Turfgrass Colorants: It’s More Than Just Green Color

Jared A. Hoyle, PhD
Assistant Professor and Extension Turfgrass Specialist
Kansas State University, Manhattan, KS

@KSUTurf
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
K-State Research
Visual Color of Dormant Zoysiagrass Treated with Colorants
Ross Braun & Dr. Jack Fry

(T1st application 10/31/12; 2nd application 2/5/13).
Example of Label

DIRECTIONS

Before applying Green Lawnger, cut turf to desired height. One gallon (3.78 liters) of Green Lawnger 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 Lawnger used, type and condition of grass being treated, and turf color desired. Green Lawnger 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 Lawnger 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 Lawnger's color will last the entire dormant season.

Non-Dormant Application

Dilute one gallon (3.78 liters) of Green Lawnger with 15 to 20 gallons (56-75 liters) of water and apply over 9,000-12,000 square feet. (8 oz Green Lawnger 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)

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

- Untreated zoysiagrass control
- Tall fescue (C3) control
Effect of Colorant Application Volumes on Turf Color

Endurant
• 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
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**  
  o Endurant  
  o Endurant Premium  
  o GreenLawnger

• **Colorants were mixed and applied at a 1:6 dilution**  
  o 1 gal/1,000 ft²

• **Application Dates**  
  o 24 October 2014  
  o 5 November 2015

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

• **Perennial Ryegrass Removal**  
  o Katana – 0.034 oz product/1,000 ft²  
    • 24 April 2015  
    • 8 April 2016
• Traffic was applied once per week
  o 0, 2, 4, 8 passes/week
• Two custom built trailers to be pulled behind turf utility vehicle.
  o Trailer loaded with water weighs 1,000 lbs
• Traffic was not applied when:
  o There was snow cover
  o 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

Weeks After Treatment

Turfgrass Color

Endurant Prem - 0
Interaction Between Colorant and Traffic (0 passes/week) on Color

Application - Oct 24, 2014

Turfgrass Color

Weeks After Treatment

Endurant Prem - 0
Interaction Between Colorant and Traffic (4 passes/week) on Color

Application - Oct 24, 2014

Turfgrass Color

Weeks After Treatment

Endurant Prem - 4

Overseeded Rye - 4
Interaction Between Colorant and Traffic (4 passes/week) on Color

Application - Oct 24, 2014

Turfgrass Color

Weeks After Treatment

WAT 0  WAT 2  WAT 3  WAT 4  WAT 5  WAT 6  WAT 7  WAT 8  WAT 10  WAT 12

Endurant Prem - 4  Overseeded Rye - 4

Nov 21, 2014
Interaction Between Colorant and Traffic (4 passes/week) on Color

Application - Oct 24, 2014

Weeks After Treatment

Turfgrass Color

- Endurant Prem - 4
- Overseeded Rye - 4
Interaction Between Colorant and Traffic (4 passes/week) on Color

Application - Oct 24, 2014

Weeks After Treatment

Turfgrass Color

Endurant Prem - 4
Overseeded Rye - 4
Interaction Between Colorant and Traffic (4 passes/week) on 
Color

Application - Oct 24, 2014

Weeks After Treatment

Turfgrass Color

Endurant Prem - 4

Overseeded Rye - 4
Interaction Between Colorant and Traffic (4 passes/week) on 
Color

Application - Oct 24, 2014

Turfgrass Color

Endurant Prem - 4

Overseeded Rye - 4

Weeks After Treatment
The Effect of Different Traffic Rates on Turfgrass Colorants

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
  o 34 WAT (2014) – PR avg. = 12.37%; All other treatments avg. = 54.13%
  o 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
• ≈ 20% green canopy
• October (fb February)
• 80-240 GPA

Glyphosate Applications
• Fully dormant
• February (> 45°F)
• 40-80 GPA
Locations

Colbert Hills GC (Manhattan, KS) - CH

• ‘Meyer’ Zoysiagrass
  o 0.5” mowing height
  o 50% Tall Fescue

Stagg Hill GC (Manhattan, KS) - SH

• ‘Meyer’ Zoysiagrass
  o 0.75” cm mowing height
  o 35% Annual Bluegrass
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

Annual bluegrass cover (%)

 Glyphosate + Endurant

Glyphosate

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

Annual bluegrass cover (%)

Application Date


150 DAA | 120 DAA | 90 DAA | 60 DAA

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 + Endurant

February (60 DAA) Glyphosate
Effect of Dormant Glyphosate and Paint Applications on Tall Fescue Populations
Rating Date: 20 March 2014

Non-treated

120 DAA                                     90 DAA                                     60 DAA                                     30 DAA

Annual bluegrass cover (%)

glyphosate + Endurant

glyphosate

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

Abbreviations: days after application, DAA.
• Glyphosate applied at 1.1 kg ha⁻¹; Endurant applied at 16.6% v/v
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

Annual bluegrass cover (%)

- **glyphosate + Endurant**
- **glyphosate**

Application Date

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>20</td>
<td>0</td>
<td>9</td>
<td>16</td>
</tr>
</tbody>
</table>

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

Annual bluegrass cover (%)


```
glyphosate + Endurant

glyphosate

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

Glyphosate + Endurant

November (210 DAA)

Glyphosate

Non-treated
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 increases 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

<table>
<thead>
<tr>
<th>Treatment</th>
<th>11 March</th>
<th>26 March</th>
<th>11 April</th>
<th>25 April</th>
<th>9 May</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Lawnger</td>
<td>73.4 a</td>
<td>83.5 b</td>
<td>100.4 a</td>
<td>94.5 ab</td>
<td>104 b</td>
</tr>
<tr>
<td>Endurant</td>
<td>73.7 a</td>
<td>87.9 a</td>
<td>101.8 a</td>
<td>95.9 a</td>
<td>107 a</td>
</tr>
<tr>
<td>Wintergreen Plus</td>
<td>72.1 b</td>
<td>82.6 b</td>
<td>97.5 b</td>
<td>92.6 bc</td>
<td>100 c</td>
</tr>
<tr>
<td>Untreated</td>
<td>69.3 c</td>
<td>75.9 c</td>
<td>93.2 c</td>
<td>90.8 c</td>
<td>97.7 c</td>
</tr>
</tbody>
</table>
Jared Hoyle, PhD @KSUTurf

Turf colorant applied 11/29/14, now melting 4" snow faster then 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)