Weed Management Update
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MOST Lawn Problems Result from Poor Turf Management Decisions

Mowing wrong height, not often enough
Fertilizer wrong time, too little...too much
Irrigation too much/little...poor coverage
Thatch makes lawn care 2X difficult
Compaction unhappy roots = unhealthy grass
Pests healthy grass = few weed, disease or insect problems = minimal pesticide use
Species Selection – wrong grass

Causes of Weed Problems in Turf

WHY WEEDS?

- Weed “seed bank” and soil disturbance
- No pre-plant weed control of tough perennials
- Poor cultural practices
- Wrong species/cultivar selection
- Other pest problems
- Planting low-quality seed or weedy sod

The turf is not competitive, and/or weeds are accidentally introduced.

Mowing Height Effects on Weed Invasion in 5 Turf Species

Mowing Tall Makes Lawn Care Easier

- 2 to 3 ½ inches
- Less turf stress
- Healthier and deeper roots
- Fewer weeds, insects and disease problems
- Less frequent mowing
Fine Fescue Mowing Height Study

3 inches                                1.5 inches

Crabgrass and yellow foxtail

Nitrogen Fertility Effect on Weed Invasion in 5 Turf Species

Evaluation of Mowing Height and Fertilizer Regime On Quality and Weed Invasion of Five Lawn Grasses.

Brad DeBels1, Shane Griffith2, Mark Garrison2, William Kreuser3, Eric Melby2 and Douglas Soldat2, (1)Soil Science, University of Wisconsin-Madison, Madison, WI, (2)University of Wisconsin-Madison, Madison, WI, (3)Cornell University, Ithaca, NY

Turf Species Effect on Weed Invasion

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Too Much Water...

- Squishy turf
- Shallow roots
- Poor drought resistance
- More soil compaction
- Needs more fertilization
- More rapid thatch formation
- Some insects are favored (grubs)
- More weeds
- Higher water bills

Necrotic Ring Spot

Ophiophlaeella (Leptosphaeria) korrae
Necrotic Ring Spot on Bluegrass

What “turns it on”?
- Excessive spring moisture
- Quick nitrogen in the spring
- Compaction, stress, thatch

Ascochyta Leaf Blight

- Seen on all turf species
- Stress-incited disease
  - drought
  - heat
- Most common when spring turns to summer
- Shows up where irrigation coverage is deficient
- Not lethal, but looks like it is

Not Enough Water...

- Lawn not as green, less dense
- More weeds that tolerate drought (crabgrass, bindweed, dandelions)
- Poor wear tolerance
- Stress-tracking on drought-stressed turf
- Certain diseases more common (Ascochyta leaf blight, dollar spot)
- Some insects are favored and damage is more severe (chinchbugs, winter mites)
**Turf Mite Damage**

- A March/April/May problem...especially with dry late winter/spring
- South- and west-facing sides of landscapes most affected
- Can kill the turf
- Preventable – winter watering, and spring watering if dry
- lambdacyhalothrin (Demand, Cyonara) or bifenthrin (Talstar)

**Annual Grassy Weeds**

- crabgrass
- goosegrass
- foxtails
- barnyardgrass

**Preemergence herbicides**

- benefin (Balan)
- benefin + trifluralin (Team)
- bensulide (Betasan)
- corn gluten meal (many brand names)
- dithiopyr (Dimension)
- isoxaben (Gallery) – broadleaf weeds only
- oxadiazon (Ronstar)
- pendimethalin (Pre-M, Pendulum, Scotts products)
- prodiamine (Barricade)
- siduron (Tapers) – for use at time of seeding
- Tenacity – short term pre; also post

**CONTROL – postemergence herbicides**

- Barnyardgrass
- Crabgrass
- Foxtails
- Goosegrass
- Pigweed spp.
- Sandbur (Wild)
- Spurge spp.

**Preemergence herbicides**

- oxadiazon (Ronstar)

**Tower**

- dimethenamid-p (DMTA-P)

- Preemergence herbicide
- Broad turf species safety
- 60 day control
- Weeds controlled
  - Barnyardgrass
  - Crabgrass
  - Foxtails
  - Goosegrass
  - Pigweed spp.
  - Sandbur (Wild)
  - Spurge spp.

**Components**

<table>
<thead>
<tr>
<th>Weed Group</th>
<th>Tower Use Rate Range for PCU (ppm)</th>
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<tbody>
<tr>
<td>Barnyardgrass</td>
<td>25</td>
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<tr>
<td>Crabgrass</td>
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<tr>
<td>Foxtails</td>
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<td>Goosegrass</td>
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<td>Pigweed spp.</td>
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<td>Sandbur (Wild)</td>
<td>25</td>
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<tr>
<td>Spurge spp.</td>
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</table>

**Notes:**
- Not for use on sandy soils or soils with low Ca concentration or when pH averages less than 5.0.
- Not for use in lawns with significant clover or perennial ryegrass, or in areas with clover and/or ryegrass; these species are sensitive to Tower and may be harmed.
- If Tower is used in a landscape or outdoor area that contains sensitive species, use the highest acceptable rate and contact sensitive species owners/land managers in advance to inform them of the application.
- If Tower is used on lawns, the application should be made at least 7 days before using a non-selective herbicide to control annual grasses, but not later than 5 days before a non-selective herbicide is applied to control other annual weeds.
### Preemergence Herbicides for Annual Bluegrass Control

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Trade Name (Examples)</th>
<th>Efficacy</th>
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<tr>
<td>atrazine</td>
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<td>bensulide</td>
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<td>dithiopyr</td>
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<tr>
<td>indaziflam</td>
<td>Specticle</td>
<td>E</td>
</tr>
<tr>
<td>mesotrione</td>
<td>Tenacity</td>
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<tr>
<td>oryzalin</td>
<td>Surfuran, others</td>
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<td>oxadiazon</td>
<td>Ronstar, others</td>
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<td>pendimethalin</td>
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<td>Barricade, others</td>
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<tr>
<td>pronamide</td>
<td>Kerb</td>
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<tr>
<td>simazine</td>
<td>Prinex, others</td>
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</table>

E = Excellent (90 to 100%), G = Good (80 to 89%), F = Fair (70 to 79%), P = Poor (<70%)

### Postemergence Crabgrass Control

- fenoxaprop p-ethyl (Acclaim Extra)
- quinclorac (Drive 75 DF, Drive XLR8)
- mesotrione (Tenacity)
- topramezone (Pylex)
- dithiopyr (Dimension)
- prodiamine + quinclorac (Cavalcade PQ)
- prodiamine + sulfentrazone (Echelon)

### Late Spring Crabgrass Control/Prevention

- dithiopyr (Dimension)
- prodiamine + quinclorac (Cavalcade PQ)
- prodiamine + sulfentrazone (Echelon)

### Postemergence Crabgrass Control

#### Tenacity (mesotrione)
- Pigment destroyers & inhibitors (bleachers)
- Two sequential applications will control mature crabgrass
- The addition of triclopyr (8 ounces of product per acre) increases the efficacy of Tenacity – providing effective control with a single application
- Pylex alone has shown good to excellent postemergence activity on tillered crabgrass in a single application.
- Inclusion of triclopyr also eliminates the bleaching or whitening
Grasses and Sedges Controlled by Tenacity

- Barnyardgrass (pre and post)
- Creeping bentgrass (post)
- Crabgrass species (pre and post)
- Foxtail, Yellow (pre and post)
- Goosegrass (pre and post)
- Nimblewill (post)
- Yellow nutsedge (post)
- Windmillgrass (post)

Postemergence Crabgrass Control

**Quinclorac (Drive 75 DF, XLRB)**

- Crabgrass has matured beyond the early post-crabgrass stage (tillered)
- Foliar-absorbed herbicides that require a surfactant and need to be applied at no less than 0.75 pounds of active ingredient (AI) per acre
- Quick crabgrass knockdown
- Will discolor and reduce the visibility of crabgrass in the canopy within three to five days

Combination Products with Quinclorac

- **Onetime** (quinclorac, dicamba and MCPP) from BASF
- **Quincept** (2,4-D, quinclorac and dicamba) from Nufarm Americas
- **Q4 Plus** (quinclorac + sulfentrazone + 2,4-D + dicamba) from PBI Gordon
- **Solitare** (quinclorac + sulfentrazone) from FMC Professional Products
- Provide excellent broadleaf weed control with activity on grassy weeds.

Perennial Weedy Grass Species

- Tall fescue
- Quackgrass
- Bromegrass
- Bentgrass
- Redtop
- Orchardgrass
- Zoysiagrass
- Bermudagrass
- *Poa annua*
- *Poa trivialis*
Grasses and Sedges Controlled by Tenacity

- Barnyardgrass (pre and post)
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- Crabgrass species (pre and post)
- Foxtail, Yellow (pre and post)
- Goosegrass (pre and post)
- Nimblewill (post)
- Yellow nutsedge (post)
- Windmillgrass (post)

Creeping Bentgrass Control with Tenacity

Windmillgrass

- Tenacity (mesotrione)
- 3-4 sequential applications
  (4 oz = 0.125 lb. active/acre)
- Use NIS (0.2 v/v)
- Warm-season perennial

Nimblewill

- Tenacity (mesotrione)
- 3-4 sequential applications
  (4 oz = 0.125 lb. active/acre)
- Use NIS (0.2 v/v)
- Warm-season perennial

Tenacity (mesotrione) on nimblewill...and Pylex (topramezone) is similarly effective
Quackgrass Control with Tenacity?

Pylex (topramezone)  
BASF

- Postemergence herbicide
- Safe for cool-season grasses
- Active on bermudagrass (multiple applications)
- Good control of goosegrass
- Good activity on crabgrass, nimblewill

Pylex herbicide controlling bermudagrass in bluegrass

Fountain Grass  
(Pennisetum alopecuroides)

- Drive XLR8 (quinclorac)
- Split applications (15-20 days)
- 0.75 lb. active/1000 sq ft
- 3 tablespoons XLR8/gallon (add 1.5 tablespoons MSO/gal)
- Consumer products containing quinclorac require 3-4 applications (10-15 days)

Dicot Weed Control

Perennials
- Dandelion, clover, bindweed, thistle, plantain, violet

Annuals
- Spurge, puncturevine, oxalis, purslane

Prevention
- Proper establishment
- Healthy turf

Herbicides
- Gallery, Portrait (isoxaben) is an effective preemergence herbicide for broadleaf/dicot weeds; poor on grasses
- Many postemergence products

Perennial Dicot Weeds are Difficult to Control

- Perennials are perennial for a reason
- Control is contingent upon herbicide uptake and translocation
- Death of the weed may be slow
- Mature weeds may not be controlled completely
Postemergence Broadleaf Herbicides

- 2,4-D (many names, often with other herbicides)
- dicamba (Banvel)
- MCP, mecoprop (many brands)
- MCPA (many)
- dichlorprop
- triclopyr (Turflon Amine, Turflon Ester)
- clopyralid + triclopyr (Confront)
- quinclorac (Drive)
- clopyralid (Lontrel)
- mesotrione (Tenacity)

Standard 3-Way Mixes

<table>
<thead>
<tr>
<th>Herbicide Signal Word</th>
<th>2,4-D</th>
<th>MCP</th>
<th>Dicamba</th>
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<tr>
<td>Aes Amine-D Danger</td>
<td>1.22</td>
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<td>Trimec 1000 Warning</td>
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<td>0.11</td>
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<tr>
<td>Trimec 992 Danger</td>
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<td>0.11</td>
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<td>Triplet - Low Odor</td>
<td>1.19</td>
<td>0.32</td>
<td>0.11</td>
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<td>Triplet - Selective</td>
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<td>0.32</td>
<td>0.11</td>
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<td>Triplet SF</td>
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<td>0.11</td>
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<td>Lesco Three-Way</td>
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<td>0.11</td>
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<tr>
<td>Trimec Classic</td>
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<td>0.27</td>
<td>0.11</td>
</tr>
</tbody>
</table>

PBI Gordon Has 8 “Trimecs”!

1. Super Trimec
2. Trimec 1000
3. Trimec 992
4. Trimec – Bentgrass Formula
5. Trimec Classic
6. Trimec LAF – 637
7. Trimec Plus
8. Trimec Southern

NuFarm Has Even More Choices!

1. 4-Speed (Pyraflufen + 2,4-D, MCP, Dicamba)
2. 4-Speed XT (Pyraflufen + 2,4-D, Triclopyr, Dicamba)
3. Cool Power (Ester Triclopyr, MCPA, Dicamba)
4. Escalade 2 (2,4-D, Fluroxypyr, & Dicamba)
5. Horsepower (MCPA, Triclopyr, & Dicamba)
6. Quincept (2,4-D, Drive, & Dicamba)
7. (3) different “Triplet”’s (Low odor, Sensitive & SF)
8. Change Up (MCPA, fluroxypyr, dicamba)
9. Elliptical (2,4-D, Fluroxypyr, & Dicamba)
10. Millennium Ultra 2 (2,4-D, Clopyralid, & Dicamba)

Tenacity for Broadleaf Weed Control

- Tenacity has good activity against dandelions and fair activity against clover and black medic
- A second application is required in order to control more mature broadleaf weeds
- A single application of Tenacity alone will result in suppression of the weed, followed by regrowth in about 42 to 56 days
- Better broadleaf activity is seen when combined with dicamba, fluroxypyr or triclopyr
- Tenacity does not combine well with Quicksilver, Dismiss or the phenoxys

Using Tenacity Effectively for Broadleaf Weed Control
**Defendor (florasulam)**
- Effective weed control under low temperatures permitting early season broadleaf weed control
- Applications made in the fall/winter will provide effective control of winter annual and perennial weeds, such as chickweed, white clover and shepherd’s purse
- Effective at extremely low use rates (0.013 lb. a.i./A)
- Leaf and root absorption
- Labeled for use on all cool- and warm-season turf species
- Recommended as a tank-mix with Dimension

**Blindside**
- Sulfentrazone and metsulfuron-methyl
- Safe on bluegrass, tall fescue, bermudagrass, zoysiagrass
- Post control of large number of weeds
  - Black medic
  - Clover
  - Dandelion
  - Knotweed
  - Kochia
  - Mallow
  - Spurges
  - Wild violet
  - Wood sorrel
- Suppresses annual grasses

**Herbicides Safe for Seedling Turf**

**Siduron (Tugraan)**
- PREEMERGENCE
  - can be used at seeding to provide crabgrass control
  - safe for cool-season grasses
  - very short residual; repeat applications every 3-4 weeks for extended control

**Dithiopyr (Dimension and others)**
- PREEMERGENCE/EARLY POSTEMERGENCE
  - controls annual grasses
  - safest of the typical PRE herbicides
  - can be used usually after the second mowing

**Herbicides Safe for Seedling Turf**

**Mesotrione (Tenacity)**
- PREEMERGENCE/POSTEMERGENCE
  - can be used at seeding (preemergence)
  - can be used as early as 28 days after emergence according to the label
  - research suggests it can be applied earlier with little risk to seedlings
  - controls crabgrass and many broadleaf weeds BOTH pre- and postemergence

**Quinclorac (Drive and many trade names)**
- POSTEMERGENCE
  - can be used 20 days after emergence
  - can be applied earlier with little risk of damage
  - do not use MOS with seeding turf
  - controls crabgrass and many broadleaf weeds POST

**Carfentrazone (QuickSilver)**
- POSTEMERGENCE
  - contact broadleaf herbicide
  - no restrictions for use on seeding turf
  - multiple applications may be required

**Quinclorac + Carfentrazone (SquareOne)**
- POSTEMERGENCE
  - can be used as early as 7 DAE
  - controls crabgrass and many broadleaf weeds

**Herbicides Safe for Seedling Buffalograss**

**Quinclorac (Drive)**
- Excellent control of young annual grassy weeds (except goosegrass), as well as some annual and perennial broadleaf weeds (especially if in seeding stages).
- Large safety margin.

**Carfentrazone (QuickSilver)**
- Excellent and rapid (24 hour) control of seeding broadleaf weeds, including purslane and spurge. Will enhance effectiveness of quinclorac when applied as a tank mix. Very low use rate, but high safety margin.
Postemergent Herbicide “Failure”

- Weeds curl and discolor, but don’t die
- Weeds appear to have died, but come back
- Reasons...
  - Weed species
  - Weed health
  - Weed age
  - Post-application management of lawn

Fiesta Herbicide

- **Best results**
  - 3 applications of an 8 percent solution applied at 2.5 gallons per 1,000 square feet at 21-day intervals
  - Very rapid burndown of weeds
  - Can discolor the turf by turning it dark green or black if used in hot weather
  - Use in cooler weather (50 to 65°F)
Fiesta on Thistle

Fiesta on Dandelion

Fiesta on Black Medic

Roundup (glyphosate) Tolerant Perennial Ryegrass

- Mature Gly-Rye™ from Jacklin Seed is tolerant to glyphosate applications, at recommended rates, as long as temperatures are above 50°F
- Gly-Rye™ seedlings are tolerant, as long as the application is made when less than 2 weeks old, or after 6 weeks old
- Avoid glyphosate application at 3 to 5 weeks after emergence
- Optimal (safest) glyphosate rate is 0.25 pound of acid equivalent per acre (8 to 12 fluid ounces of product, depending on the formulation)
- JS501 and Replay are the cultivars

Herbicide Resistance Defined

Herbicide resistance can be defined as the acquired ability of a weed population to survive a herbicide application that previously was known to control the population.

Herbicide tolerance is the inherent ability of a species to survive and reproduce after herbicide treatment. There has been no selection acting on the tolerant weed species, and there has been no change in the weed species lack of response to the herbicide over time.
Table 2. Modes of action commonly used by turfgrass managers.

<table>
<thead>
<tr>
<th>Mode of action</th>
<th>NGA</th>
<th>RR</th>
<th>Active ingredient</th>
<th>Trade name</th>
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<tbody>
<tr>
<td>Herbicide</td>
<td>A</td>
<td>B</td>
<td>Cyanoalkylphosphonates (CAP)</td>
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Herbicide Resistant Weeds in Turf Globally

<table>
<thead>
<tr>
<th>#</th>
<th>Species</th>
<th>Common Name</th>
<th>Country</th>
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<td>Glyphosate</td>
<td>Glyphosate</td>
</tr>
</tbody>
</table>

1.2 fl oz x 2 in Spring 2012 Blacksburg CC- Blacksburg, VA

Image Taken

Fall 2012
Questions?

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<table>
<thead>
<tr>
<th>Fungicide</th>
<th>Product Name</th>
<th>Efficacy</th>
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<tbody>
<tr>
<td>azoxystrobin</td>
<td>Heritage</td>
<td>Fair to good</td>
</tr>
<tr>
<td>azoxystrobin</td>
<td>Headway</td>
<td>Good</td>
</tr>
<tr>
<td>iprodione</td>
<td>Chipco 26GT</td>
<td>Good</td>
</tr>
<tr>
<td>iprodione</td>
<td>Raven, Lesco</td>
<td>Unknown</td>
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<tr>
<td>iprodione</td>
<td>18 Plus, Iprodione Pro</td>
<td>Unknown</td>
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<tr>
<td>metconazole</td>
<td>Tourney</td>
<td>Good</td>
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<tr>
<td>myclobutanil</td>
<td>Eagle</td>
<td>Fair to good</td>
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<tr>
<td>propiconazole</td>
<td>Banner MAXX, Spectator</td>
<td>Fair to good</td>
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<tr>
<td>thiophanate</td>
<td>Cleary’s 3336, Fungo, T-Storm</td>
<td>Poor to fair at current labeled rates</td>
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<tr>
<td>triticonazole</td>
<td>Trinity, Triton</td>
<td>Fair to good</td>
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First application in May when soil temperature at 2-inch depth reaches 65 F; make second application 4 weeks later; 3rd application 4 weeks after second