# Weed Control in Newly Established and Overseeded Areas

J.T. Brosnan, Ph.D.
University of Tennessee

Failure to Control Weeds on Athletic Fields….


We don't have data to support our opinion

# Center for Athletic Field Safety

# Broadleaf & Grassy Weed Effects on Athletic Field Quality

# Experimental Design

Large Crabgrass (***Digitaria sanguinalis***) seeded at 1.6 lb/M on April 30, 2012

White Clover (***Trifolium repens***) seeded at 1lb/M on April 30, 2012

Plot size 5 x 5 ft, three replications

# Cady Traffic Simulator

# Traffic

18 games of traffic

1st game occurred on 8/21/12

Last game concluded on 9/25/12

3 simulated games each week

# Tennessee Athletic Field Tester

P < 0.0001

Green Cover (%)

100
80
60
40
20
0

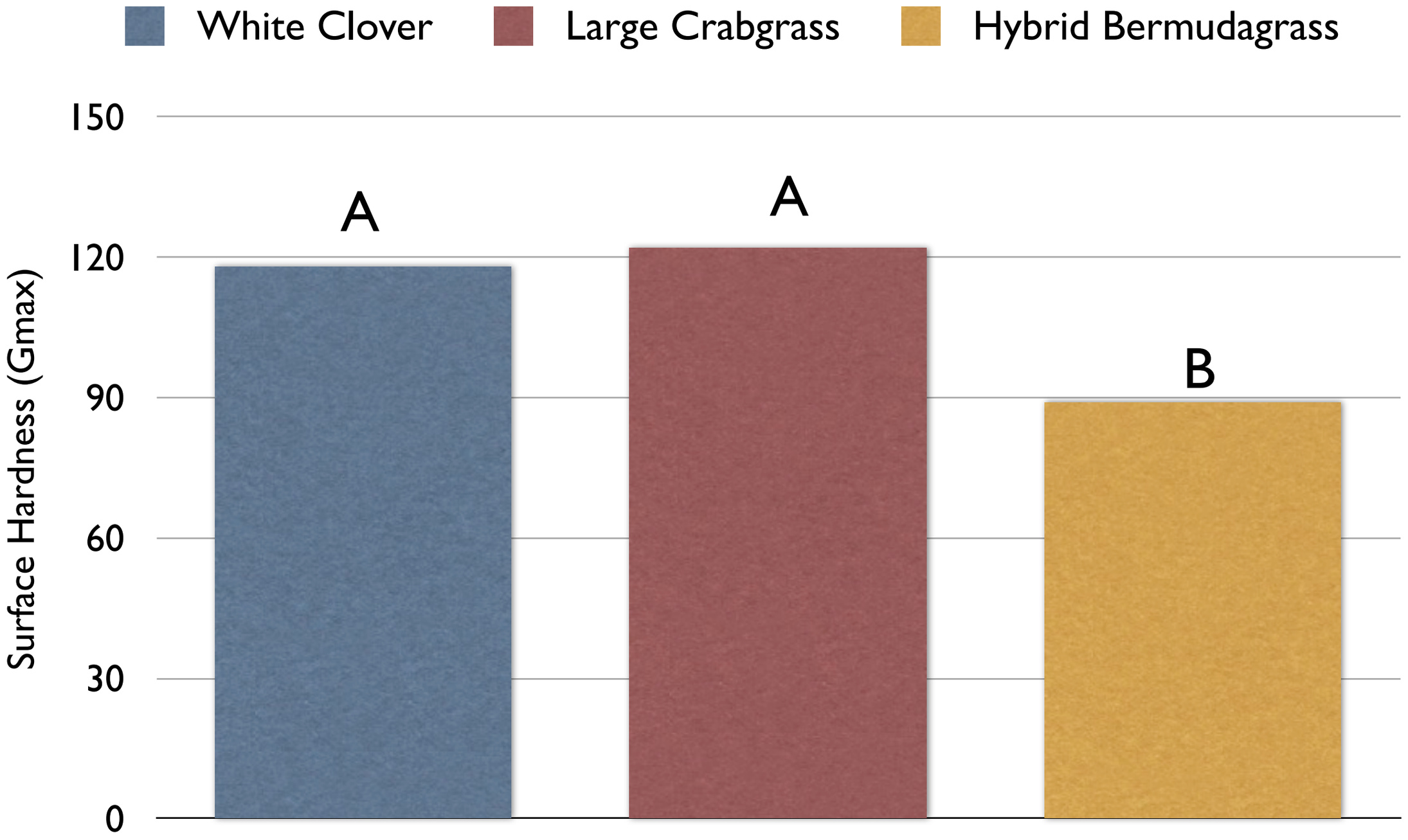
0
5
10
15
20

Games

Hybrid Bermudagrass
White Clover
Large Crabgrass

Tifway Bermudagrass After 15 Simulated Games

Large Crabgrass After 15 Simulated Games

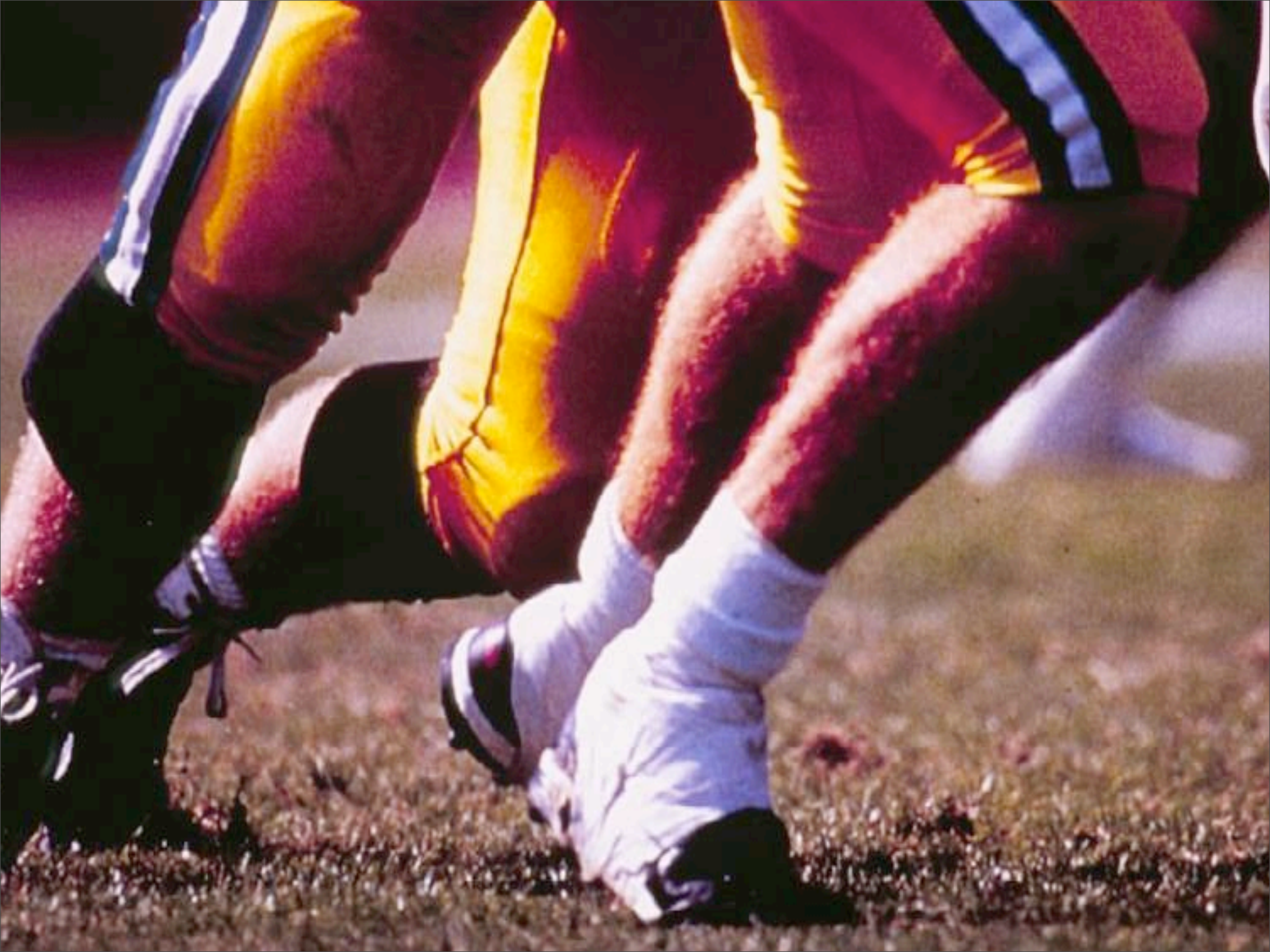



Surface Hardness Measured with F-355 after 12 simulated games in 2012 in Knoxville, TN


>20% chance of head injury

# Controlling Weeds Improves Player Safety

# What Do We Care About ?



# Injury Endemic

- 3.5 million children (<14) hurt annually playing sports

- Youth injuries (<14) cost the US public $49,192,781,832 in 1997

- Emergency room visits (2004)
  - 116,000 – baseball
  - 186,000 – football


AAP, US CPSC, & National Youth Sports Safety Foundation

50% of Injuries Are Preventable

So We Do as Much as Possible to Prevent Them

2008 National Finalist
STMA High School Field of the Year

One Staff, One Vision
One Goal

NATIONAL
FIELD of the YEAR

That is not the perception

Outdoor Activities
Animals, Plants, Aquatic Life
Chemical and Pollution Control
Pest Management
Pest Management for Schools, Day Care Centers and Parents
Summary of NYS Requirements for Pesticide Neighbor Notification
Pest Management Resource List
Energy and Climate
Lands and Waters
Education
Permits and Licenses
Public Involvement and News
Regulations and Enforcement
Publications, Forms, Maps
About DEC

# Pest Management for Schools, Day Care Centers and Parents

## Pesticide Prohibition on Grounds at Schools and Day Care Centers

Under amendments to the State Education Law (Section 409-k) and Social Services Law (Section 390-g), no school or day care center can apply pesticides to any playgrounds, turf, or athletic or playing fields. The requirements are administered by the State Education Department for schools and by the Office of Children and Family Services for day care centers. Contact those agencies for information and answers to questions on the prohibition. Contact information is contained in NYSDEC Guidance (see below).

## Emergency Pesticide Application Determinations

Under the State Education Law and Social Services Law, no school or day care center may

Important Links
Guidance on Chapter 85, Laws of 2010 (PDF - 234 KB)
NYS Education Law - Requirements for Notification of Pesticide Application (PDF 16 KB)
Links Leaving DEC's Website
NYS Education Department - Facilities Planning
Office of Children and Family Services
NYS Department of Health - Chapter 85 Guidance
PDF Help
For help with PDFs on this page, please call 518-402-8788.

# Connecticut's Lawn Care Pesticide Ban

## Information for Schools and Day Care Centers

### 1. Why no pesticides?

The Connecticut legislature passed a law (P.A. 09-56) banning lawn care pesticide applications on the grounds of day care centers, elementary and middle schools (grade 8 and lower) as a result of residents' concerns about children's health and the environment. This ban went into effect for day care centers on October 1, 2009 and for K-8 schools on July 1, 2010. Some Connecticut municipalities have gone beyond the requirements of the law and have stopped using pesticides to manage turfgrass on all their municipal properties.

### 2. What does Connecticut's pesticide ban cover?

Connecticut's pesticide ban prohibits the use of all U.S. Environmental Protection Agency (EPA) registered pesticides labeled for use on lawn and/or ornamental sites at


fantastik
Orange
Action


BAYER

# Perception

# *Perceived Risk*

- **Roger Bate, editor of *What Risk*, asked 123 people the following question:**
  - **The chemical industry routinely uses a chemical called ‘dihydrogen monoxide’ in its processes.**
    - **It is used in significant ways and often spilled or intentionally released into the environment.**
    - **It regularly finds its way into our food supply.**

# *Perceived Risk*

- It is a major component of acid rain.
- It contributes to erosion.
- It decreases the effectiveness of automobile brakes.
- In its vapor state, it is a major greenhouse gas.
- It can cause excessive sweating and vomiting.
- Accidental inhalation can cause death.
- It has been found in terminal cancer patients.

# *Perceived Risk*

- Should this chemical be strictly regulated or even banned by an authority such as the British Government or the EU?

- Responses:
  - No 5%
  - Don't Know 19%
  - Yes 76%

# *Perceived Risk*

- **Dihydrogen Monoxide = ?**

# *Perceived Risk*

- Dihydrogen Monoxide = $H_20$

# We Need to Work on Perception

STMA CERTIFIED SPORTS FIELD MANAGER

stma

# Using Athletic Covers to Your Advantage

Dr. Mike Goatley and
Jesse Pritchard, CSFM

Exposure Research

Follow Golf's Lead


Take the emotion out of it

# Others Care About Safety Too

# Realizing a Shared Goal

## Only Way to Move Forward

# Use Your Resources

Extension
W270
TURFGRASS SCIENCE
at the University of Tennessee

# Safety of Herbicides Compared to Other Commonly Used Chemicals

*Greg Breeden, Assistant Specialist I – Turfgrass Weed Science*
*James T. Brosnan, Ph.D., Assistant Professor – Turfgrass Weed Science*
*Greg Armel, Ph.D., Assistant Professor- Extension Weed Specialist*
*Joseph Thomas, Graduate Research Assistant*

## Introduction

Herbicides are products that are used to control weeds.

## What are $LD_{50}$ values? [2,4]

In toxicology, an $LD_{50}$ value represents the dose of a

http://tennesseeturfgrassweeds.org

some natural weed control methods, such as salt and vinegar applications. In some parts of the United States and Canada, the use of herbicides to control turfgrass weeds has been banned entirely. However, materials used for natural weed control, such as salt and vinegar, also have toxicological properties similar to herbicides. This publication was developed to provide practitioners with a reference to which they can refer individuals concerned about the safety of herbicides and other commonly used chemicals.

## What are MSDS sheets? [1,4]

MSDS sheets are used for product stewardship and safety. These sheets contain data describing the properties of a particular substance and are intended to inform workers and other personnel about the risks associated with coming in contact with these substances. MSDS sheets provide pertinent information on how to properly handle, store and dispose of a substance, as well as any environmental or health risks associated with the material. MSDS sheets will state whether or not the substance is a carcinogen or teratogen and will provide information about acute toxicity often represented in the form of an $LD_{50}$ value.

(usually mice or rats) after a specified duration. These values are frequently used as a general indicator of a substance's acute toxicity. Acute toxicity describes the adverse effects resulting from a single exposure to a chemical (i.e., accidental ingestion of a product). $LD_{50}$ values are expressed in units of milligrams (mg) of substance per kilogram (kg) of body weight. Toxicity increases as $LD_{50}$ values decrease. For example, a chemical with a $LD_{50}$ of 10 mg/kg is 10 times more toxic than one with a $LD_{50}$ of 100 mg/kg.

Considering that $LD_{50}$ studies are conducted on all chemicals sold in the United States, they can be used as a means to compare the toxicity of one chemical to another. Table 1 presents $LD_{50}$ values for many herbicides, as well as many chemicals commonly found in household products. MSDS sheets for most herbicides can easily be accessed for free from websites such as http://www.cdms.net.

MSDS sheets for household products can be accessed directly from company websites. Often, a single product may be sold by different companies. For example, several different brands of sodium hypochlorite

(i.e., bleach) can be found in most grocery stores. As a result, each product will have its own MSDS sheet with $LD_{50}$ values that may vary slightly. The values in Table 1 are simply examples presented as a guide for comparing the relative toxicity of one compound to another. Any discrepancy in this publication with a MSDS sheet is unintentional. If such a discrepancy exists within this publication, and in all cases, use the MSDS sheet as the authority to guide you in the legal use of the product.

## What is a carcinogen? [4]

A carcinogen is a substance that causes cancer. Carcinogens can increase cancer development by changing cellular metabolism or damaging cellular DNA. Once this happens, biological processes are disrupted and uncontrolled, leading to malignant cell division. Examples of commonly known carcinogens include asbestos and tobacco.

## What is a teratogen? [4]

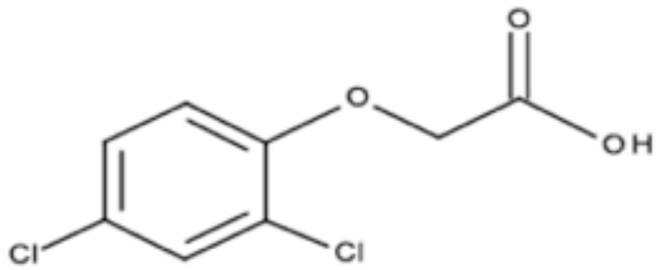
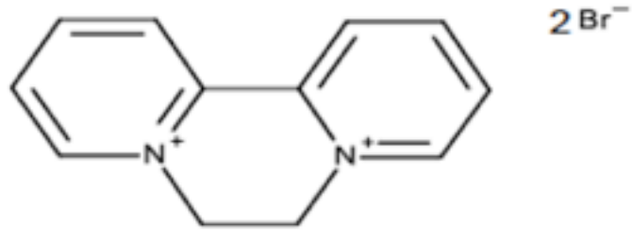
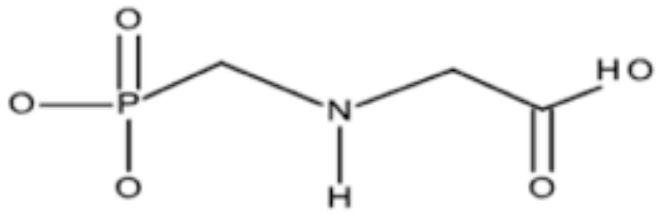
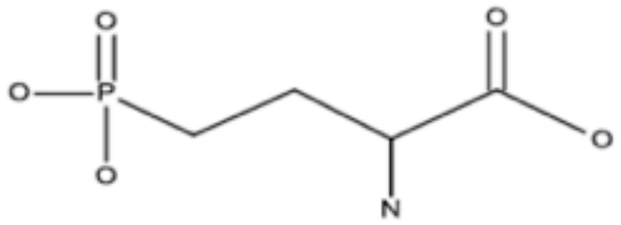
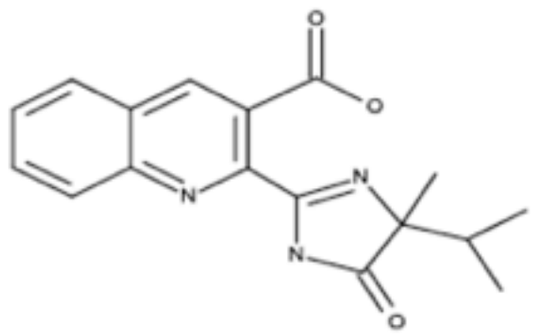
A teratogen is a substance that causes abnormalities in physical development and/or birth defects. Birth defects occur in about 3 to 5 percent of newborns and are the leading cause of infant mortality. Many chemicals and

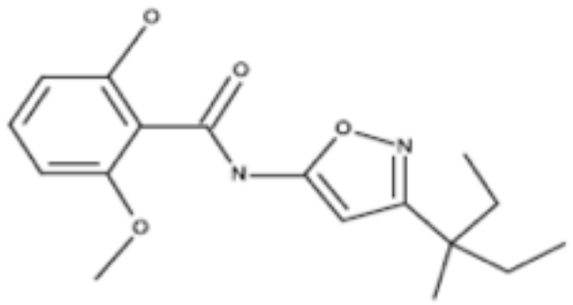
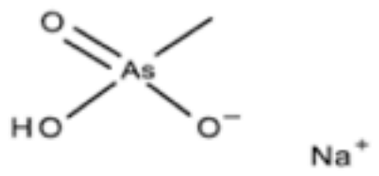
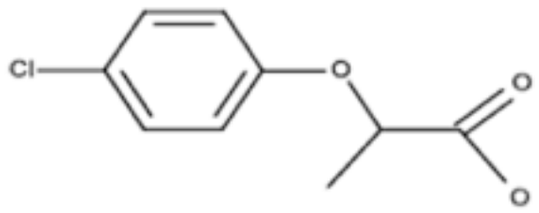
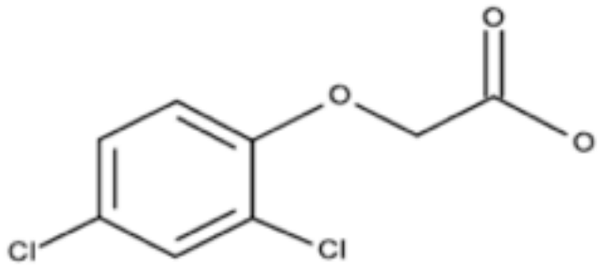
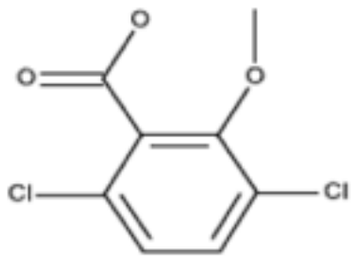
toxic than bleach. When used according to label instructions, Paraquat is a highly effective herbicide; however, end-users must take special precautions when applying the material (e.g., wear correct personal protective equipment, etc).

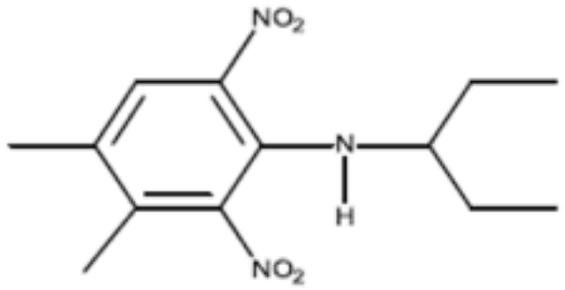
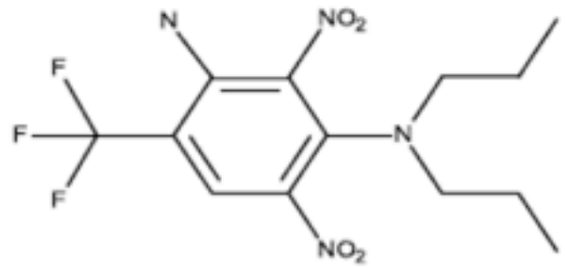
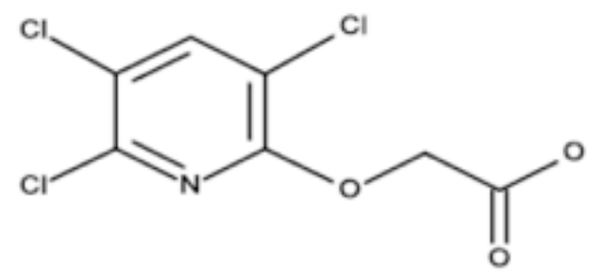
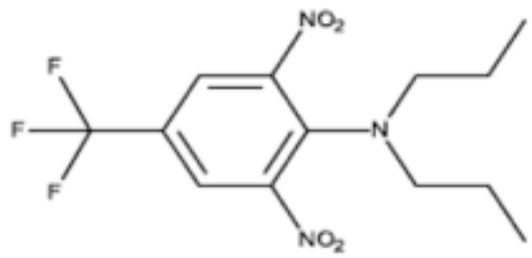
## Conclusion

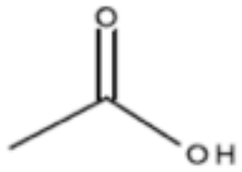
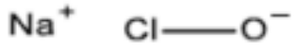
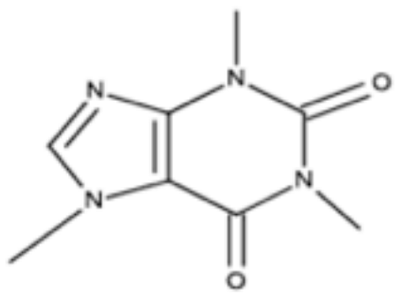
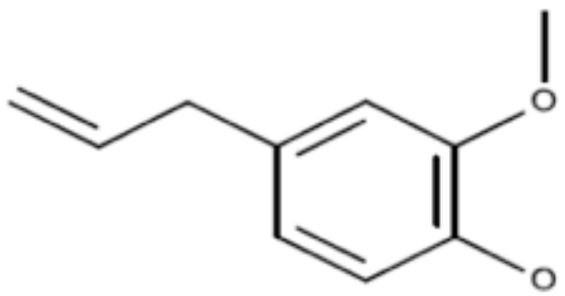
When used according to label instructions, herbicides are safe and effective. Many of the problems that have been associated with herbicides are the result of improper use. Similarly, many health problems have been linked to improper (e.g., excessive) use of substances like alcohol.

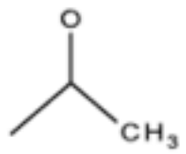
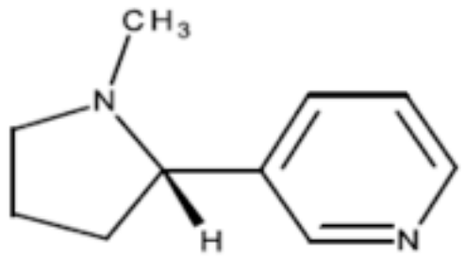
Before applying any herbicide, always refer to the product label for specific information on proper product use; tank-mix compatibility; and turfgrass, vegetable, fruit or ornamental tolerances. For more information on weed control, visit the University of Tennessee's turfgrass weed science website, http://tennesseeturfgrassweeds.org or the University of Tennessee horticultural weed control site at http://hortweeds.tennessee.edu/.

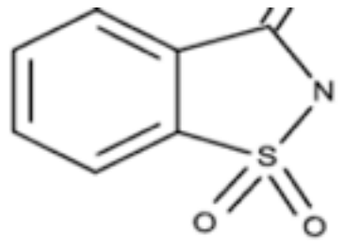
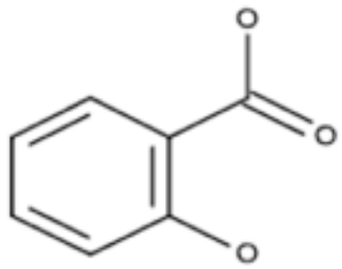
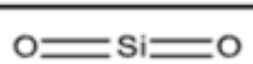
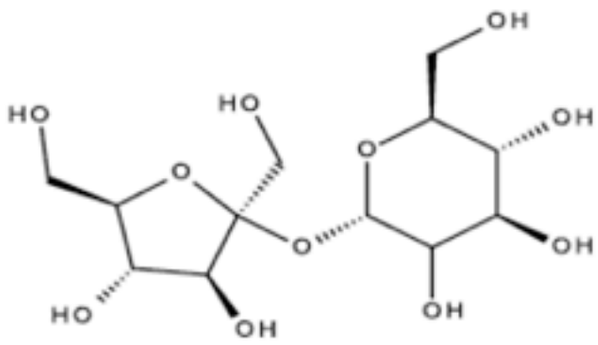
| Herbicides | Chemical Structure | Oral | Dermal | Carcinogen | Teratogen |
|---|---|---|---|---|---|
| 2,4-D |  | 370 | 1500 | No | Unlikely |
| Diquat (Reward) |  | 886 | >5000 | No | Potential |
| Glyphosate (Roundup Pro) |  | 5108 | >5000 | No | None |
| Glufosinate (Finale) |  | 3570 | >2000 | No | None |
| Imazaquin (Image) |  | >5000 | >2000 | No | None |

| | | | | | |
|---|---|---|---|---|---|
| **Isoxaben (Gallery)** |  | **>5000** | **>5000** | **Potential** | **Yes** |
| **MSMA** |  | **700** | **2500** | **Unknown** | **Unknown** |
| **MCPP+2,4-D+Dicamba (Trimec Classic)** |    | **>1550** | **>2240** | **Unknown** | **Unknown** |

| | | | | | |
|---|---|---|---|---|---|
| **Pendimethalin (Pendulum Aquacap)** |  | **>5000** | **>5000** | **No** | **None** |
| **Prodiamine (Barricade)** |  | **>5000** | **>2000** | **Potential** | **Yes** |
| **Triclopyr (Turflon Ester)** |  | **1338** | **>2000** | **Potential** | **None** |
| **Trifluralin (Trifluralin 10G/Preen)** |  | **>5050** | **>2020** | **No** | **Unknown** |

| Common Chemicals | Chemical Structure | Oral | Dermal | Carcinogen | Teratogen |
|---|---|---|---|---|---|
| Acetic acid (Vinegar) |  | 3310 | >5000 | No | Unknown |
| Sodium hypochlorite (Bleach) |  | 192 | NA | Unknown | Unknown |
| Caffeine |  | 127 | NA | Potential | Unknown |
| Clove oil |  | 1370 | 1200 | Unknown | Unknown |

| | | | | | |
|---|---|---|---|---|---|
| **Ethanol + surfactant (Ultra Dawn)** |  | **6300** | **NA** | **No** | **Unknown** |
| **Ethyl alcohol (grain alcohol)** |  | **7060** | **NA** | **Unknown** | **Potential** |
| **Isopropyl alcohol (Windex)** |  | **>5000** | **>2000** | **Unknown** | **Unknown** |
| **Nicotine** |  | **3.4** | **50** | **Yes** | **Potential** |

| | | | | | |
|---|---|---|---|---|---|
| |  | 14200 | NA | Yes | Unknown |
| Salicylic acid (Aspirin) |  | 200 | NA | No | Potential |
| Crystaline silica (Silica sand) |  | NA | NA | Yes | Unknown |
| Sodium chloride (Table Salt) | NaCl | 3000 | 10 g/kg | Unknown | Unknown |
| Sucrose (Sugar) |  | 29700 | NA | No | Unknown |

*MSDS sheets for most herbicides can easily be accessed for free from websites such as http://www.cdms.net. MSDS sheets for household products can be accessed directly from company websites. Often, a single product can be sold by different companies. For example, several different brands of sodium hypochlorite (i.e., bleach) can be found in most grocery stores. As a result, each product will have its own MSDS sheet with LD50 values that may vary slightly. The values in this table are simply examples presented as a guide for comparing the relative toxicity of one compound to another. Any discrepancy in this publication with a MSDS sheet is unintentional. If such a discrepancy exists within this publication, and in all cases, use the MSDS sheet as the authority to guide you in the legal use of the product.

# Continue to Advance the Professionalism of the SFM

# Benefits of Overseeding


D/MVP 4

# Controlling *Poa* Before Overseeding

# Xonerate™

POST annual bluegrass control + select broadleaf weeds

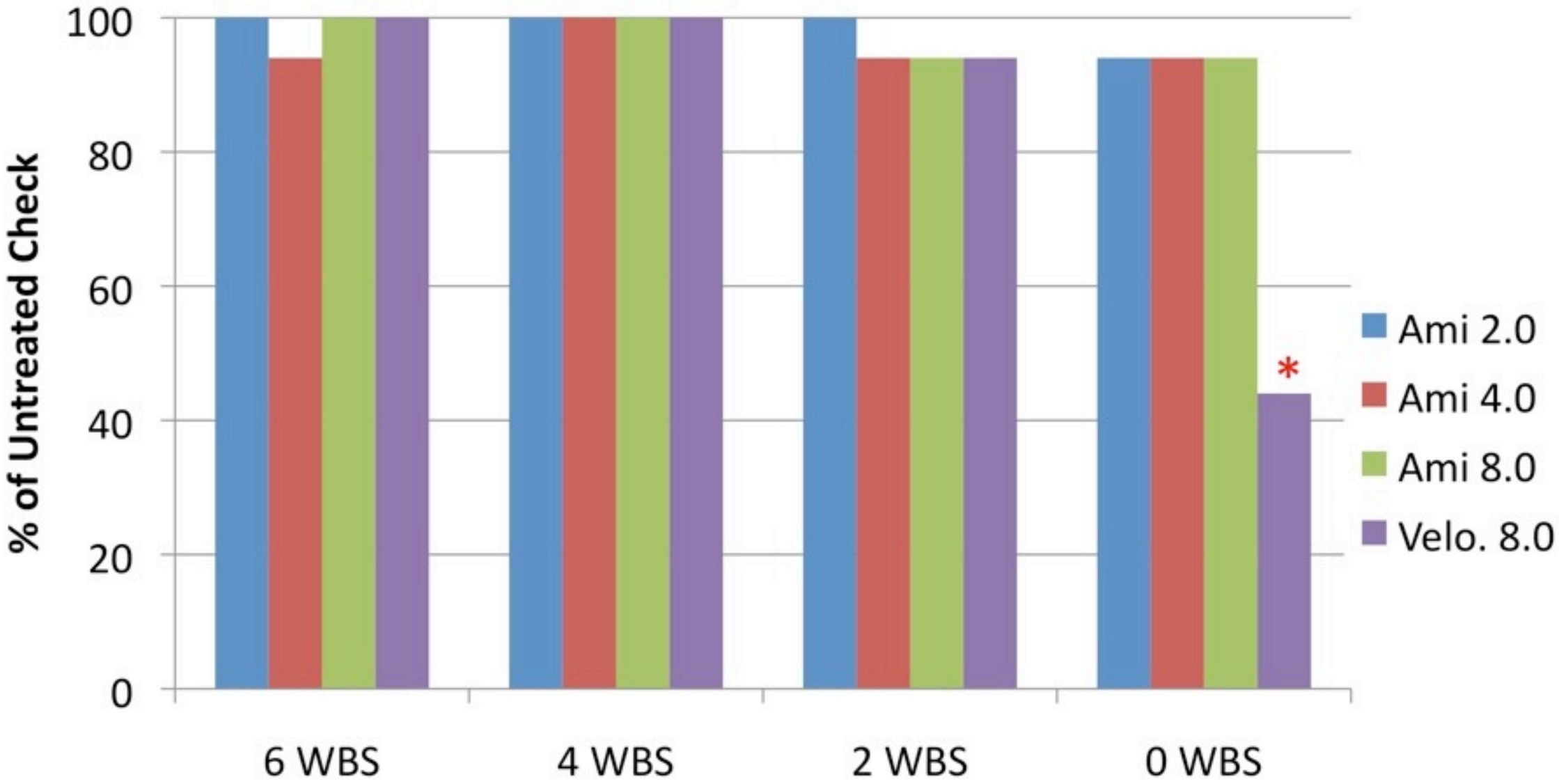
Photosystem II inhibitor, soil residual

KBG, PR, TF, FF (2 to 4 oz)
Bermuda and Zoysia (5 to 10 oz)

Sequential, Spring Applications
(soil temp > 50F, air temp < 80 F)

# Safe for Use at Seeding

# Effect of Amicarbazone on Perennial Ryegrass Establishment at Four Weeks after Seeding. TN. 2010



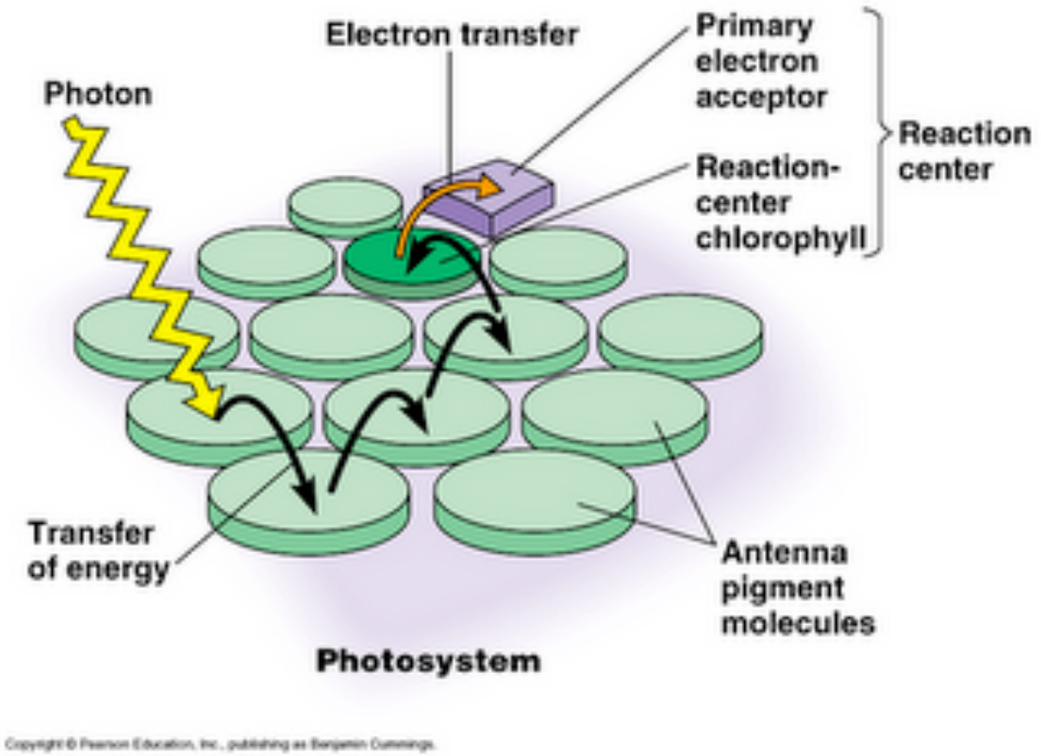

Perennial ryegrass seeded Apr. 12, 2010

* Sig. reduction to UTC.

Perennial ryegrass density was 100% in untreated check at 4 WAS.

# Tenacity

- Inhibitor of 4-HPPD
- Carotenoids
- Protect photosystem
- Lead to bleaching






Safe for Use at Seeding

# *Poa* Control at Seeding with Tenacity

J Borger, Penn State Univ.

# Current Research

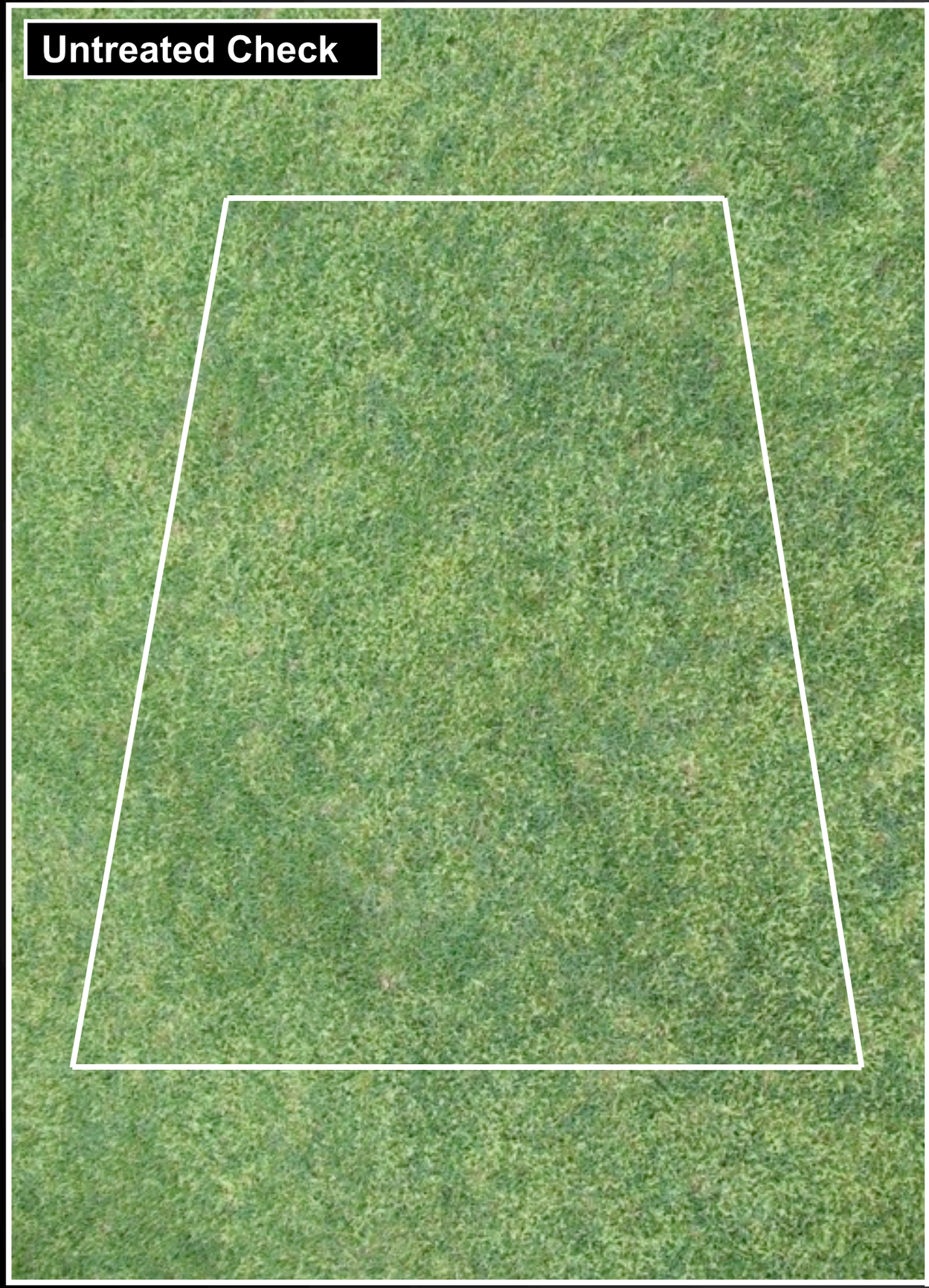
Evaluating *Poa* and winter annual broadleaf weed control with combinations of mesotrione and amicarbazone applied at overseeding

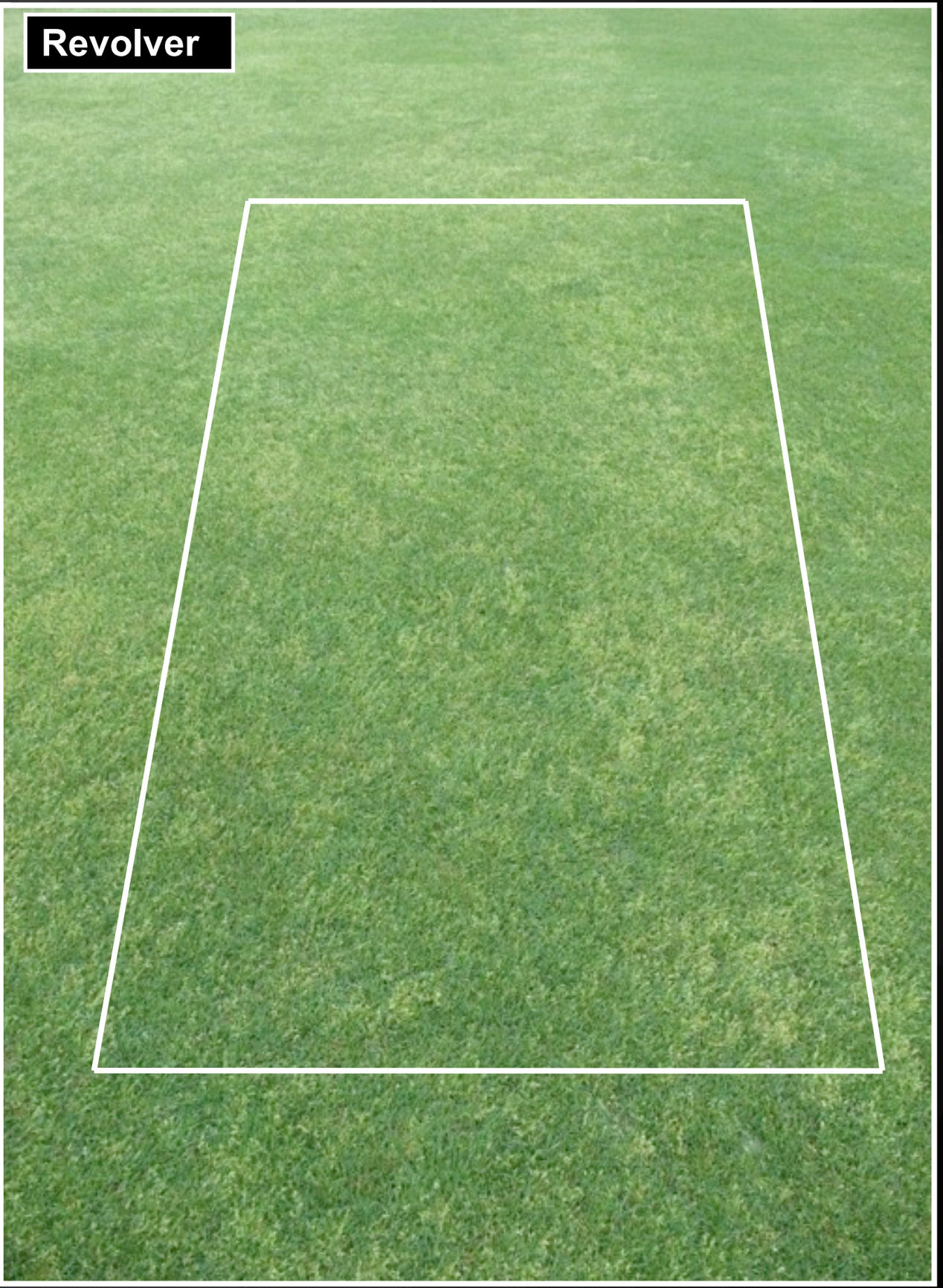
# Sulfonylurea Herbicides

| Herbicide | Rate | Interval to Seeding |
|---|---|---|
| Revolver | 17.4 fl oz | 7 days |
| Monument | 0.53 oz | 14 days |
| Katana | 1.5 fl oz | 14 days |

Will Require POST application in Spring

# Pictures from 32 WAS



# Selective POST Control in Overseeded Turf


# Prograss

- "Holiday herbicide"
  - –First app- late Nov
  - –Second app- 3 wk later
- Delayed green-up in spring
- Labeled for golf, sod, home lawns, and "parks"

| Turf Species | Rate (fl oz/1000 $ft^2$) |
|---|---|
| Perennial Ryegrass | 2-4 |
| Kentucky Bluegrass | 1.5 |
| Tall Fescue | 2-4 |

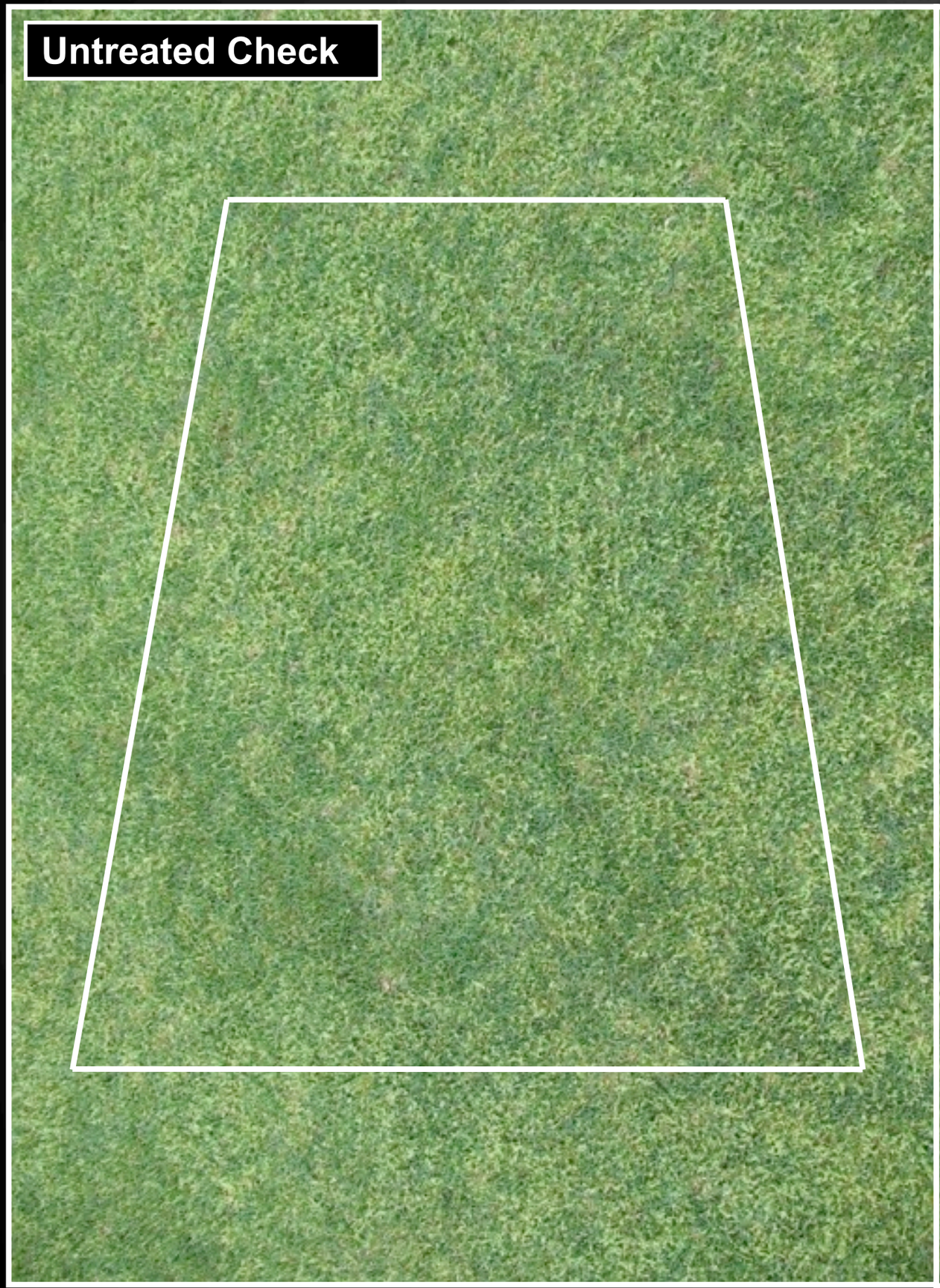
Two (or more) applications will be needed

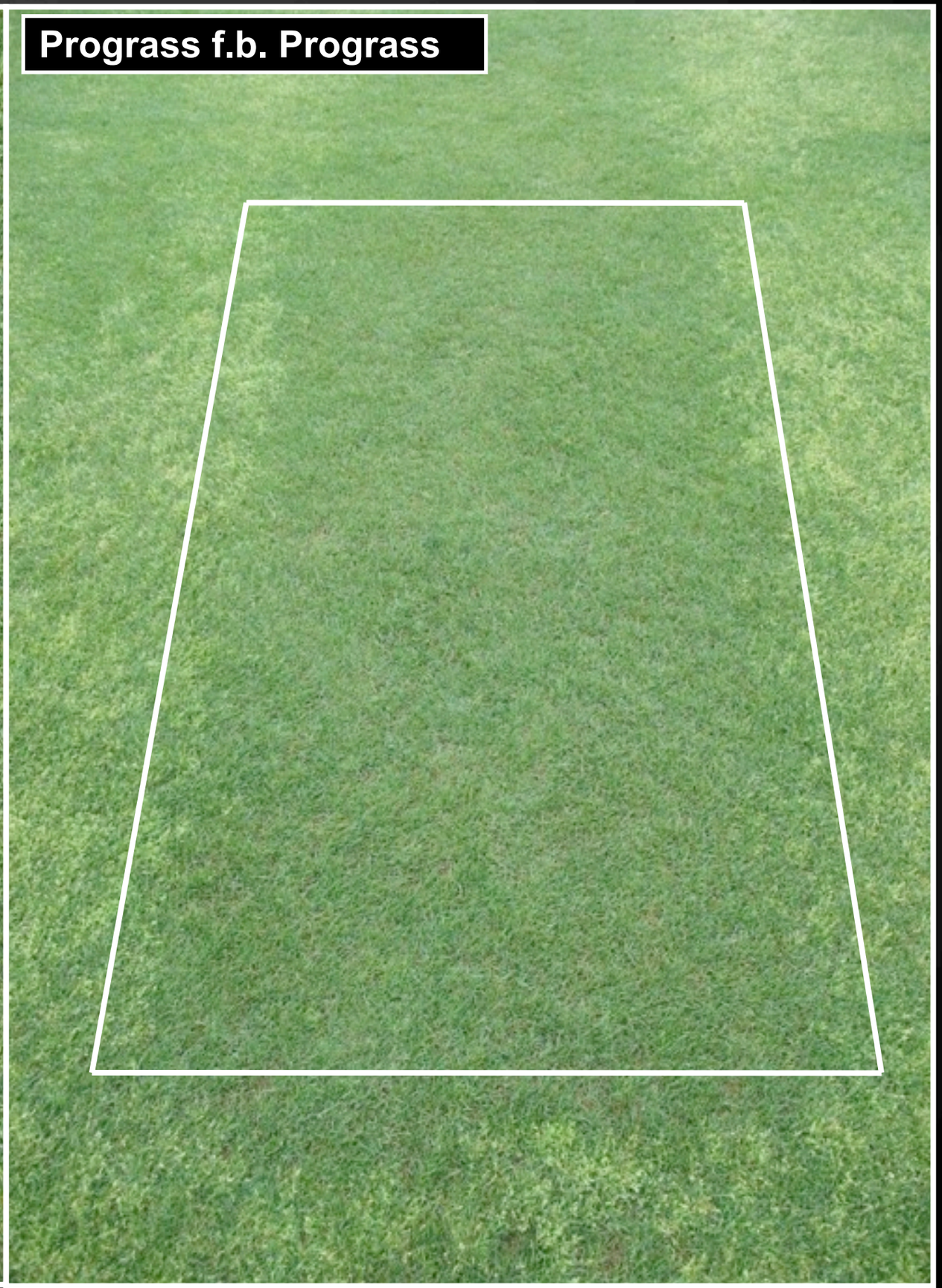
Use lower rates on mixed stands

No KBG seeding for 6 wks after application

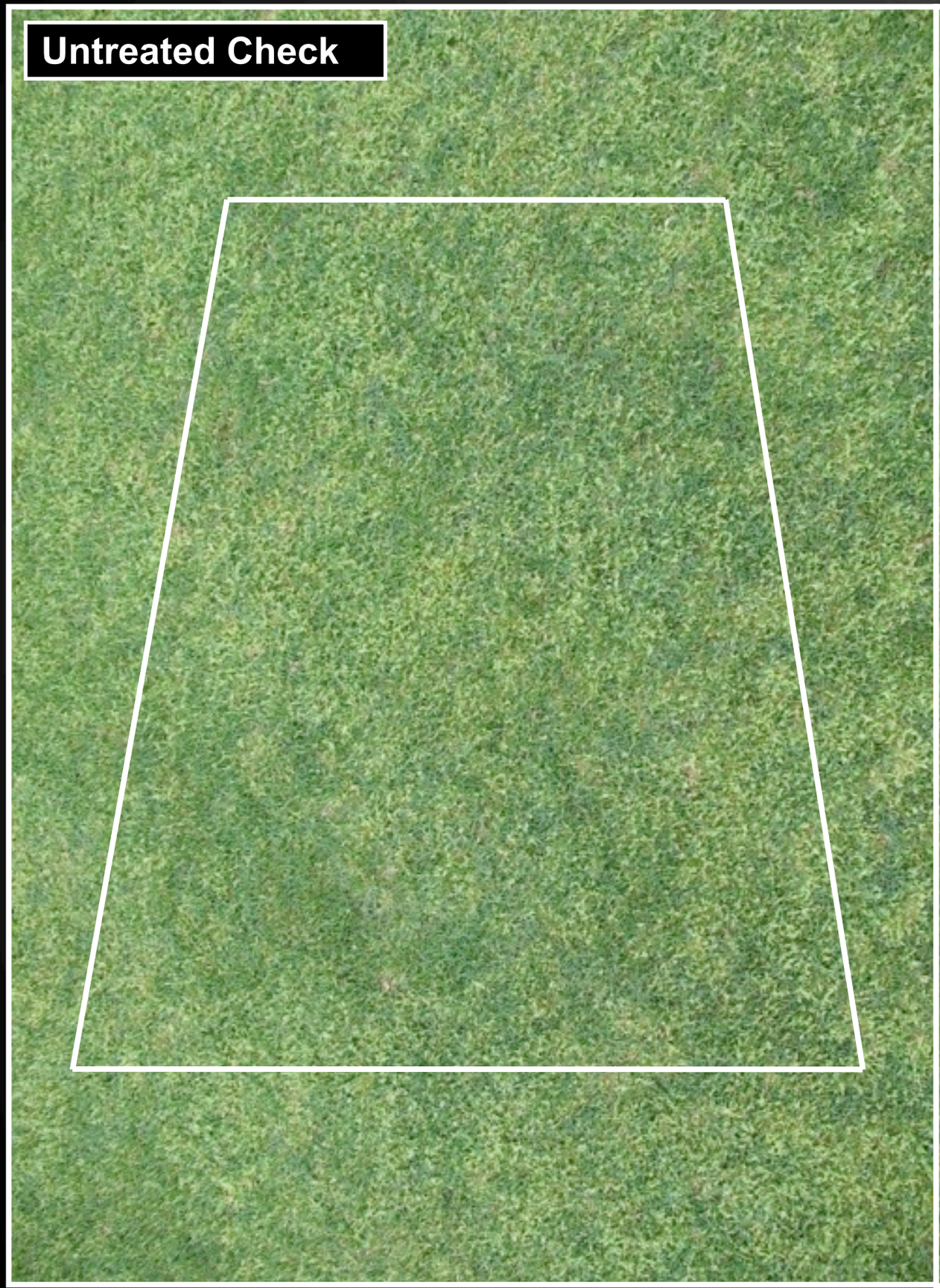
Emergence restrictions -- see label

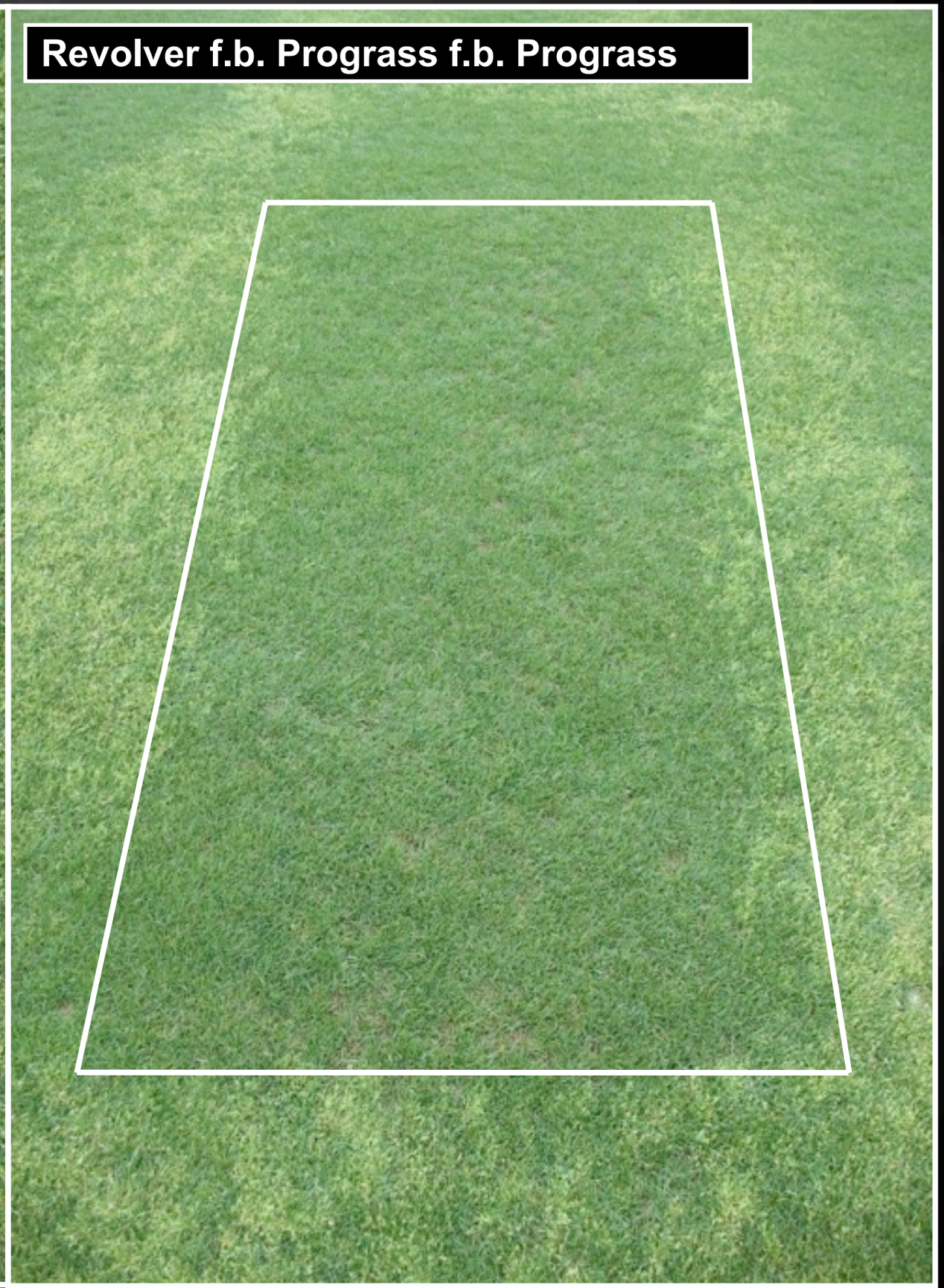
# Pictures from 32 WAS



# Pictures from 32 WAS



| GROUP | 2 | HERBICIDE |
|---|---|---|

PROFESSIONAL VALENT PRODUCTS

# Velocity®

## SG HERBICIDE

**SELECTIVE POSTEMERGENCE HERBICIDE FOR CONTROL OF ANNUAL BLUEGRASS, ROUGH-STALK BLUEGRASS AND CERTAIN BROADLEAF WEEDS ON GOLF COURSE TURFGRASS AND SOD FARMS**

**SUPPRESSION OF DOLLAR SPOT**

| Active Ingredient | By Wt. |
|---|---|
| *Bispyribac-sodium | 17.6% |
| Other Ingredients | 82.4% |
| Total | 100.0% |

*Sodium 2,6-bis[(4,6-dimethoxypyrimidin-2-yl)oxy]benzoate

Contains 0.011 lb active ingredient per oz of formulated product.

**FIRST AID (continued)**

**If swallowed:** Call a poison control center or doctor immediately for treatment advice.
Have person sip a glass of water if able to swallow.
Do not induce vomiting unless told to do so by the poison control center or doctor.
Do not give anything by mouth to an unconscious person.

**If inhaled:** Move person to fresh air.
If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible.
Call a poison control center or doctor for further treatment advice.

**HOT LINE NUMBER**

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact **1-800-892-0099** for emergency medical treatment information.

## PERSONAL PROTECTIVE EQUIPMENT (PPE):

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow instructions for category A on an EPA chemical resistant category selection chart.

**GROUP 2 HERBICIDE**

PROFESSIONAL VALENT PRODUCTS

# Velocity®

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rate of 2.0 oz/A (10 g ai/A). Begin application early in the recommended use season, and continue until the desired level of control is achieved during the current use season. This program should be considered for turf with a heavy infestation of annual bluegrass and/or roughstalk bluegrass, where complete removal of these weeds during a single season could result in an unacceptable stand of creeping bentgrass or perennial ryegrass.

- **Rapid Conversion to Creeping Bentgrass or Perennial Ryegrass**
  Apply *Velocity* SG up to four times at the rate of 6.0 oz/A (30 g ai/A) on a 14 to 21 day interval. Use a 21 day interval if turf is exhibiting undesirable chlorosis at 14 days after application. Efficacy may be decreased if application interval exceeds 21 days. This program should be considered for turf with light infestations of annual bluegrass and/or roughstalk bluegrass, and where complete removal of these weeds during the current use season would not result in an unacceptable stand of turfgrass. In general, this program is best suited to turfgrass areas where there are no large patches of annual bluegrass and/or rough bluegrass, and where the level infestation of these weeds is less that 10 percent.

- Do not apply to turfgrass exhibiting symptoms of pythium blight or growing under stress due to drought, high or low temperatures, low fertility, heavy thatch, mechanical injury or other stresses.
- Do not apply *Velocity* SG between 10 days before and 30 days after seedling emergence of creeping bentgrass or perennial ryegrass.
- *Velocity* SG has not been evaluated for safety on all creeping bentgrass and perennial ryegrass cultivars.
- *Velocity* SG has not been evaluated under all microclimates or against all biotypes of annual bluegrass and roughstalk bluegrass. Therefore, performance may be less effective in some locations, and against some biotypes of these weed species.
- *Velocity* SG should not be applied in heavy traffic and/or heavily shaded turf areas.
- *Velocity* SG may dramatically reduce overall turfgrass cover due to its high activity against annual bluegrass and roughstalk bluegrass.

## SPRAY DRIFT

- Do not spray if winds are gusty or if wind speeds are greater than 5 mph.
- Do not apply within 15 ft of native plant communities when sustained winds will carry *Velocity* SG towards these native plant communities.

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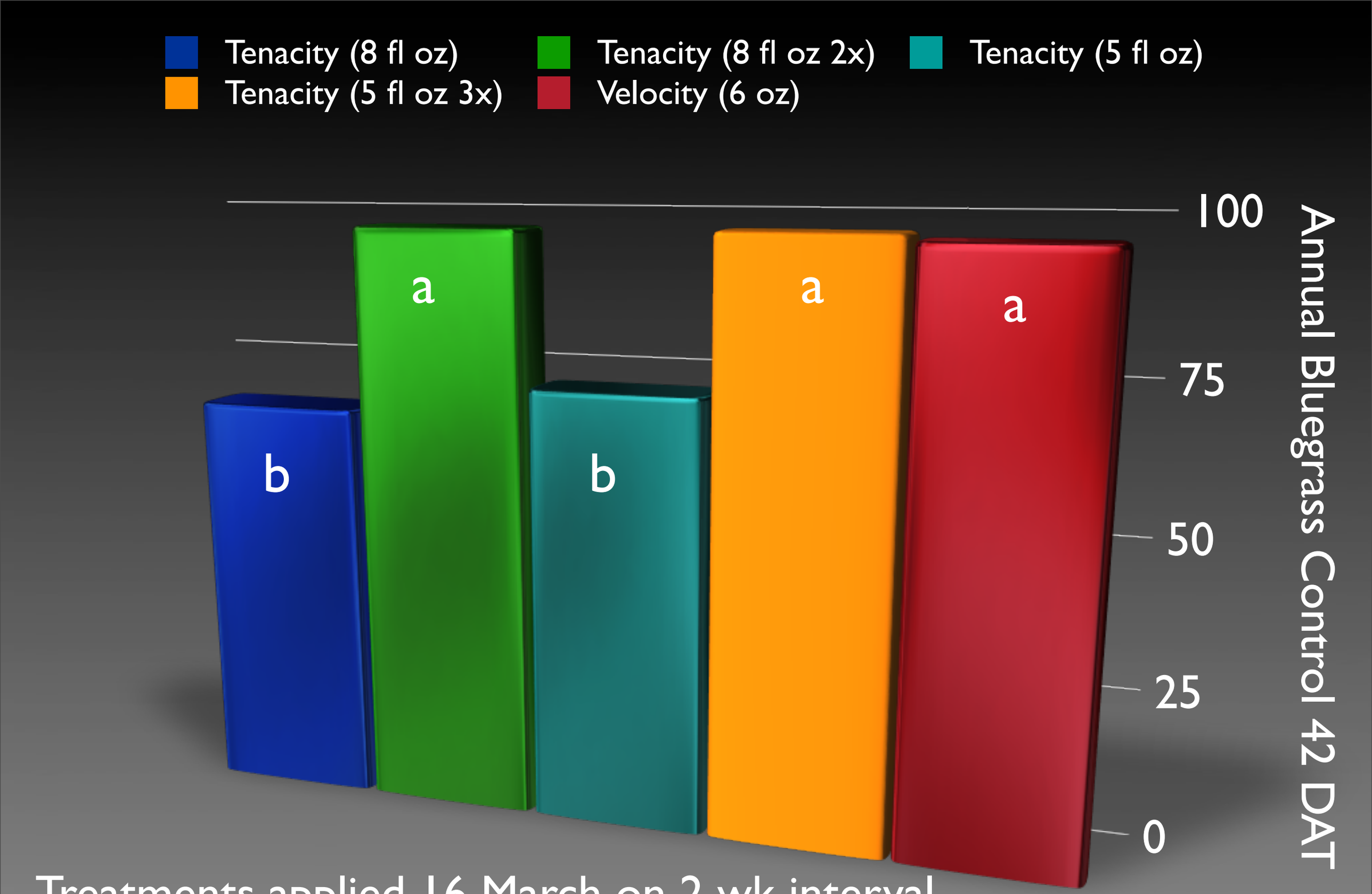
# Tenacity Programs

- Midwestern US (IL, ID, IA)
- Seq. apps at lower rates
  - 5 apps at 3.14 fl oz (every 3 days)
  - 4 apps at 4 fl oz (every 7 days)
  - 3 apps at 5.14 (every 10 days)

GROUP 27 HERBICIDE

Tenacity™

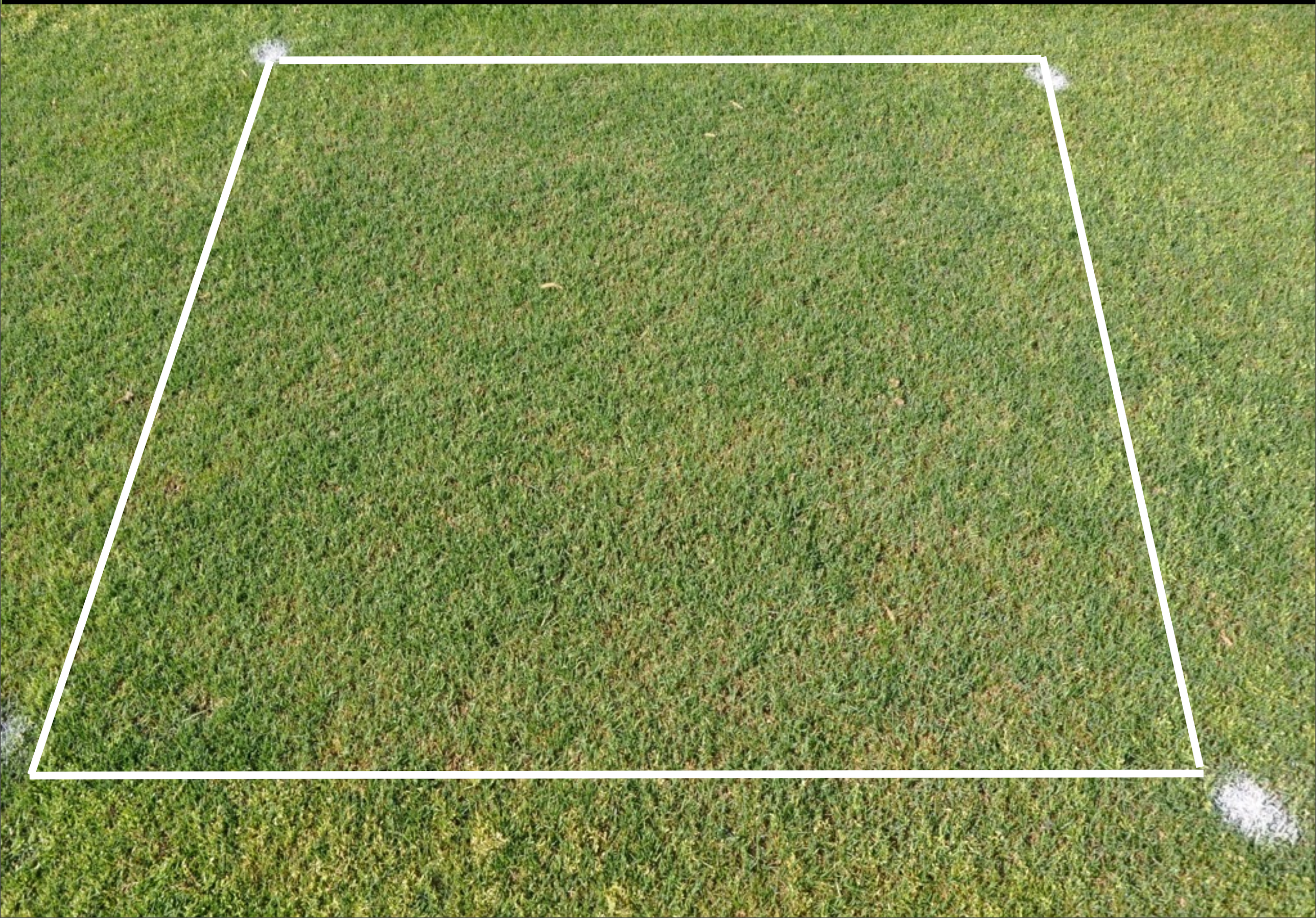
# Spring Programs



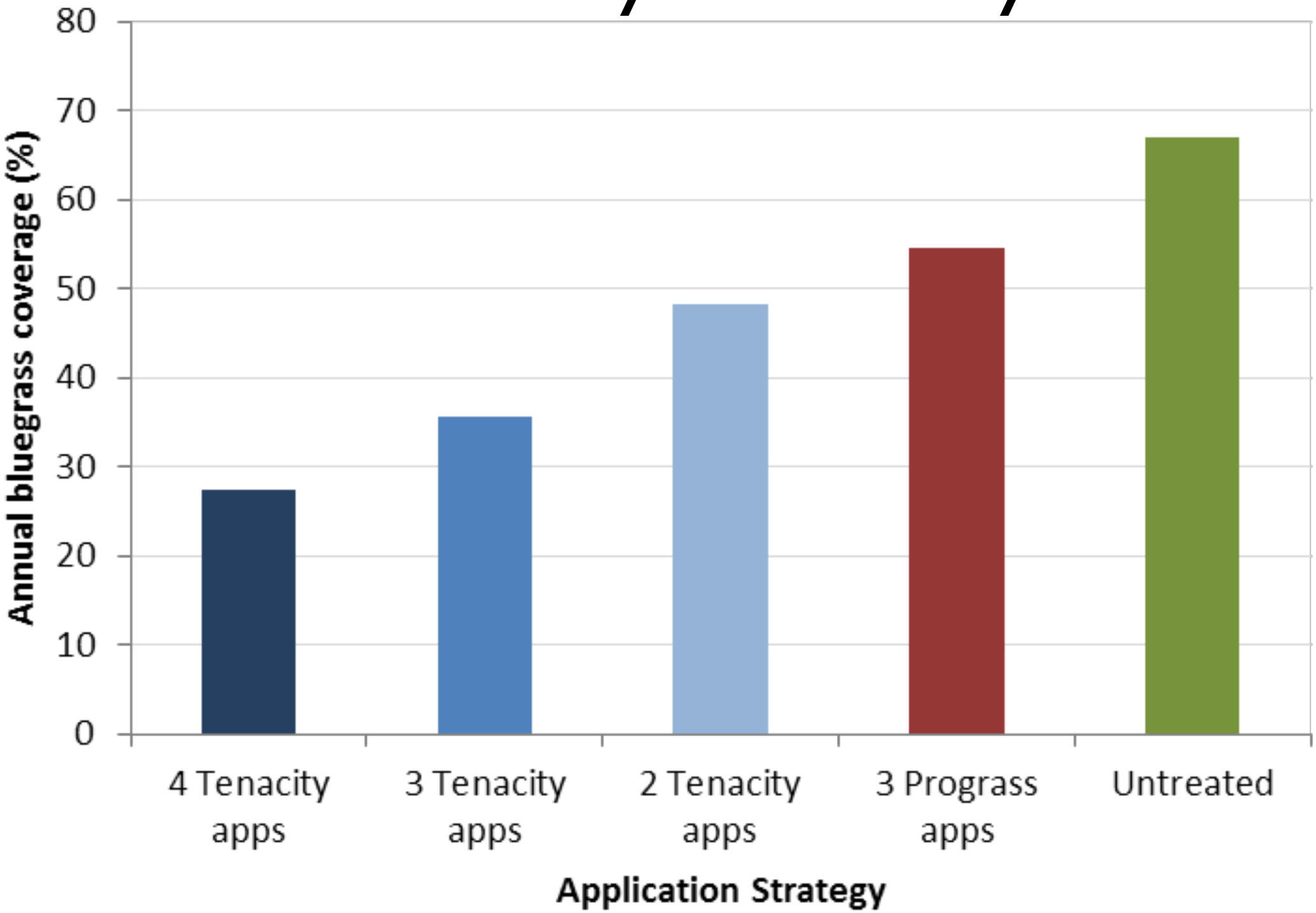

Treatments applied 16 March on 2 wk interval
All treatments included NIS at 0.25% v/v

# Untreated Control 28 DAT

# Tenacity at 8 fl oz/A 2x 28 DAT



# Results in May the next year



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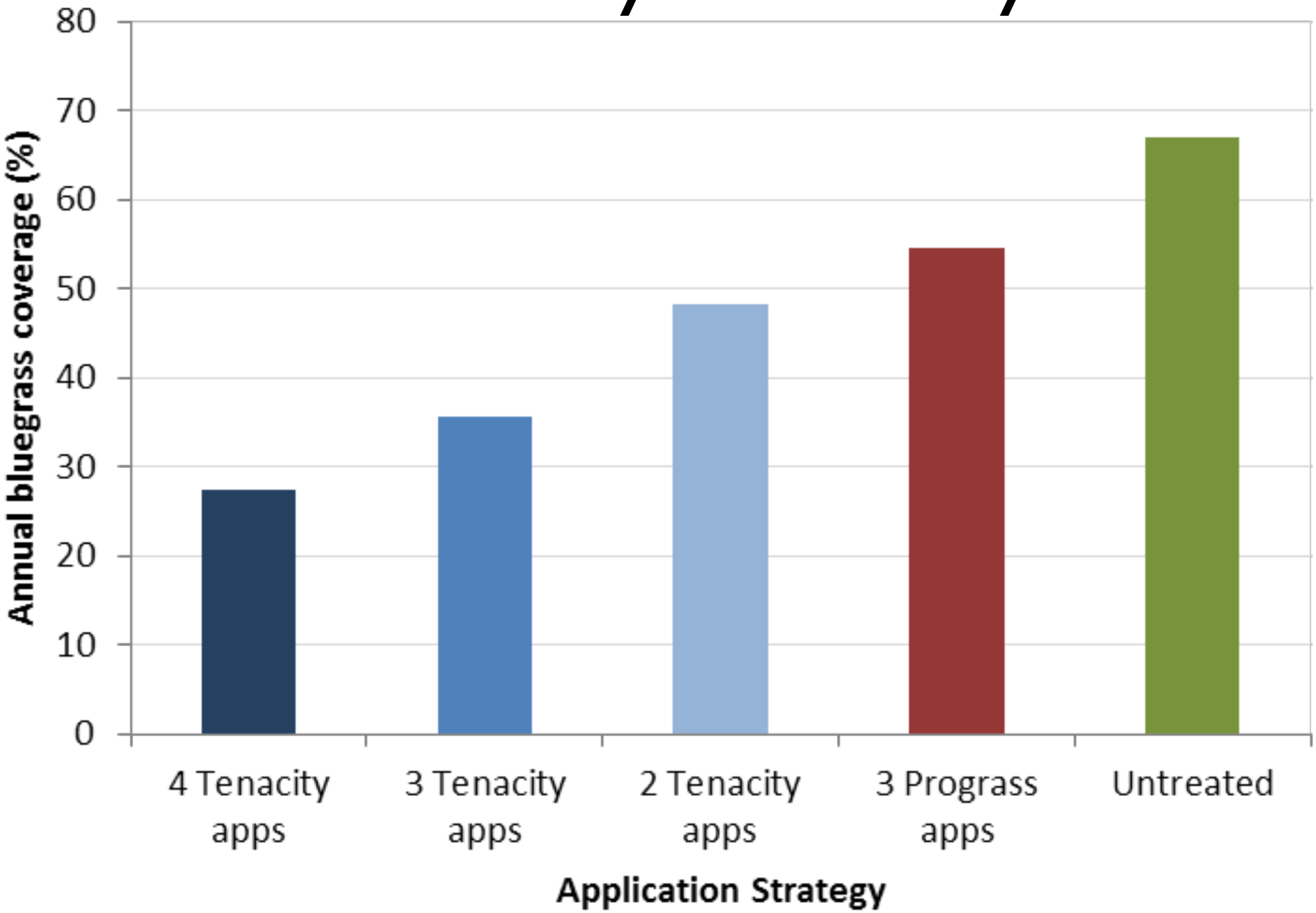
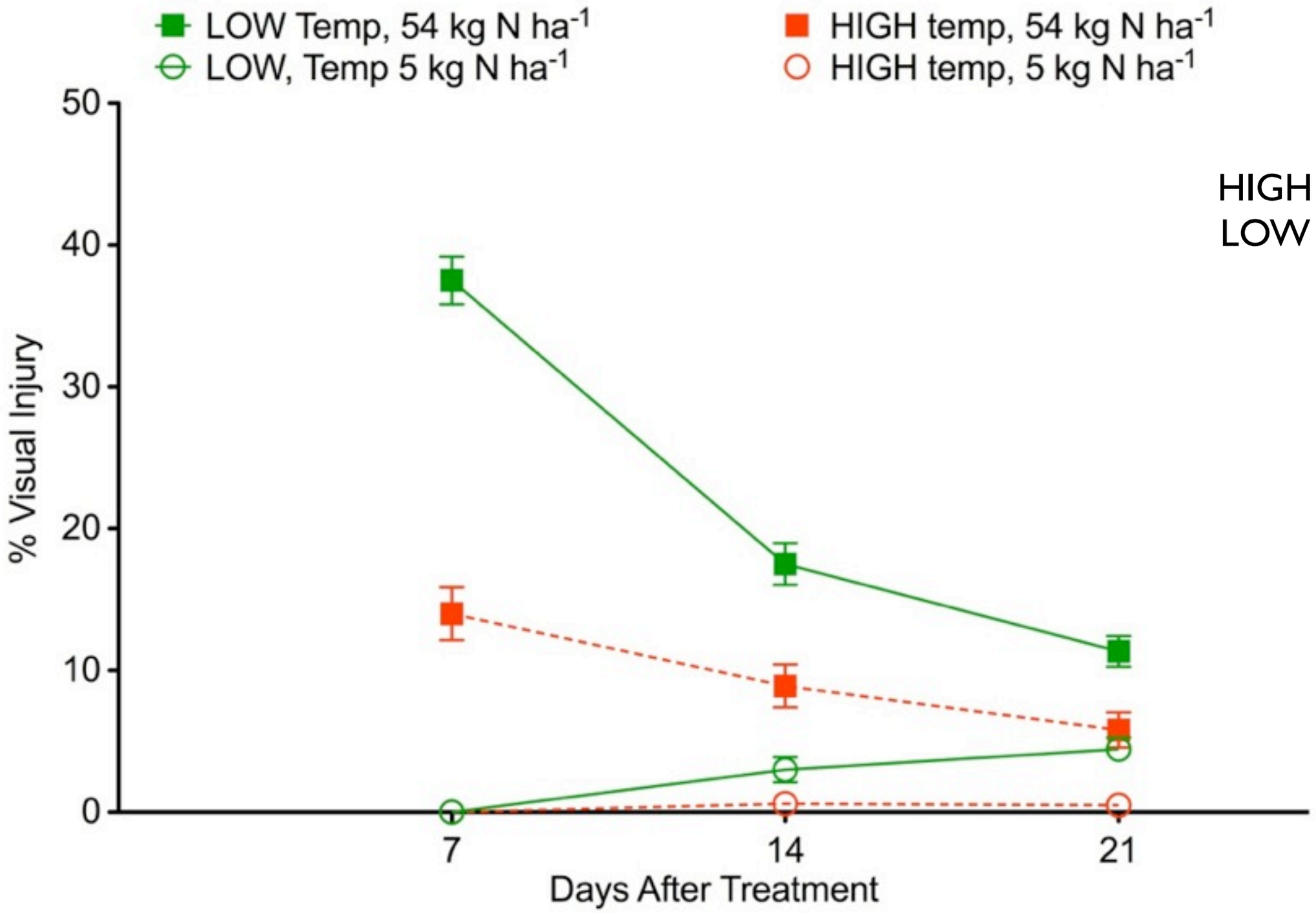



$113/A $85/A $57/A $218/A




HIGH = 90/79 F
LOW = 75/64 F

Both Air Temperature and N status Affect *Poa* Control

Lower Carrier Volumes (19 GPA in IL)

Use Tenacity Under Conditions that Favor *Poa* Growth

# Tenacity-Xonerate Synergy for POST Control

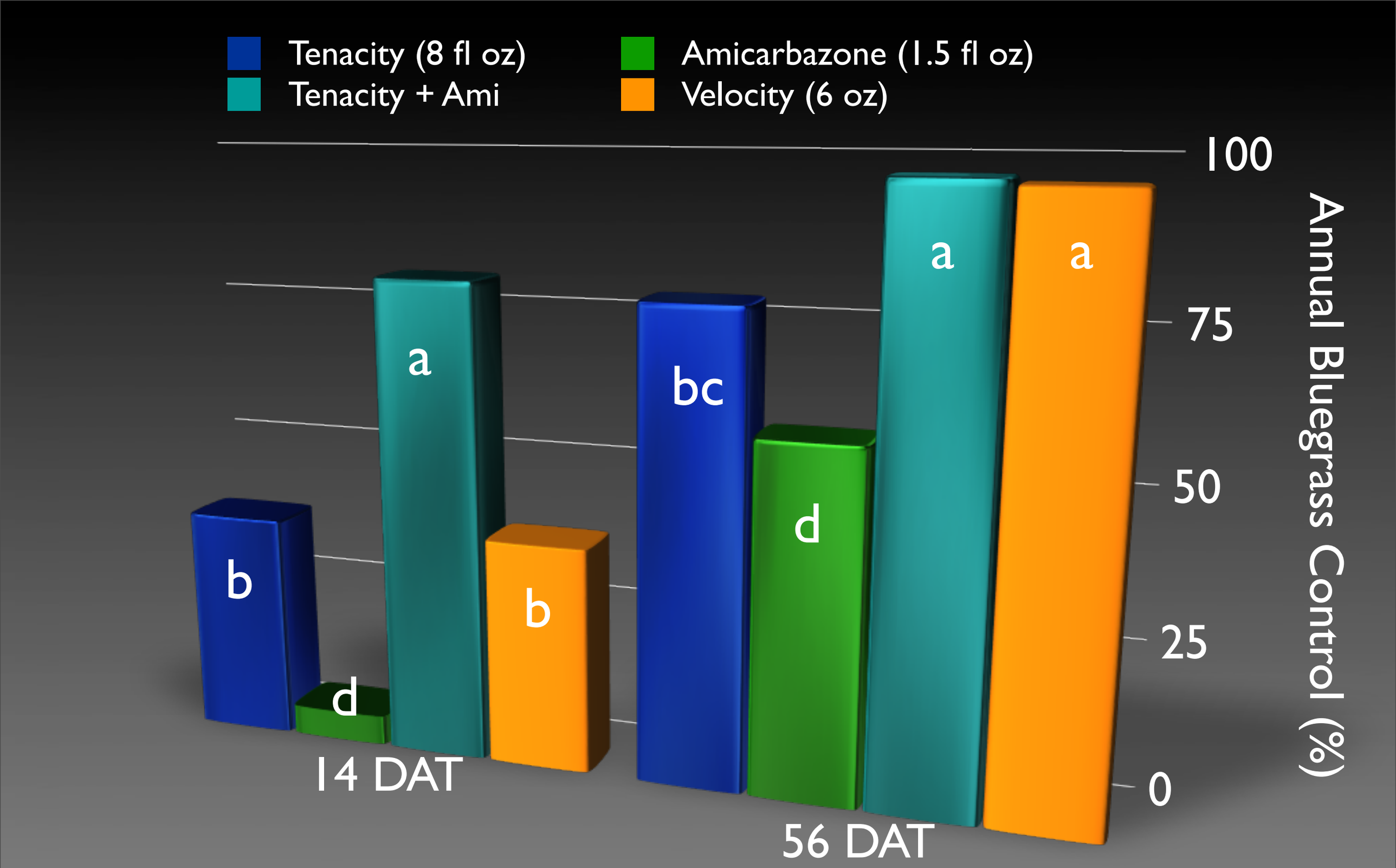
14 DAA

Amicarbazone 1.5 oz/A

Mesotrione 8 oz/A

Mesotrione 8 oz/A +
Amicarbazone 1.5 oz/A

TURFGRASS SCIENCE
The University of Tennessee




Treatments applied 16 March 2011
All treatments included NIS at 0.25% v/v

Mesotrione (8 oz)
14 DAA

Mesotrione (8 oz) +
Amicarbazone (1.5 oz)
14 DAA

Minimal Activity on Mature Plants in IN

First Evaluated on Creeping Bentgrass


# Effect of Soil Type and Rooting Depth on Creeping Bentgrass Injury with Amicarbazone

# Conclusions

- Greater at shallower rooting depths
- Slightly greater in silt loam (rooting depth?)
- Minimum rooting depth of 6” for field applications

Do Not Apply Xonerate in Fall

# Overseeded Bermudagrass Fields

# Improved Ryegrasses

# Commitment to Applying a Transitioning Herbicide

# Can you force transition with cultural practices ?

- Horgan and Yelverton, 2001
  - $NH_4NO_3$ – no effect
  - Core cultivation – no effect
  - Vertical mowing – no effect
  - Scalping – no effect
  - Vertical mowing / scalping – no effect

# Bermudagrass
# 100 Days

# If not removed….

- Suppression of bermudagrass growth and decrease in bermudagrass health
  - Decreased wear tolerance
  - Decreased winter survival
  - Decreased recuperative potential

**WEAKER PLANTS**

# Transitioning Herbicides

Revolver (8.8 to 17.4 fl oz/A)

Monument (0.35 to 0.53 oz/A)

Katana (3 fl oz/A)

TranXit (1 to 2 oz/A)

Certainty (1.25 to 2.0 oz/A)

Tribute Total (1 to 3.2 oz/A)

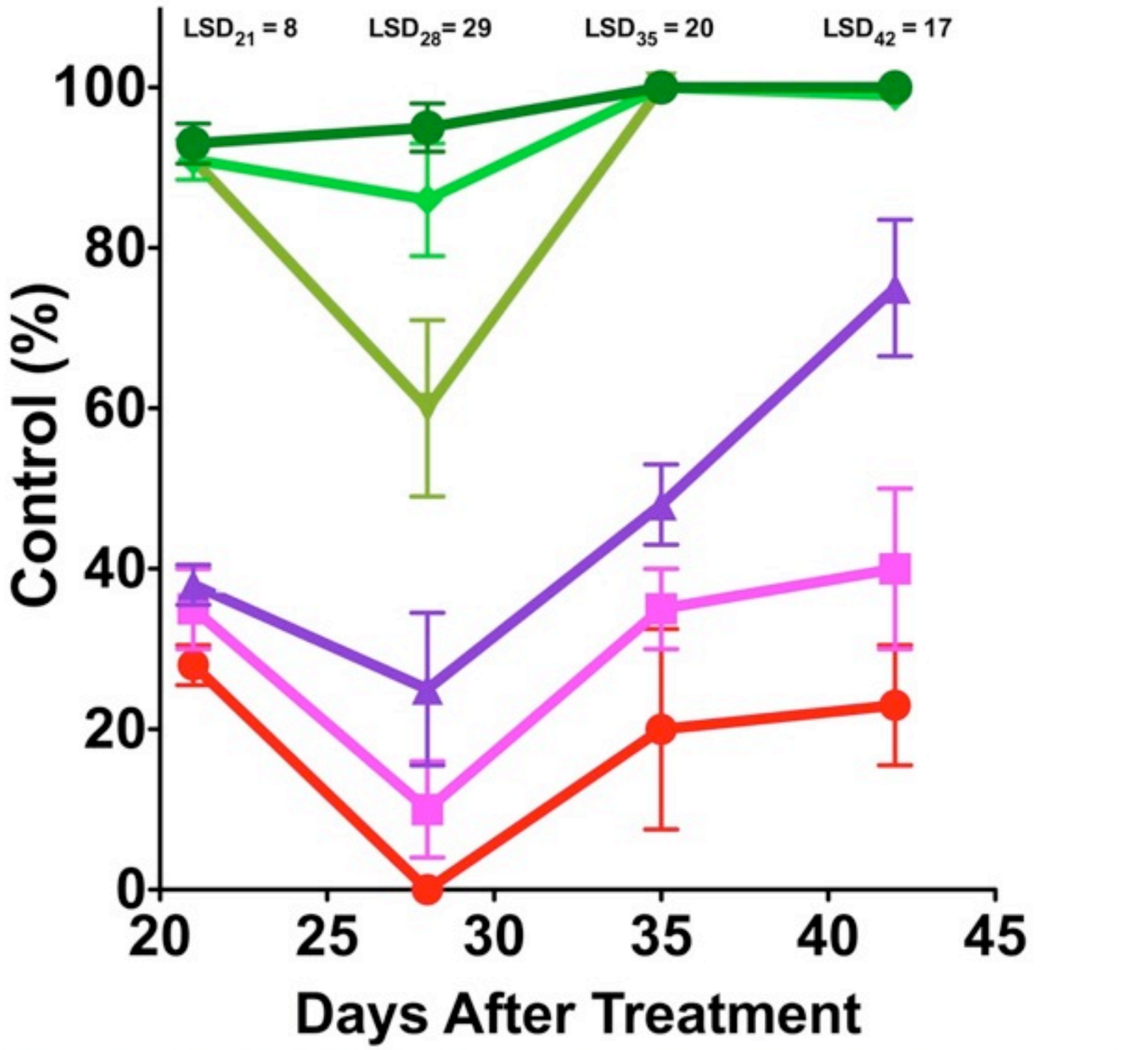
Kerb (2 to 3 lb/A)

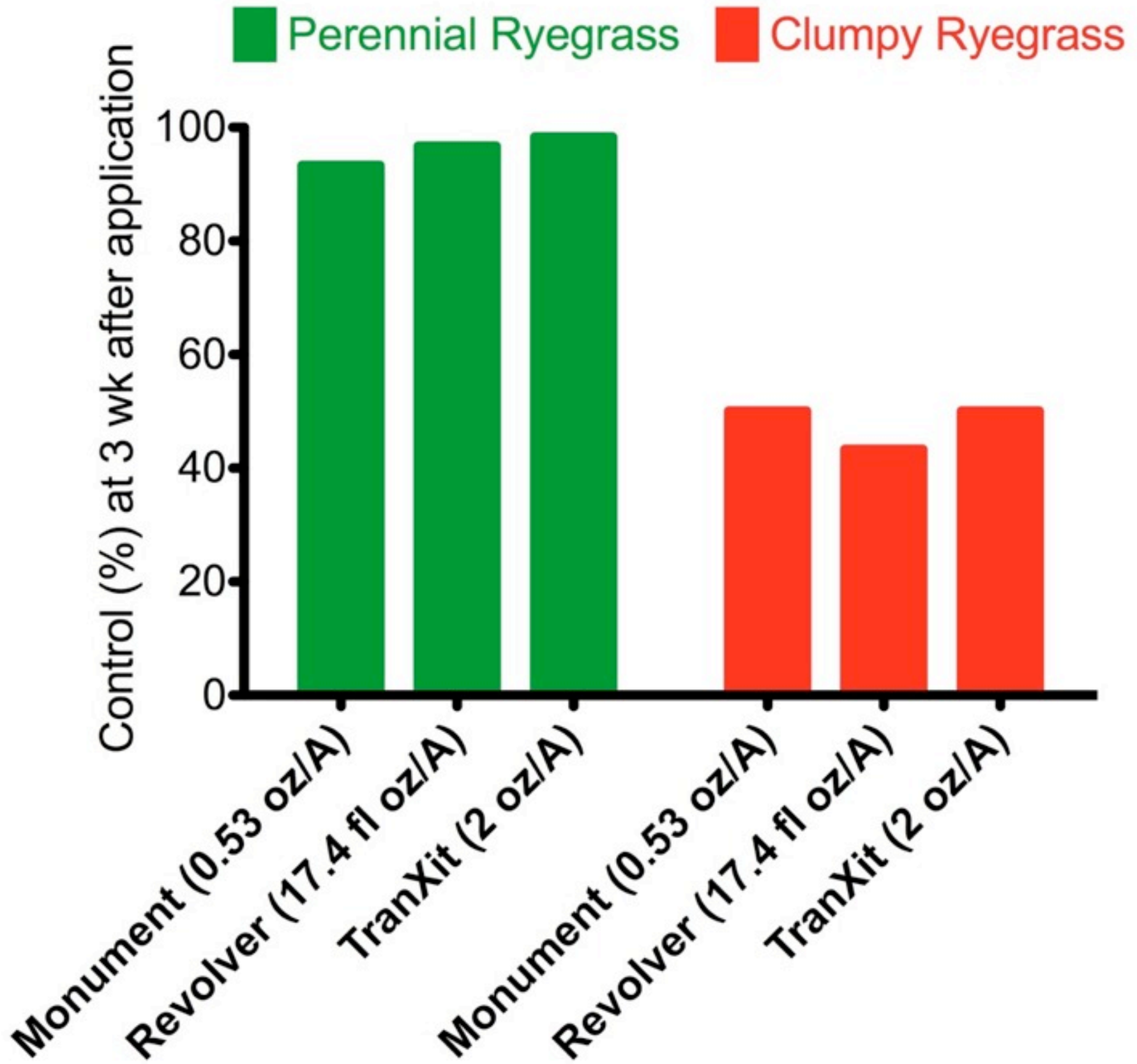
Soil temperatures > 60 F

2% increase per degree

Enhanced activity with N fertilization, adjuvants

# Annual Bluegrass Control




Perennial Ryegrass
Clumpy Ryegrass
Control (%) at 3 wk after application
100
80
60
40
20
0
Monument (0.53 oz/A)
Revolver (17.4 fl oz/A)
TranXit (2 oz/A)
Monument (0.53 oz/A)
Revolver (17.4 fl oz/A)
TranXit (2 oz/A)

# What About Cool-Season Fields?


# Expose soil to sunlight

# Apply Starter Fertilizer

Irrigate regularly

# Seeds are Seeds

# Weed Control During Establishment is Critical

# Tenacity

## WEEDS CONTROLLED

| Common Name | Scientific Name | Preemergence[1] | Postemergence[2] |
|---|---|---|---|
| Barnyardgrass | *Echinochloa crusgalli* | Y | Y |
| Bentgrass, Creeping | *Agrostis stolonifera* | Y | Y |
| Bluegrass, Annual | *Poa annua* | Suppression | N |
| Buckhorn Plantain | *Plantago lanceolata* | Y | Y |
| Buttercup | *Ranunculus sardous* | -[3] | Y |
| Carpetweed | *Mollugo verticillata* | Y | Y |
| Chickweed, Common | *Stellaria media* | Y | Y |
| Chickweed, Mouseear | *Cerastium vulgatum* | Y | Y |
| Clover, Large Hop | *Trifolium aureum* | Y | Y |
| Clover, White | *Trifolium repens* | Y | Y |
| Crabgrass, Large | *Digitaria sanguinalis* | Y | Y[4] |
| Crabgrass, Smooth | *Digitaria ischaemum* | Y | Y[4] |
| Crabgrass, Southern | *Digitaria ciliaris* | Y | Y[4] |
| Curly dock | *Rumex crispus* | - | Y |
| Dandelion, Catsear | *Hypochoeris radicata* | - | Y |
| Dandelion, Common | *Taraxacum officinale* | - | Y |
| Florida Betony | *Stachys floridana* | - | Y |
| Florida Pusley | *Richardia scabra* | - | Y |
| Foxtail, Yellow | *Setaria glauca* | Y | Y |

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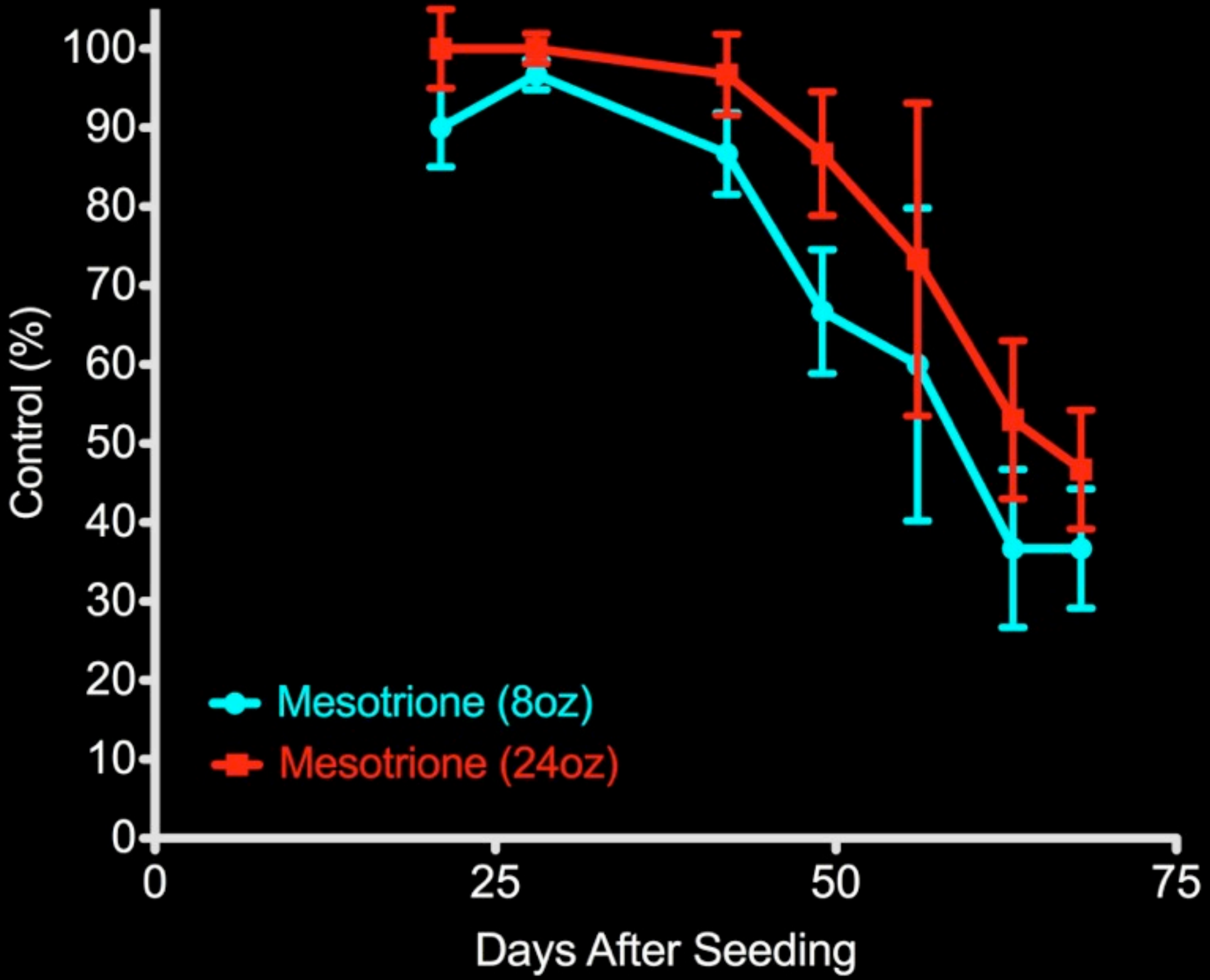
| Florida Pusley | *Richardia scabra* | - | Y |
| Foxtail, Yellow | *Setaria glauca* | Y | Y |

# *Poa* Control at Seeding with Tenacity

J Borger, Penn State Univ.

# Smooth Crabgrass Control With Mesotrione During Summer Establishment of Tall Fescue



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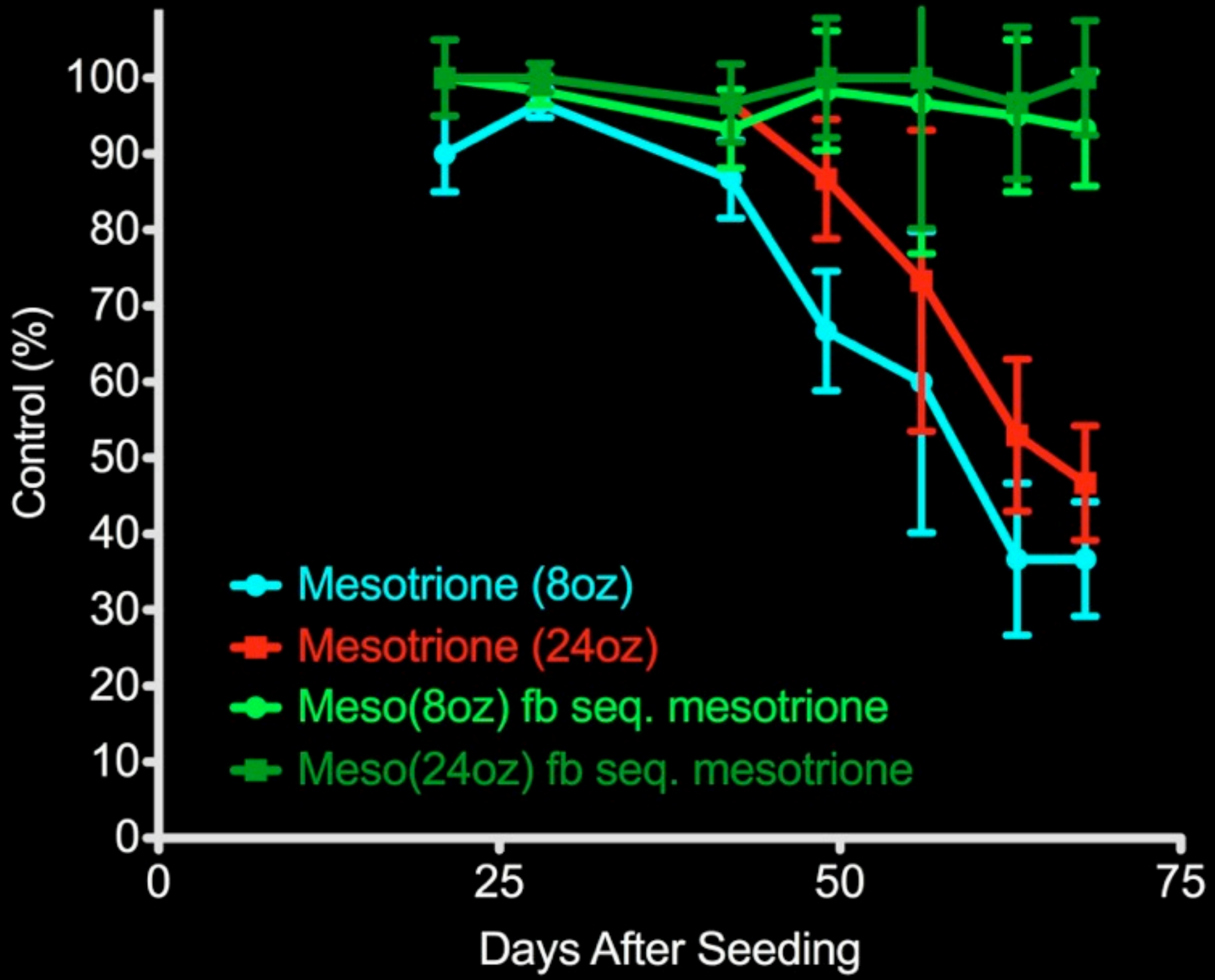


# Sequential Applications are Required with Tenacity

# Topramezone 2.8 SC

Golf, Lawn (residential & commercial), Sod Production, Parks, Picnic Grounds, Schools, Roadside, Cemeteries,

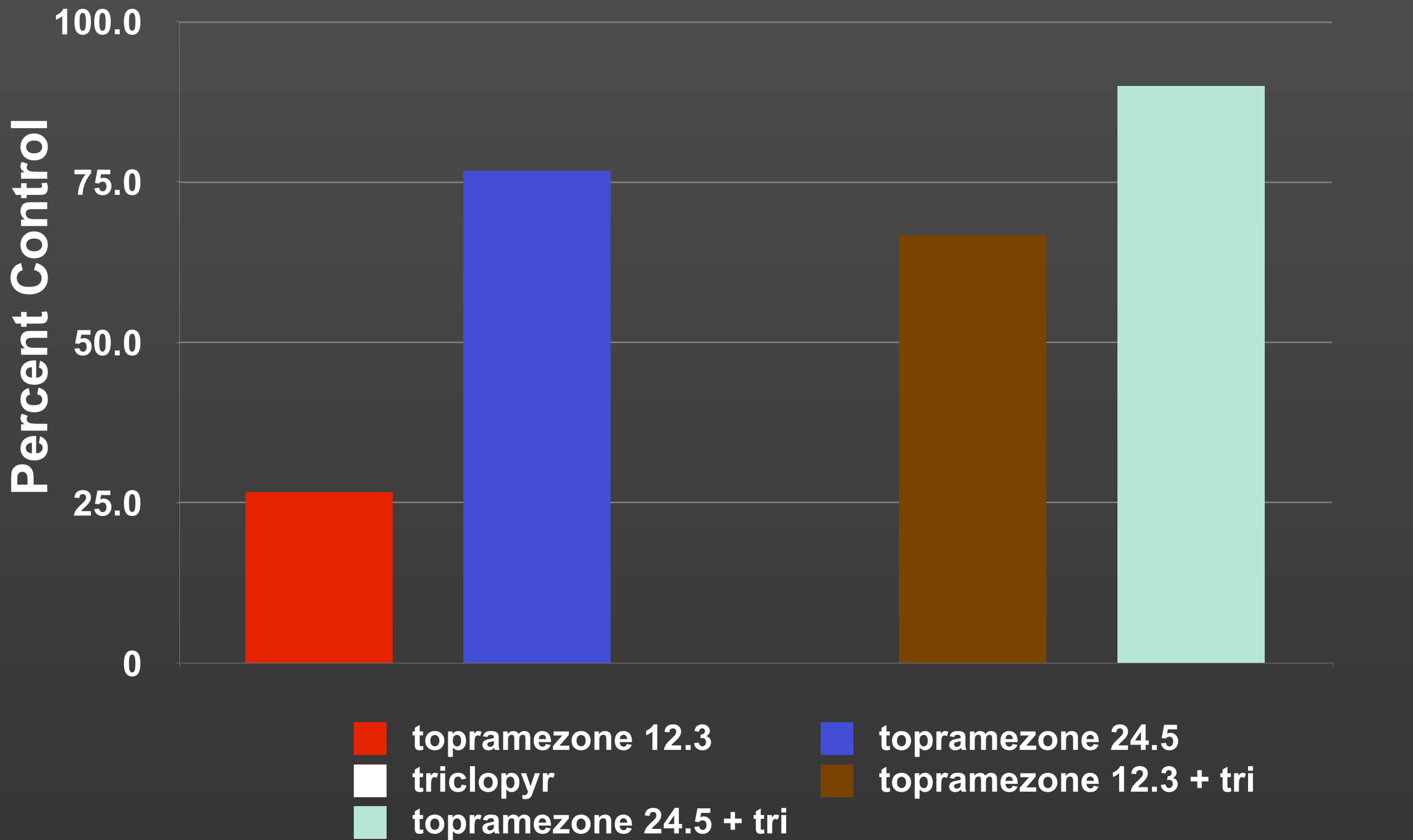
HPPD inhibitor for grassy weed control

Tall fescue, KBG, FF, PR

Rates of 0.5 to 2.0 fl oz/A with MSO surfactant

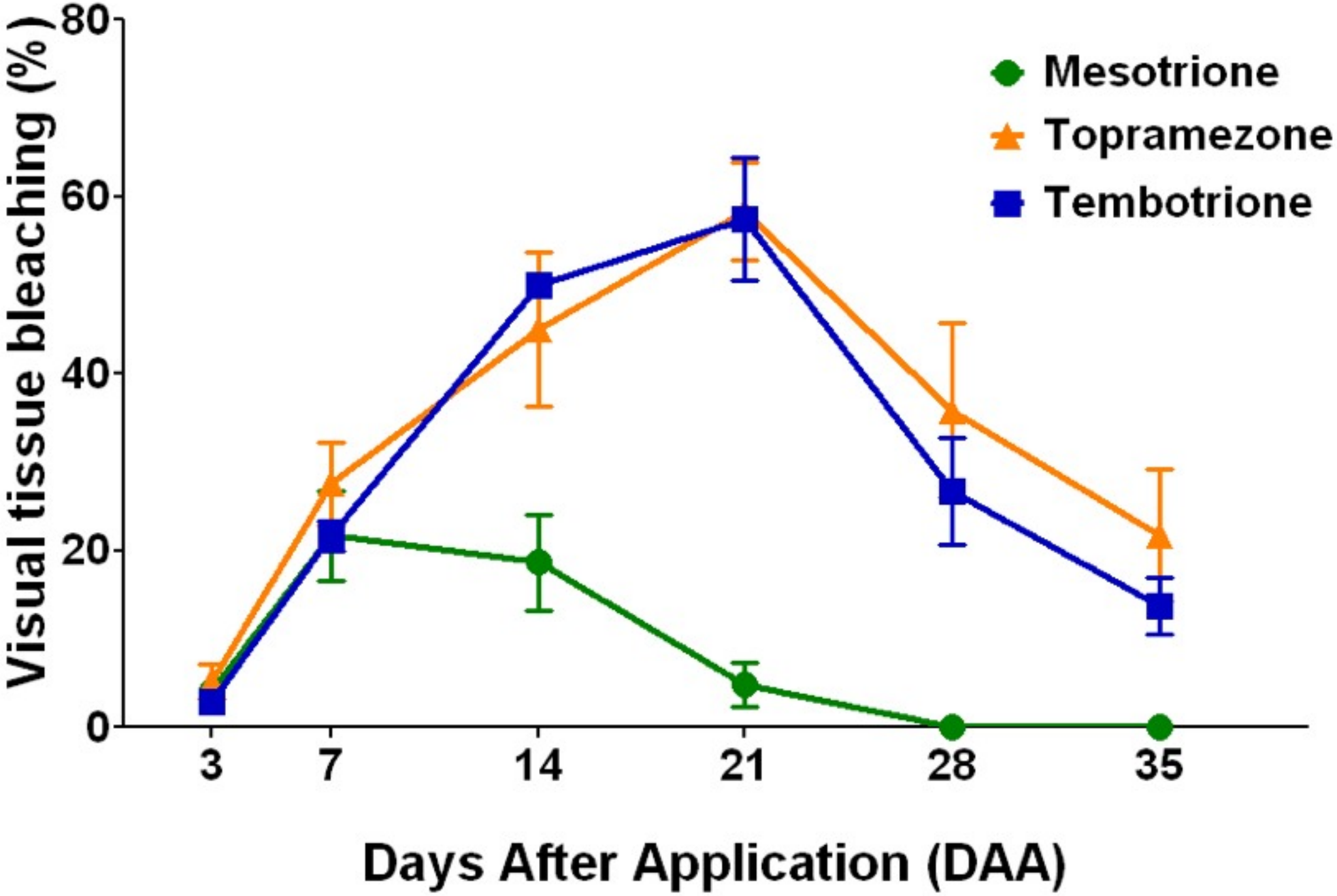
Yearly max at 4 fl oz/A

# 1-3 Tiller Smooth Crabgrass Control
# 9 WAT, Tennessee

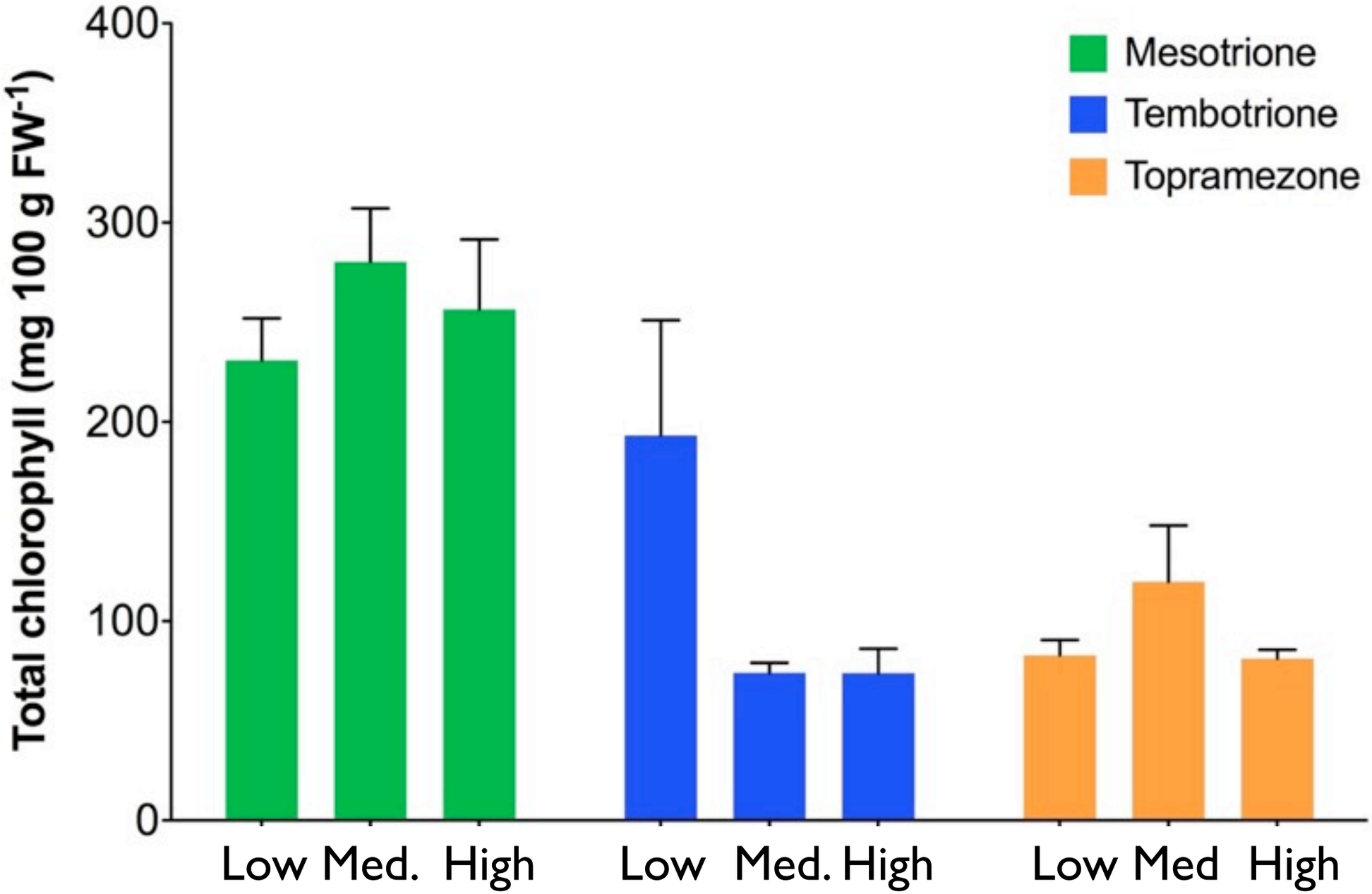



LSD (0.05) = 20

# Riviera Bermudagrass Bleaching

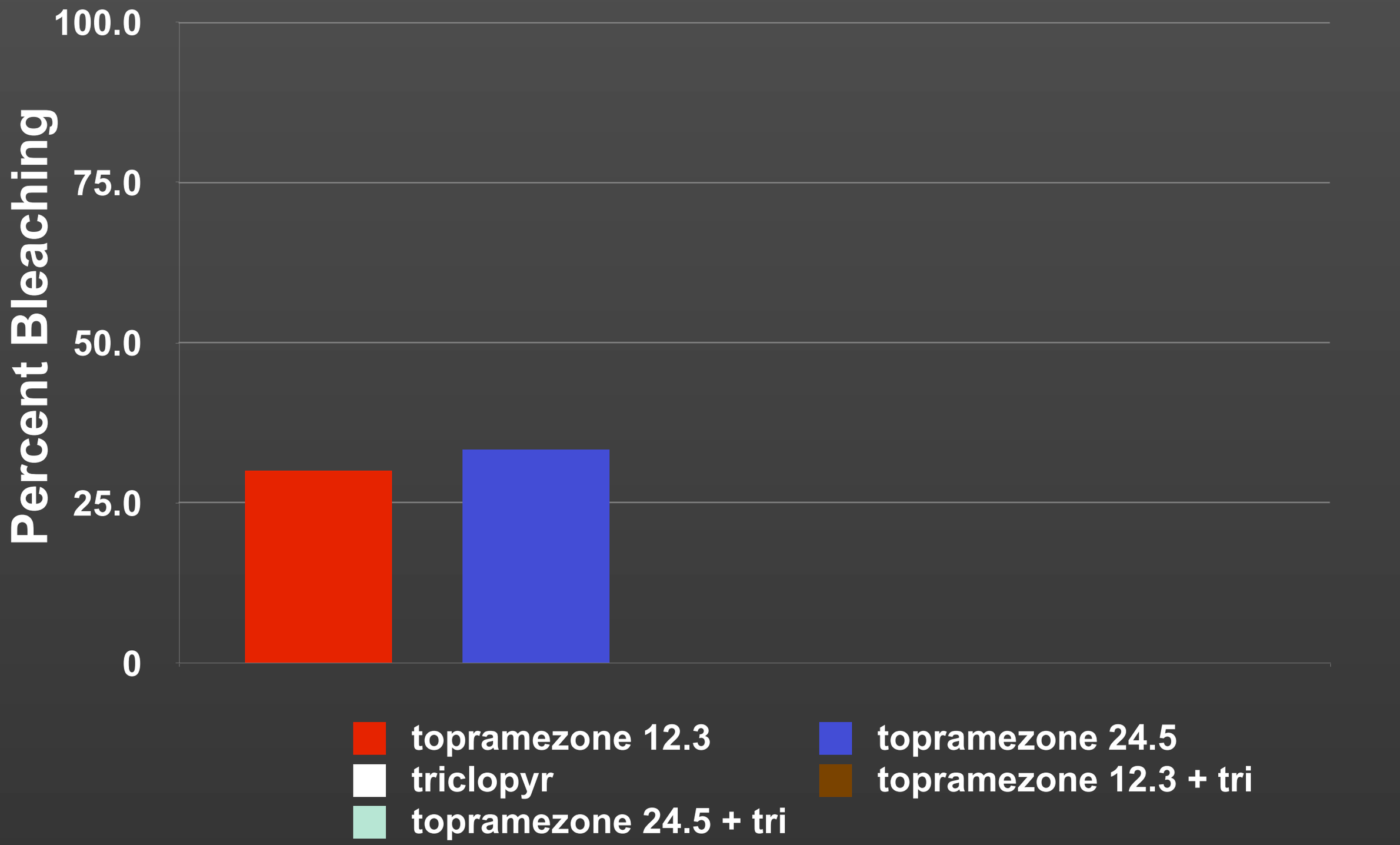


# Tifway Total Chlorophyll Concentration - 14 DAA



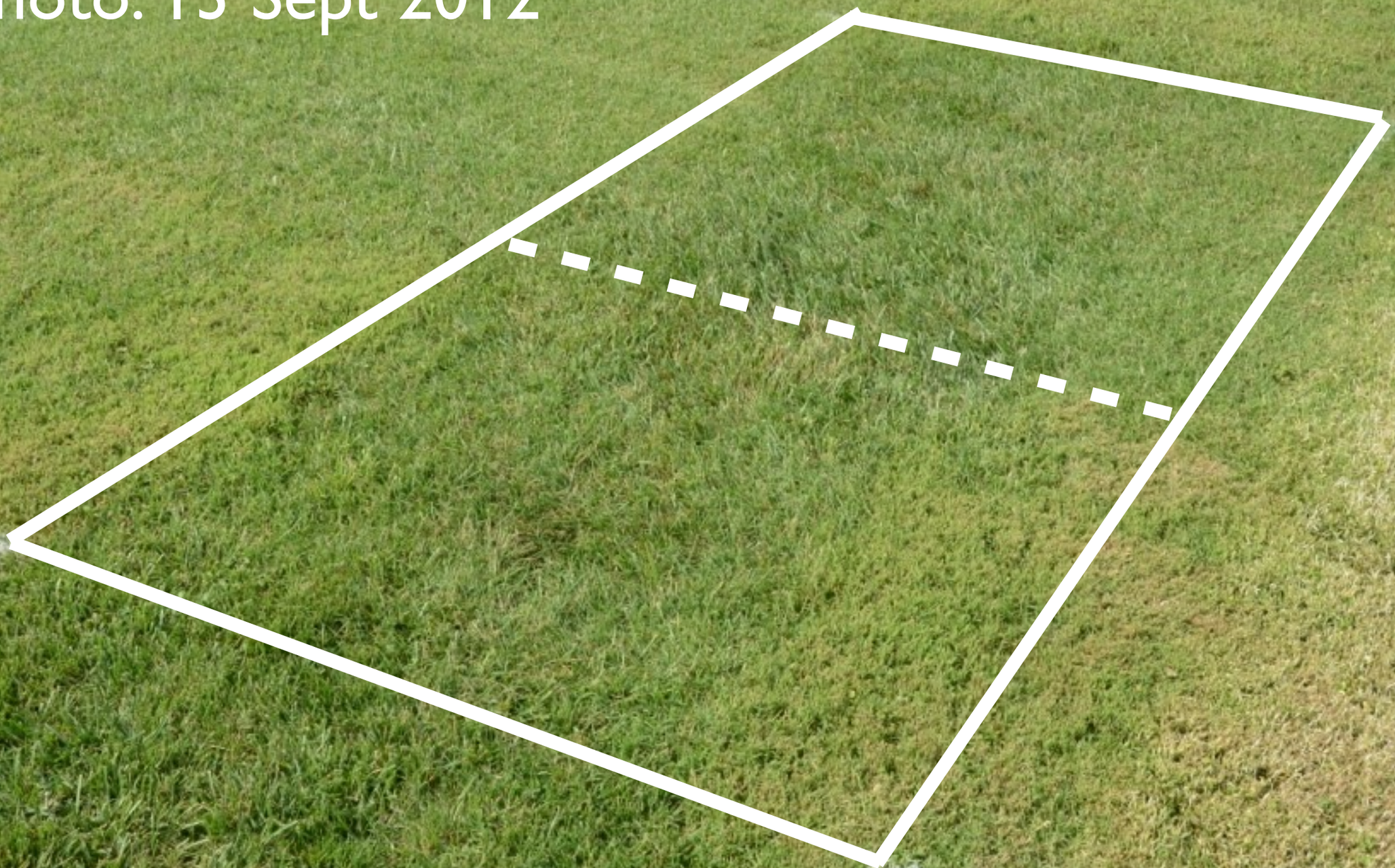
# Synergy with triclopyr

# 1-3 Tiller Smooth Crabgrass Bleaching
# 1 WAT, Tennessee




LSD (0.05) = 7

BAS 670 (0.5 oz) + Triclopyr (32 fl oz)
3 apps in 2010 + 3 apps in 2011
Photo: 13 Sept 2012



Topramezone 2.8 SC fit in sports turf will be goosegrass

| Herbicide | Rate | Turf | Interval |
|---|---|---|---|
| Tenacity | 5-8 fl oz | PR, TF, KBG | None |
| *Topramezone 2.8 SC* | *0.5-2 fl oz* | *TF, KBG* | *TBD* |
| Drive XLR8 | 64 fl oz | B, PR, TF, Z | None<br>(28 d for KBG, SP) |
| Auxins<br>(2,4-D, dicamba, etc) | See Label | See Label | 2nd to 4th Mowing |

**Topramezone labeling to be finalized in 2013*

| Weed Species Controlled | | Drive® XLR8 herbicide Rate | Additive Rate |
|---|---|---|---|
| **Grass Weeds** | | **Broadcast Application**<br>64 fl ozs of product per acre or 1.45 fl ozs per 1000 sq ft (0.75 lb ae/A) | Methylated seed oil at 1.5 pints per acre (0.55 fl oz per 1000 sq ft) |
| **Common Name** | **Scientific Name** | | |
| Barnyardgrass | *Echinochloa crusgalli* | | |
| Crabgrass, large[1,4] | *Digitaria sanguinalis* | | |
| Crabgrass, smooth[1,4] | *Digitaria ischaemum* | | |
| Foxtail, giant[1] | *Setari faberi* | | |
| Foxtail, green[1] | *Setari viridis* | | |
| Foxtail, yellow[1] | *Setari glauca* | | |
| Kikuyugrass[2,3] | *Pennisetum clandestinum* | | |
| Signalgrass, broadleaf[1] | *Brachiaria platyphylla* | | |
| Torpedograss[3] | *Panicum repens* | | |
| **Broadleaf Weeds** | | **Spot Application**<br>1.45 fl ozs of product per 1000 sq ft of treated area (0.75 lb ae/A)<br>Refer to footnotes in **Table 2** and **Table 3** for specific turfgrass or weed instructions. | |
| **Common Name** | **Scientific Name** | | |
| Bindweed, field | *Convolvulus arvensis* | | |
| Clover, hop | *Trifolium aureum* Pollich | | |
| Clover, red | *Trifolium pratense* | | |
| Clover, white | *Trifolium repens* | | |
| Daisy, English[2,5] | *Bellis perenne* | | |
| Dandelion, common[2] | *Taraxacum officinale* | | |
| Dollarweed | *Hydrocotyle umbellata* | | |
| Geranium, Carolina | *Geranium carolinium* | | |
| Medic, black | *Medicago lupulina* | | |
| Morningglory spp. | *Ipomea* sp. | | |
| Speedwell, common | *Veronica officinalis* | | |
| Speedwell, slender | *Veronica filiformis* | | |
| Speedwell, thymeleaf | *Veronica serpyllifolia* | | |
| Violet, wild | *Viola* sp. | | |

THE UNIVERSITY of TENNESSEE KNOXVILLE

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# The FUTURE of Turfgrass Weed Science

## Winter Annual Weeds Are On The Way

Saturday, August 25, 2012

Temperatures have begun to cool across much of Tennessee over the past few weeks with overnight lows falling below 60 degrees in certain locations. This cooler weather, combined with the elevated levels of soil moisture experienced across the eastern region of the state, will create a hospitable environment for the germination of winter annual weeds such as annual bluegrass and henbit . Turf managers interested in controlling these weeds with preemergence herbicides should

### Weed in Focus

Annual Bluegrass
*Poa annua*

### Upcoming Events

- **October 22**, ETGCSA Scholarship and Research Golf Tournament
  The Virginian, Bristol, VA
- **October 29**, MTGCSA Scholarship Fundraiser Golf Outing
  The Vanderbilt Legends Club, Franklin, TN
- **November 12**, MTGCSA Educational Meeting
  Brentwood Country Club, Brentwood, TN

### Resources


# Turf & Ornamental Field Day - September 12, 2013

University of Tennessee Turfgrass

www.facebook.com/UTturfgrass

Reader

News | UT Information | Weather | LaTex | Plant ID | Stats | Herbicide | Turf

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You are posting, commenting, and liking as University of Tennessee Turfgrass — Change to Jim Brosnan

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# University of Tennessee Turfgrass

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456

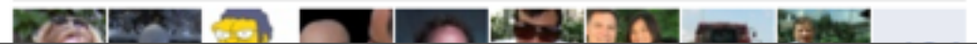
About | Photos | Likes | Notes

Highlights

Status | Photo / Video | Offer, Event +

Write something...

**193** Friends
Like University of Tennessee Turfgrass



See Your Ad Here

The weather this week will certainly be great fo...


2

# UT turfgrass

@UTturfgrass

Knoxville,TN · http://tennesseeturfgrassweeds.org

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**21** FOLLOWING

**170** FOLLOWERS

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