Weed Control on a Budget

J.T. Brosnan, Ph.D.
University of Tennessee
Spray X, Y, Z
Spray X, Y, Z
Maximize Effectiveness
Maximize Effectiveness

Wide Spectrum
Maximize Effectiveness

Wide Spectrum

Applied Correctly
Maximize Effectiveness

- Wide Spectrum
- Applied Correctly
- Broadleaves
Maximize Effectiveness

Wide Spectrum

Applied Correctly

Broadleaves

Grasses
Maximize Effectiveness

- Wide Spectrum
- Applied Correctly
  - Broadleaves
  - Grasses
  - Residual
  - Timing
Maximize Effectiveness

Wide Spectrum

Applied Correctly

Timing

Rate

Broadleaves

Grasses

Residual
<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Active Ingredient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barricade</td>
<td>prodiamine</td>
</tr>
<tr>
<td>Dimension</td>
<td>dithiopyr</td>
</tr>
<tr>
<td>Echelon</td>
<td>prodiamine + sulfentrazone</td>
</tr>
<tr>
<td>Pendulum</td>
<td>pendimethalin</td>
</tr>
<tr>
<td>FreeHand</td>
<td>pendimethalin + dimethenamid-P</td>
</tr>
<tr>
<td>Ronstar</td>
<td>oxadiazon</td>
</tr>
<tr>
<td>Specticle</td>
<td>indaziflam</td>
</tr>
</tbody>
</table>
Missing Window on PREs
Forsythia Bloom on 9 Dec. 2012 in Knoxville, TN
If you think you’ve potentially missed the window...
Dimension 2EW is a preemergence herbicide that controls weeds during germination. **Dimension 2EW does not control emerged broadleaf or grass weeds except crabgrass up to tillering stage of growth.** Apply prior to germination of target weeds to bare ground. Optimum weed control is obtained when applications are made to soil that is free of clods, weeds and debris such as leaves. Prior to applying, control existing vegetation by cultivation, hand weeding, or use of a postemergence herbicide. After applying Dimension 2EW, excessive soil disruption may breakdown the herbicide barrier. Minimal surface disruption such as raking should not break down the herbicide barrier. Following transplanting, care must be taken that soil or planting mixes have settled firmly through irrigation, rainfall or packing and that there are no cracks that would allow direct contact of this product to the plant roots or plant injury may occur.
What is tillered??

Will Not Control this Plant
What is tillered??

Will Not Control this Plant
What is tillered??

Will Not Control this Plant
What is tillered??

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What is tillered??

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What is tillered??

Will Not Control this Plant
Smooth Crabgrass Control (%) on 11 September 2012

- Dimension 2EW (32 fl oz)
- Dimension (32 fl oz) + NIS
- MSMA (2 lb ai) + NIS
- Drive (0.75 lb ai) + COC

Smooth Crabgrass Control End of 2012 Season
Why are Drive and MSMA so low?
Postemergence Smooth Crabgrass Control

Trts applied at 1-4 LF Stage on 28 April in Knoxville, TN (ETREC)
Postemergence Smooth Crabgrass Control

Trts applied at 3-5TL Stage on 22 June in Knoxville, TN (ETREC)
Need Something With Residual in Soil
Tenacity (8 fl oz) + Barricade (2.3 lb)
Drive (64 fl oz, with MSO) + Pendulum (6.3 pt)
Acclaim (28 fl oz) + Dimension (1.5 pt)
Solitare (2 lb) + Echelon (2.25 pt)

Treatments applied 4 May 2011 to plants averaging 1 tiller
Maximize Effectiveness

Wide Spectrum
- Broadleaves
- Grasses
- Residual

Applied Correctly
- Timing
- Rate
- Calibration
Maximize Effectiveness

Wide Spectrum

Applied Correctly

Broadleaves

Timing

Grasses

Rate

Residual

Calibration
POST Crabgrass Control with Specticle?
Non-tillered Smooth Crabgrass Control 35 DAT
Non-tillered Smooth Crabgrass
Control 35 DAT

Specticle (3.75 oz/A)
Non-tillered Smooth Crabgrass

Control 35 DAT

Specticle (3.75 oz/A)
Non-tillered Smooth Crabgrass Control 35 DAT

- Specticle (3.75 oz/A)
- Drive XLR8 + MS0 (64 fl oz)

Control (%)

- Soil Only
- Foliar Only
- Soil + Foliar

Bar labels:
- a
- b

The chart shows the control percentages for different treatments on non-tillered Smooth Crabgrass. The treatments are Specticle (3.75 oz/A) and Drive XLR8 + MS0 (64 fl oz).
Control at Various Stages of Growth in the Field
Smooth Crabgrass Control 12 WAFT in 2011

- Specticle (3.75 oz)
- Dimension (32 fl oz)
- Drive XLR8 (64 fl oz)

LSD = 19
Smooth Crabgrass Control (%)

- Specticle (3.75 oz)
- Dimension (32 fl oz)
- Drive XLR8 (64 fl oz)

Smooth Crabgrass Control 12 WAFT in 2012

LSD = 27

* indicates significant difference
Post Control with Specticle

Not claimed on product label
Activity on plants < 1 tiller via root uptake
Inconsistent responses in field
Rainfall?
Additional application flexibility in spring?
Weed Seed is in Soil Profile
Weed Seed is in Soil Profile
Volatility
What About Mowing?
<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Frequency</th>
<th>Yearly Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indaziflam</td>
<td>Single, Sequential</td>
<td>2.5 oz, 3.75 oz</td>
</tr>
<tr>
<td>Dimension</td>
<td>Single, Sequential</td>
<td>32 fl oz</td>
</tr>
<tr>
<td>Ronstar G</td>
<td>Single, Sequential</td>
<td>200 lb</td>
</tr>
<tr>
<td>Pendulum</td>
<td>Single, Sequential</td>
<td>101 fl oz</td>
</tr>
<tr>
<td>Barricade</td>
<td>Single, Sequential</td>
<td>37 oz</td>
</tr>
<tr>
<td>Echelon</td>
<td>Single, Sequential</td>
<td>36 fl oz</td>
</tr>
</tbody>
</table>

Applied PRE (or 8 wk later) in 2012
0.6 inches with a reel mower

2 inches with a rotary mower
Smooth Crabgrass Control 5 MAT in Knoxville, TN

Smooth Crabgrass Control (%)

- **0.6 in**
- **2 in**

- **Single**
- **Sequential**

Smooth Crabgrass Control 5 MAT in Knoxville, TN
Smooth Crabgrass Control 5 MAT in Knoxville, TN
Clippings Contain Nitrogen
Maximize Effectiveness

Wide Spectrum
- Broadleaves
- Grasses
- Residual

Applied Correctly
- Timing
- Rate
- Calibration
Budget = $5000
Budget = $5000
Budget = $5000
Budget = $5000
1% = $50

Budget = $5000
1% = $50

5% = $250

Budget = $5000
1% = $50
5% = $250
15% = $750
Budget = $5000
What is the reality?

Surveyed 195 applicators in NE

85% of applicators had calibration/mixing errors > 5%

60% of applicators had errors greater 10%

Errors ranged from 40% under application - 60% over application

4.26 million dollars

Make Sure Your Employees Can Calibrate
Practical Math for the Turfgrass Professional
Broadleaf Weeds
Maximize Effectiveness

Wide Spectrum

Applied Correctly

Timing

Rate

Calibration

Broadleaves

Grasses

Residual
<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Active Ingredients</th>
<th>Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive XLR8</td>
<td>quinclorac</td>
<td>Grasses, BLW</td>
</tr>
<tr>
<td>Solitare</td>
<td>quinclorac + sulfentrazone</td>
<td>Grasses, BLW, Sedges</td>
</tr>
<tr>
<td>Blindside</td>
<td>metsulfuron + sulfentrazone</td>
<td>BLW, Sedges</td>
</tr>
<tr>
<td>Q4 Plus</td>
<td>quin. + sulf. + 2,4-D + dicamba</td>
<td>Grasses, BLW, Sedges</td>
</tr>
<tr>
<td>Tribute Total</td>
<td>thiencarbazone + foramsulfuron + halosulfuron</td>
<td>BLW, Sedges</td>
</tr>
</tbody>
</table>
Perennial Weed Control
Early and Late Postemergence Control of Dallisgrass in Tall Fescue

J. T. Brosnan, G. K. Breeden, and M. T. Elmore, Department of Plant Sciences, University of Tennessee, Knoxville, TN 37996; and J. M. Zidek, Senior Research Scientist, ZedX Inc., Bellefonte, PA 16823

Corresponding author: J. T. Brosnan. jjbrosnan@utk.edu


Abstract
Dallisgrass (Paspalum dilatatum Poir.) is a problematic turfgrass weed throughout the southern United States. A two-year study was conducted evaluating applications of fluazifop at 105 g/ha, mesotrione at 280 g/ha, and fluazifop + mesotrione at 105 + 280 g/ha, respectively, for control of dallisgrass in tall fescue (Festuca arundinacea). Treatments were applied in early spring shortly after dallisgrass broke dormancy (< 160 growing degree days (GDD_{10C})) and early summer well after dallisgrass broke dormancy (> 500 GDD_{10C}). Yearly accumulated GDD_{10C} values were calculated using a base temperature of 10°C beginning on 1 January. Applied at < 160 GDD_{10C} in 2008, a single application of fluazifop provided 73% control of dallisgrass at 28 days after treatment (DAT) and 90% control at 76 DAT. When applied at > 500 GDD_{10C} in 2008, a single application of fluazifop only provided 46% and 0% control of dallisgrass at 28 and 76 DAT, respectively. Similar trends were also observed with sequential applications each year. Dallisgrass control with fluazifop + mesotrione was not greater than fluazifop alone at either timing. These data suggest dallisgrass is more susceptible to fluazifop when emerging out of dormancy in early spring.
### Materials and Methods

#### Herbicide Application Timing

<table>
<thead>
<tr>
<th>Timing</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>75 GDD</td>
<td>7 April</td>
<td>22 March</td>
</tr>
<tr>
<td>175 GDD</td>
<td>22 April</td>
<td>14 April</td>
</tr>
<tr>
<td>375 GDD</td>
<td>18 May</td>
<td>12 May</td>
</tr>
<tr>
<td>775 GDD</td>
<td>15 June</td>
<td>13 June</td>
</tr>
<tr>
<td>5 CDD</td>
<td>8 Sept.</td>
<td>9 Sept.</td>
</tr>
</tbody>
</table>
Control - Fluazifop - Year 1

% Control

WAT

75 GDD  175 GDD  375 GDD

775 GDD  5 CDD

= LSD
Why do we see better control in spring and fall?
Small Plants in Spring
2011 Daily Temperature in Knoxville, TN
2011 Daily Temperature in Knoxville, TN
2011 Daily Temperature in Knoxville, TN
Application Timing Affects Bermudagrass Suppression with Mixtures of Fluazifop and Triclopyr

J. T. Brosnan, G. K. Breeden, M. T. Elmore, and J. M. Zidek*

Bermudagrass is a troublesome weed of zoysiagrass golf-course fairways. Field research was conducted in 2009 and 2010 evaluating bermudagrass suppression with applications of fluazifop plus triclopyr at various timings. Three rates of fluazifop (0.10, 0.21, and 0.32 kg ai ha$^{-1}$) were applied with triclopyr (1.12 kg ae ha$^{-1}$) once six thresholds of growing-degree-day accumulation (GDD$^{10\text{C}}$) had been reached: 200, 450, 825, 1,275, 1,775, and 2,250 GDD$^{10\text{C}}$. Yearly accumulated GDD$^{10\text{C}}$ values were calculated with a base temperature of 10 C beginning on 1 January. Applications at 200 and 2,250 GDD$^{10\text{C}}$ suppressed bermudagrass ≥ 90% at 5 WAT each year. Increased rates of fluazifop did not provide additional bermudagrass suppression at these timings. Cooling accumulation models may be needed to time fall applications, as the 1,775 GDD$^{10\text{C}}$ timing in 2009 provided similar bermudagrass suppression to the 2,250 GDD$^{10\text{C}}$ timing in 2010. Late-spring and midsummer applications at 450 GDD$^{10\text{C}}$, 825 GDD$^{10\text{C}}$, and 1,275 GDD$^{10\text{C}}$ only suppressed bermudagrass 4 to 16% at 6 wk after treatment (WAT) in 2009 and 0 to 57% at 6 WAT in 2010. Zoysiagrass injury measured < 25% for all timings and decreased to 0 to 7% by 5 WAT each year. Future studies should evaluate bermudagrass suppression with other herbicides with the use of growing-degree-day and cooling accumulation models.

**Nomenclature:** Fluazifop; triclopyr; bermudagrass (*Cynodon dactylon* L. Pers.) ‘Riviera’; zoysiagrass (*Zoysia japonica* Steud.) ‘Zenith’.

**Key words:** Efficacy, golf course, growing-degree day, turf.

*Cynodon dactylon* es una maleza problemática en campos de golf con la grama *Zoysia japonica*. Se realizó una investigación de campo en 2009 y 2010 para evaluar la supresión de *Cynodon* con aplicaciones de fluazifop más triclopyr en varios tiempos. Tres dosis de fluazifop (0.10, 0.21 y 0.32 kg ha$^{-1}$) se aplicaron con triclopyr (1.12 kg ae ha$^{-1}$), una vez que se
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
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