 bc	100 c
Untreated	69.3 c	75.9 c	93.2 c	90.8 c	97.7 c



Jared Hoyle, PhD @KSUTurf

12/20/14

Turf colorant applied 11/29/14, now melting
4" snow faster than surrounding turf. #ksuturf
pic.twitter.com/kAQ3nUTUY9

Cost Analysis

Turfgrass Colorants

- Endurant Premium
 - \$499.30/acre
- Endurant
 - \$392.59/acre
- GreenLawnger
 - \$433.99/acre

Overseeded PR

- \$2,500 - \$5,000
per/acre (Liu et al.,
2007; Briscoe et al., 2010)



Questions?



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