

# TURF: INSECT CONTROL IN COMMERCIAL TURF

Will Hudson, Extension Entomologist

## Note on insecticide selection and use for various turfgrass sites:

Not all turfgrass sites are created equal. It is important to read the label on the product before purchasing an insecticide for a particular site use. An insecticide may not be labeled for all turfgrass uses (e.g., lawns, athletic fields, sod farms, or golf courses). Some products are only labeled for use on golf courses or sod farms. For example, Dursban 50W (chlorpyrifos) is not labeled for use on residential or commercial lawns. Furthermore, Orthene (acephate) formulations are labeled for use against fire ants in residential and commercial lawns, but not other pests.

In some instances, manufacturers will add “GC” as part of the title to inform users that a product can be used on golf courses when other formulations of that product are not labeled for that site. For example, Allectus SC is not labeled for use on golf courses but Allectus GC SC is. Labeling for sod farms will also follow similar rules. For example, Merit 0.5G is not to be used on sod farms, but Merit 2 and Merit 75WP are labeled for use on sod farms.

If product restrictions are noted on the label, they may appear as a note next to the product names in this publication. For example, when you read, “landscape turf only” that product is not available for use on golf courses or sod farms. When a product labeled for these other sites is available it is included but it may not have any restrictions noted. If no restrictions are noted, the product is likely labeled for

general use on turfgrass or on all turfgrass sites. The label on your individual product may vary from the online version of the manufacturer’s label, therefore abide by all restrictions on the product label if they differ from those presented in this guide.

Restricted entry intervals (REI) listed are for sod farm use. For landscape sites, re-entry is allowed once sprays have dried completely.

**Restricted Use Pesticides (RUPs)**, those that only a certified pesticide applicator may use, supervise the use of, or purchase, will be noted. Uncertified pesticide applicators may not purchase, use or supervise the use of these products.

**Protection of pollinators:** Managed landscapes often contain flowering plants and can be important foraging sites for bees and other pollinators. Many insecticides are extremely toxic to bees, and others can affect colony health with repeated exposure. Use extreme care when applying insecticides to flowering plants, including turfgrasses. The neonicotinyl insecticides (MOA 4A) have systemic activity and can move to pollen and nectar if applied to plants in bloom. If there are flowering weeds, such as clover, in the turf, the blossoms should be mowed before application of this class of insecticide. Read and follow all restrictions on the labels, as there have been changes made recently to neonicotinyl use instructions

PESTS	INSECTICIDE	MOA	RATE	REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
Imported Fire Ants/ Ants	<b>BAIT TREATMENTS</b>				<p>The most effective method for control of ants over a broad area is the use of a broadcast bait 2 times per year (spring/fall) coupled with individual mound treatments as needed.</p> <p><b>Broadcast Bait Treatments:</b></p> <p>Broadcast baits are used when ants are actively foraging for food (typically, warm, dry days in spring and fall). Some baits work within 48 hrs, some may take a month. Avoid applying baits just before or after irrigation or rain.</p> <p><b>Individual Mound Treatments:</b></p> <p><b>Do not disturb mounds before treatment.</b></p> <p><i>Drenches:</i> Drench mounds when queen and brood are located close to soil surface on warm, dry days. Generally, it takes 1-2 gallons of water to drench a fire ant mound effectively.</p> <p><i>Granules:</i> Scatter granules around the edge of the nest, not on top.</p> <p><i>Dusts:</i> Dust evenly over top mound.</p>
	<i>indoxacarb</i> Advion	22A	4 Tbsp/mound or 1.5 lb/A	24 H/ –	
	<i>metaflumizone</i> Siesta	22B	2-4 Tbsp/mound or 1-1.5 lb/A	12 H/ –	
	<i>hydromethylnon</i> Amdro	20A	5 Tbsp/mound or 1-1.5 lb/A	12 H/ –	
	<i>methoprene</i> Extinguish Plus	7A	2-5 Tbsp/mound or 1.5 lb/A	12 H/ –	
	<b>MOUND DRENCH TREATMENTS</b>				
	<i>acephate</i> Orthene 75WP Orthene 97	1B	1 oz/5 gal 0.75 oz/5 gal	24 H/ –	
	<i>bifenthrin</i> Talstar GC Flowable	3A	1 tsp/gal	12 H/ –	
	<i>carbaryl</i> Sevin SL	1A	0.75 fl oz/gal	12 H/ –	
	<i>chlorpyrifos</i> Dursban 50W (golf courses & sod farms only) Dursban Pro	1B	<b>RUP</b> 0.24 oz/gal 1 fl oz/2 gal	24 H/ –	
	<i>deltamethrin</i> DeltaGard GC 5SC	3A	1.5 fl oz/gal		

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PESTS	INSECTICIDE	MOA	RATE	REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
Imported Fire Ants/ Ants  (continued)	<b>MOUND DRENCH TREATMENTS</b>				
	<i>imidacloprid + bifenthrin</i> Allectus GC SC (golf courses & sod farms only)	4A + 3A	0.33 fl oz/gal	12 H/ -	
	Allectus SC (landscape turf only)		0.33 fl oz/gal		
	<i>lambda-cyhalothrin</i> Scimitar CS (landscape turf only)	3A	0.5 fl oz/2.5 gal	12 H/ -	Many generic formulations of the pyrethroid insecticides are available for use on commercial turf.
	<i>permethrin</i> Astro (landscape turf only)	3A	1.6 fl oz/gal	12 H/ -	
	Scimitar GC	3A	0.5 fl oz/2.5 gal	12 H/ -	
	<i>spinosad</i> Conserve		0.1 fl oz/gal	4 H/ -	
	<b>DRY MOUND TREATMENTS</b>				
	<i>acephate</i> Orthene 75WP	1B	1-2 tsp/mound	24 H/ -	
	<i>cyfluthrin</i> Bayer Fire Ant Killer	3A	1 tsp/mound	12 H/ -	
	<i>deltamethrin</i> Bengal Ultra Dust Fire Ant Killer 0.05% Terro Fire Ant Killer 0.05% DeltaGard G (landscape turf only)	3A	1 Tbsp/mound 1 Tbsp/mound 2 Tbsp/mound**	12 H/ -	** Follow with 1-2 gallons water for best results
	<i>imidacloprid + bifenthrin</i> Allectus GC (golf course & sod farms only) Allectus G (landscape turf only)	4A + 3A	4 oz/mound**  4 oz/mound**	12 H/ -	** Follow with 1-2 gallons water for best results
	<b>BROADCAST TREATMENTS</b>				
	<i>bifenthrin</i> Talstar GC Flowable Talstar EZ Golf Granular	3A	0.5 fl oz/1000 sq ft 2.3-4.6 lb/1000 sq ft	12 H/ -	
	<i>carbaryl</i> Sevin SL	1A	3 fl oz/1000 sq ft	12 H/ -	
	<i>chlorpyrifos</i> Dursban 50W (golf course & sod farms only) Dursban Pro	1B	<b>RUP</b> 16 lb/A  1.5 fl oz/1000 sq ft	24 H/ -	

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PESTS	INSECTICIDE	MOA	RATE	REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
Imported Fire Ants/ Ants <i>(continued)</i>	<b>BROADCAST TREATMENTS</b>				
	<i>cyfluthrin</i> Tempo SC Ultra <i>(landscape turf only)</i>	3A	8 ml/1000 sq ft	12 H/ –	
	Tempo WP Ultra <i>(landscape turf only)</i>		5-10 g (1-2 scoops)/1000 sq ft		
	Tempo WP GC <i>(golf courses &amp; sod farms only)</i>		1 packet/7,800 sq ft		
	<i>deltamethrin</i> DeltaGard GC 5SC DeltaGard T&O 5SC <i>(landscape turf only)</i>	3A	1.5 fl oz/gal 1.5 fl oz/gal	12 H/ –	
	DeltaGard G <i>(landscape turf only)</i>		1.5 fl oz/gal		
<i>fipronil 0.01%</i> Chipco Top Choice	2B	2 lb/1000 sq ft	24 H/ –		
<i>imidacloprid + bifenthrin</i> Allectus GC SC Allectus SC <i>(landscape turf only)</i>	4A + 3A	1.32-1.65 fl oz/1000 sq ft 1.32-1.65 fl oz/1000 sq ft	12 H/ –		
Allectus GC Allectus G <i>(landscape turf only)</i>		1.7-2.9 lb/1000 sq ft 1.7-2.9 lb/1000 sq ft			
<i>lambda cyhalothrin</i> Scimitar CS <i>(landscape turf only)</i>	3A	7 ml/1000 sq ft	12 H/ –		
Scimitar GC		7 ml/1000 sq ft			
Bees and Wasps (burrowing)	<i>acephate</i> Surrender, others	1B	1-2 tsp/hole <i>(do not exceed this amount in 1 sq ft)</i>	24 H/ –	Apply in late afternoon or early evening at insect entrance/exit holes.  Bee, wasp, and hornet sprays in pressurized cans are also effective. Follow label instructions.
	<i>carbaryl</i> 10% Sevin granules	1A	1.4-1.9 lb/1000 sq ft <i>Water in after application</i>	12 H/ –	
	Orthene 75WP	1B	1-2 tsp/hole <i>(do not exceed this amount in 1 sq ft)</i>	24 H/ –	
	various pyrethroids*	3A	See label		
Billbugs	<i>bifenthrin</i> Talstar EZ Golf Granular Talstar GC flowable	3A	1.15-2.3 lb/1000 sq ft 0.25-0.5 fl oz/1000 sq ft 6 fl oz	12 H/ –	The sporadic occurrence and multiple generations of this pest makes its appearance unpredictable. Some areas that consistently experience billbug injury may be treated in a prophylactic manner.
	<i>carbaryl</i> Sevin SL	1A	6-8 oz/1000 sq ft or 8 qt/A	12 H/ –	

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Billbugs <i>(continued)</i>	<i>chlorantraniliprole</i> Acelepryn	28	8-20 oz	4 H/ –	
	<i>chlorpyrifos</i> Dursban 50W	1B	<b>RUP</b> 2-4 lb/A	24 H/ –	
	<i>chlorthiandin</i> Arena 50WDG Arena 0.5G	4A	8 oz/A 50 lb/A	12 H/ –	
	<i>clothiaidin + bifenthrin</i> Aloft GC SC Aloft LC G	4A + 3A	0.27-0.44 fl oz/1000 sq ft 1.8-3.6 lb/1000 sq ft	12 H/ –	
	<i>imidicloprid</i> Merit 75WSP Merit 0.5G	4A	1.6 oz/8250 sq ft or 8.6 oz/A 1.4 lb/1000 sq ft or 60 lb/A	12 H/ –	
	<i>imidacloprid + bifenthrin</i> Allectus GC SC Allectus GC	4A + 3A	<b>RUP</b> 0.4-1.65 fl oz/1000 sq ft 1.7-2.9 lb/1000 sq ft	12 H/ –	The sporadic occurrence and multiple generations of this pest makes its appearance unpredictable. Some areas that consistently experience billbug injury may be treated in a prophylactic manner.
	<i>trichlorfon</i> Dylox 420 SL Dylox 6.2 G	1B	4.6-6.9 fl oz/1000 sq ft (200-300 fl oz/A) 3 lb/1000 sq ft or 130 lb/A		For use on residential and golf course turf only.  Not for sod farm use.
	NOTE: Premixed formulations of systemic insecticides with pyrethroids are available (Allectus, Aloft). These may provide control of multiple pests with a single spray.				
Chinch bugs	<i>acephate</i> Orthene 75WP Orthene 97 <i>(golf courses &amp; sod farms only)</i>	1B	1.2-2.4 oz/1000 sq ft 0.9-1.8 oz/1000 sq ft	24 H/ –	Reducing the number of treatments and applying spot treatments (which is most effective especially early in the season) will allow for the conservation of natural enemies, as native parasites and predators can play a significant role in chinch bug management.
	<i>bifenthrin</i> Talstar EZ Golf Granular Talstar GC Flowable	3A	2.3-4.6 lb/1000 sq ft 0.25-0.5 fl oz/1000 sq ft	12 H/ –	Pyrethroids are effective, but they provide no residual control and evidence of resistance has already surfaced for bifenthrin (Talstar, Bifen), with cross-resistance to other pyrethroids expected. Rotation of chemistries is, therefore, important. In most cases, irrigate turf area prior to application unless noted otherwise on the product label.
	<i>carbaryl</i> Sevin SL	1A	6-8 fl oz/1000 sq ft	12 H/ –	Granules can be used but must be watered in thoroughly. Use high volume application (5 gal/1000 sq ft) especially with pyrethroids.
	<i>clothianidin</i> Arena 50WDG Arena 0.5G	4A	10.67 oz/A 66.67 lb/A	12 H/ –	
	<i>clothiaidin + bifenthrin</i> Aloft GC SC Aloft LC G	4A + 3A	0.27-0.44 fl oz/1000 sq ft 1.8-3.6 lb/1000 sq ft	12 H/ –	

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Chinch bugs <i>(continued)</i>	<i>cyfluthrin</i> Tempo SC Ultra <i>(landscape turf only)</i> Tempo WP Ultra <i>(landscape turf only)</i> Tempo 20 WP <i>(golf course only)</i>	3A	8 ml/1000 sq ft  7.7-15.4 oz/A  1 packet/7,800 sq ft		
	<i>deltamethrin</i> DeltaGard T&O 5SC <i>(landscape turf only)</i> DeltaGard GC 5SC DeltaGard G <i>(landscape turf only)</i> DeltaGard T&O Granular	3A	0.6-0.9 fl oz/1000 sq ft  0.6-0.9 fl oz/1000 sq ft 2-3 lb/1000 sq ft  2-3 lb/1000 sq ft		
	<i>Dinotefura</i> Zylam 20 SG	4A	1 oz/1000 sq ft	12 H/ –	
	<i>imidacloprid + bifenthrin</i> Allectus SC <i>(landscape turf only)</i> Allectus GC	4A + 3A	0.4-1.65 fl oz/1000 sq ft  1.7-2.9 lb/1000 sq ft	12 H/ –	
	<i>lambda-cyhalothrin</i> Scimitar CS <i>(landscape turf only)</i> Scimitar GC	3A	19.2 oz/A  19.2 oz/A		
	<i>trichlorofon</i> Dylox 80	1B	3.75 oz/1000 sq ft		
	Ground Pearls	None			
Millipedes, sowbugs and pillbugs	<i>bifenthrin</i> Talstar F, GC, G	3A	0.25-0.5 fl oz/1000 sq ft	12 H/ –	
	various pyrethroids*		See label		
Mites/Eriophyid mites	none				Carbaryl may provide some suppression, but no effective miticides are labeled.
Mole Crickets	<i>acephate</i> Orthene 75WP Orthene 97 <i>(golf courses &amp; sod farms only)</i>	1B	1-1.9 oz/1000 sq ft 0.8-1.4 oz/1000 sq ft	24 H/ –	Best results with early instar nymphs.  Fiponil is a widely used insecticide that has proven to be the most effective and most expensive single application approach. Since it provides season-long control the economics must be considered in that context.
	<i>bifenthrin</i> Talstar GC Flowable Talstar GC Granular	3A	0.25-0.5 fl oz/1000 sq ft 2.3-4.6 lb/1000 sq ft	12 H/ –	Indoxacarb, acephate, the bifenthrin + imidacloprid combination and chlorpyrifos baits are available for use against larger nymphs in late summer.
	<i>carbaryl</i> Mole Cricket Bait	1A	0.75-0.9 lb/1000 sq ft	12 H/ –	
	<i>clothianidin</i> Arena 50WDG Aloft LC SC	4A	Suppression only 10.67 oz/A 11.65-23.3 oz/A	12 H/ –	

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Mole Crickets <i>(continued)</i>	<i>cyfluthrin</i> Tempo WP Ultra Tempo SC Ultra	3A	7.7-15.4 oz/A 8 ml/1000 sq ft or 12 fl oz/A		The pyrethroids and imidacloprid are less effective, particularly on larger nymphs and adults. Imidacloprid should be applied at or just before egg hatch.
	<i>deltamethrin</i> DeltaGard GC 5SC DeltaGard T&O Granular <i>(landscape turf only)</i>	3A	0.6-0.9 fl oz/1000 sq ft 2-3 lb/1000 sq ft		Clothianidin is less susceptible to photodegradation than imidacloprid.  For most treatments irrigate 24 hours before treatment if soil is dry. Apply in late afternoon to dry turf, then do not irrigate for 48 hours.
	<i>fipronil</i> Chipco Topchoice	2B	2 lb/1000 sq ft	24 H/ –	
	<i>imidacloprid</i> Merit 75WSP Merit 0.5G <i>(not for sod farms)</i>	4A	1.6 oz/8,250 sq ft 1.8 lb/1000 sq ft	12 H/ –	Rates of Chipco Choice higher than 12.5 lb/A must be applied through slit-seed (subsurface) application equipment.
	<i>lambda-cyhalothrin</i> Scimitar CS <i>(landscape turf only)</i>	3A	Nymphs: 7 ml/1000 sq ft Adults: 14 ml/1000 sq ft		
	Orthene 97 <i>(golf courses &amp; sod farms only)</i>	1B	0.8-1.4 oz/1000 sq ft	24 H/ –	
	Scimitar GC  <i>permethrin</i> Astro <i>(landscape turf only)</i>	3A	Nymphs: 7 ml/1000 sq ft Adults: 14 ml/1000 sq ft  1.6 fl oz/gal		
	<i>trichlorfon</i> Dylox 80 T&O Dylox 6.2 G	1B	3.75 oz/1000 sq ft 3 lb/1000 sq ft		
Slugs and Snails	Metaldehyde or mesurol	1A	Follow label directions for mixed baits	12 H/ –	Apply late in afternoon. Fall applications will help control slugs and snails before egg laying.
Spittlebugs	<i>acephate</i> Orthene 75WP Orthene 97	1B	1-1.9 oz/1000 sq ft 0.8-1.4 oz/10,000 sq ft	24 H/ –	Pyrethroids applied with sufficient volume of water have been effective but not always consistently so.
	<i>bifenthrin</i> Onyx	3A	0.07-0.15 fl oz/ 1000 sq ft	12 H/ –	Cut grass to its recommended height and remove clippings prior to application.
	<i>carbaryl</i> Sevin SL	1A	1.5-3 fl oz/1000 sq ft or 2-4 qt/A	12 H/ –	
	<i>deltamethrin</i> DeltaGard GC 5SC  DeltaGard T&O 5 SC <i>(landscape turf only)</i>	3A	0.2-0.4 fl oz/1000 sq ft or 8.75-17.5 fl oz/A  0.2-0.4 fl oz/1000 sq ft or 8.75-17.5 fl oz/A		

## INSECT CONTROL IN COMMERCIAL TURF

PESTS	INSECTICIDE	MOA	RATE	REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
Turf caterpillars (cutworms, armyworms, webworms, loopers)	<i>acephate</i> Orthene 75WP	1B	0.5-1.2 oz/1000 sq ft	24 H/ –	Caterpillar pests are best controlled with insecticides in the early instars when they are still small. Higher rates must be used for larger caterpillars. Reduced-risk products like B.t. Mach 2, and Conserve are also more effective against younger caterpillars. On larger caterpillars even higher rates of these products may not be effective.
	Orthene 97 ( <i>golf course &amp; sod farm only</i> )	1B	0.4-0.9 oz/1000 sq ft	24 H/ –	
	<i>bifenthrin</i> Talstar GC Flowable	3A	<b>RUP</b> 0.25-0.5 fl oz/1000 sq ft or 10 fl oz/A	12 H/ –	A number of chemicals listed for control are broad-spectrum and fairly economical, especially chlorpyrifos, acephate, carbaryl and several labeled pyrethroids.
	<i>carbaryl</i> Sevin 80 WSP Sevin SL	1B	2.5-5 lb/A 1.5-3 fl oz/1000 sq ft or 2-4 qt/A	12 H/ –	Treat in late afternoon. DO NOT cut grass for 1-3 days after application. B.t. is not toxic to non-lepidopterous pests.
	<i>cyfluthrin</i> Tempo SC Ultra ( <i>landscape turf only</i> ) Tempo 20 WP ( <i>golf courses only</i> )	3A	4-8 ml/1000 sq ft or 6-12 fl oz/A  55 g/7,800-11000 sq ft		
	<i>deltamethrin</i> DeltaGard GC 5SC	3A	0.2-0.4 fl oz/1000 sq ft or 8.75-17.5 fl oz/A		
	Acelepyrn	28	2-16 oz/A	4 H/ –	
	Aloft LCSC	4A + 3A	11.65-23.3 fl oz/A	12 H/ –	
	<i>lambda-cyhalothrin</i> Scimitar CS ( <i>landscape turf only</i> )	3A	3.4-7 ml/1000 sq ft or 5-10 fl oz/A		
	<i>spinosad</i> Conserve 1SC	5	0.25-0.8 fl oz/ 1000 sq ft or 10-35 fl oz/A	4 H/ –	
<i>trichlorfon</i> Dylox 80 T&O	1B	2.5-3.75 oz/1000 sq ft or 6.8-10.2 lb/A			
White Grubs (Japanese Beetle, Chafers, Green June Beetle)	Acelepyrn	28	8-16 oz/A	4 H/ –	Best results can be expected if early instars are treated.
	Allectus GC	4A + 3A	2.3-2.9 lb/1000 sq ft		The number of grubs per square foot or damage threshold varies by grub species, grass species and variety, as well as management intensity and use.
	<i>carbaryl</i> Sevin SL	1A	6 fl oz/1000 sq ft or 8 qt/A	12 H/ –	Identification of pest grub species is important for effective control recommendations. Consult your Cooperative Extension county agent.
	<i>clothianidin</i> Arena 50WDG Arena 0.5G	4A	8 oz/A 50 lb/A	12 H/ –	Carbaryl and pyrethroids are excellent for June beetle control, less effective on other species. Generally good adult control.
	<i>Dinotefuran</i> Zylam 20 SG	4A	1 oz/1000	12 H/ –	Curative control of older larvae is excellent with trichlorfon for mostgrub species.

\*NOTE: A number of pyrethroid materials are available in a variety of formulations for use as broad-spectrum contact insecticides.

Common names include permethrin, bifenthrin, cypermethrin, cyfluthrin, lambda-cyhalothrin and deltamethrin.

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White Grubs (Japanese Beetle, Chafers, Green June Beetle) <i>(continued)</i>	Dylox 6.2 G	1B	3 lb/1000 sq ft or 130 lb/A		
	<i>imidacloprid</i> Merit 75 WSP Merit 0.5 G	4A	6.4-8.6 oz/A 1.4 lb/1000 sq ft or 60 lb/A	12 H/ –	
	<i>imidacloprid + bifenthrin</i> Allectus SC <i>(landscape turf only)</i>	4A + 3A	<b>RUP</b> 1.32-1.65 fl oz/1000 sq ft	12 H/ –	
	<i>trichlorfon</i> Dylox 80 T&O	1B	3.75 oz/1000 sq ft or 10.2 lb /A		
	imidacloprid Merit 75 WSP Merit 0.5 G	4A	6.4-8.6 oz./A 1.4 lb/1000 sq ft or 60 lb/A	12 H/ –	
	imidacloprid + bifenthrin Allectus SC <i>(landscape turf only)</i>	4A + 3A	<b>RUP</b> 1.32-1.65 fl oz/1000 sq ft	12 H/ –	
	trichlorfon Dylox 80 T&O	1B	3.75 oz/1000 sq ft or 10.2 lbww/A		

\*NOTE: A number of pyrethroid materials are available in a variety of formulations for use as broad-spectrum contact insecticides. Common names include permethrin, bifenthrin, cypermethrin, cyfluthrin, lambda-cyhalothrin and deltamethrin.



# TURF DISEASE CONTROL

Alfredo Martinez-Espinoza, Extension Plant Pathologist

DISEASE	FUNGICIDE	MOA	RATES (oz/1000 sq ft)	REMARKS
Algae	<i>chlorothalonil</i> Chlorostar Chlorothalonil 500ZN, 720SFT, DF Daconil Action Daconil G Daconil Ultrex Daconil Weatherstik Daconil Zn Docket Echo DF Echo Dyad ETQ Evade Legend Manicure Manicure Ultra Pegasus DFX	M5	1.8-7.4 oz at 7-14 day intervals	Make sure surface drainage is good. Spike, slice or aerify if necessary.  Label changes by manufacturers restrict use to commercial turf only. Not to be used on home lawns.
	<i>copper hydroxide</i> Kocide 54DF	M1	16 oz	1 application.
	<i>fluazinam</i> Secure	29	0.5 fl oz at a 14-day interval	For Algal scum (filamentous blue-green algae/cyanobacteria).
	<i>fluxapyroxad</i> Xzemplar	7	0.21-0.26 fl oz at 14-28 day interval	
	<i>hydrogen dioxide</i> Zerotol TerraCyte Pro	NC	6-25 oz	Curative control may require 2-3 consecutive applications.
	<i>mancozeb</i> Dithane Fore Manzate Protect T/O	M3	80WP-6 oz 4F-9.6 fl oz	
	<i>mancozeb + copper sulfate</i> Junction	M3 + M1	2-4 oz at 7-14 day intervals	May cause phytotoxicity during hot weather.
	<i>triticonazole</i> Trinity, Triton	3	0.5-1 fl oz at 14-28 day intervals	For algae suppression.
	<i>triticonazole + chlorothalonil</i> Reserve	3 + M5	3.2-5.4 oz at 14-28 day intervals	Use the lower rate preventively for the suppression of algae.
Brown/Large Patch ( <i>Rhizoctonia solani</i> ) and Dollar Spot ( <i>Sclerotinia homoeocarpa</i> )	<i>azoxystrobin</i> Heritage 50WG Heritage G Heritage TL, Strobe ArmorTech	11	0.2-0.4 oz at 14-28 day intervals 2-4 lb at 14-28 day intervals  Heritage TL: 2 fl oz	*Not Recommended for Dollar Spot.
	<i>azoxystrobin + Acibenzolar-S-Methyl</i> Heritage Action	11 + P	0.2-0.4 oz at 14-28 day intervals	*Not Recommended for Dollar Spot.

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Brown/Large Patch ( <i>Rhizoctonia solani</i> ) and Dollar Spot ( <i>Sclerotinia homoeocarpa</i> ) (continued)	<i>azoxystrobin</i> + <i>chlorothalonil</i> Renown	11 + M5	2.5-4.5 fl oz at 7-28 day intervals	
	<i>azoxystrobin</i> + <i>difencconazole</i> Briskway	11 + 3	Brown Patch/Large Patch – 0.3-0.725 fl oz at 14-28 day intervals Dollar Spot – 0.3-0.725 fl oz at 14-21 day intervals	
	<i>azoxystrobin</i> + <i>propiconazole</i> Headway	11 + 3	0.75-3 oz at 14-28 day intervals	
	<i>azoxystrobin</i> + <i>tebuconazole</i> ZoxyT, Strobe T	11 + 3	0.5-1.5 oz at 14-28 day intervals 0.75-1.5 oz at 14-28 day intervals	
	<i>boscalid</i> Emerald	7	0.13-0.18 oz at 14-21 day intervals	*For Dollar Spot control only. Apply when conditions are favorable for disease development.
	<i>bacillus licheniformis</i> EcoGuard SB 3086	44	Up to 20 oz at 3-14 day intervals	
	<i>bacillus subtilis</i> Strain QST713 Rhapsody, Sonnet, ArmorTech Sonnet	44	2-10 fl oz at 7-10 day intervals 0.5-2.5 fl oz at 7-10 day intervals	Apply in sufficient water to provide thorough coverage 2 gal/1000 sq ft are commonly used.
	<i>bacillus subtilis</i> Strain GB03 Companion	44	4-6 fl oz at 14-28 day intervals	
	<i>chlorothalonil</i> ArmorTech CLT 720 ArmorTech CLT 825 Chlorostar Chlorothalonil 500ZN, 720SFT, DF Daconil Action Daconil G Daconil Ultrex Daconil Weatherstik Daconil Zn Docket Echo DF Echo Dyad ETQ Evade Legend Manicure Manicure Ultra Pegasus DFX	M5	<b>FLOWABLE 40.4%</b> <b>Preventive:</b> Brown Patch – 3-6 fl oz at 7-10 day intervals Dollar Spot – 3-6 fl oz at 7-14 day intervals <b>Curative:</b> Brown Patch – 6-11 fl oz at 7-10 day intervals Dollar Spot – 6-11 fl oz at 7-14 day intervals <b>WETTABLE POWDER (WDG90)</b> <b>Preventive:</b> Brown Patch – 1.75-3.5 oz at 7-10 day intervals Dollar Spot – 1.75-3.5 oz at 7-14 day intervals. 4 oz = 15 Tbsp <b>Curative:</b> Brown Patch – 3.5-6.5 oz at 7-10 day intervals Dollar Spot – 3.5-6.5 oz at 7-14 day intervals	Recent label changes by manufacturers restrict use to commercial turf only. Not to be used on home lawns.
	<i>chlorothalonil</i> + <i>propiconazole</i> Concert Concert II	M5 + 3	1.5-3 fl oz at 7-10 day intervals 3-5.5 fl oz at 14-21 day intervals 5.5-8.5 fl oz at 14-28 day intervals	
<i>chlorothalonil</i> + <i>propiconazole</i> + <i>fludioxonil</i> Instrata	M5 + 3 + 12	2.75-6 fl oz at 21-28 day intervals		

**TURF DISEASE CONTROL**

<b>DISEASE</b>	<b>FUNGICIDE</b>	<b>MOA</b>	<b>RATES (oz/1000 sq ft)</b>	<b>REMARKS</b>
Brown/Large Patch ( <i>Rhizoctonia solani</i> ) and Dollar Spot ( <i>Sclerotinia homoeocarpa</i> ) (continued)	<i>chlorothalonil</i> + <i>thiophanate methyl</i> Consyst Peregrine Tee-1-up WDG TM + CTN SPC	M5 + 1	2-8 oz at 7-21 day intervals 2-5.76 oz at 7-14 day intervals	
	<i>chlorothalonil</i> + <i>thiophanate methyl</i> + <i>iprodione</i> + <i>tebuconazole</i> Enclave	M5 + 1 + 2 + 3	3-4 fl oz at 14-21 day intervals 7-8 fl oz at 28 day intervals	Apply when disease first appears. Make additional applications as needed. Allow spray to dry with no watering in.
	<i>hydrogen dioxide</i> TerraCyte Pro Zerotol	NC	6-25 oz	Curative control may require 2-3 consecutive applications.
	<i>fenarimol</i> Rubigan A.S. 11.6	3	0.75-1.5 fl oz at 10-21 day or 14-28 day intervals respectively for Dollar Spot	
	<i>fluazinam</i> Secure	29	0.5 fl oz at a 14 day interval	Dollar Spot: Apply as preventative disease program, starting when conditions become favorable for disease. Brown Patch: Apply when conditions become favorable for disease. Large Patch: Apply in fall when temperatures drop below 70°F.
	<i>fludioxonil</i> Medallion Medallion SC	12	0.5-0.9 oz at 14-28 day intervals 0.75-2 fl oz at 7-14 day interval	Use as preventative. Begin application when conditions are favorable for fungal infection; prior to disease symptom development.
	<i>fluopyram</i> + <i>trifloxystrobin</i> Exteris	7 + 11	Brown Patch – 2.1-6.0 fl oz at 14-28-day interval Dollar Spot – 1.5-4.13 fl oz at 7-28-day interval	Brown Patch: Lightly water-in application to move fungicide into thatch for increased effectiveness.
	<i>flutolanil</i> ProStar 70WG Prostar WP	7	<b>Preventive:</b> 2.2 oz at 21-28 day intervals <b>Curative:</b> 4.5 oz Repeat in 30 days.	Use of wetting agent or aeration prior to treatment may improve disease control. Do not treat more than 10,000 sq ft/A of turfgrass.
	<i>flutolanil</i> + <i>thiophanate methyl</i> Systar	7 + 1	2-3 oz at 14-30 day intervals	
	<i>fluoxastrobin</i> Disarm 480 SC Disarm G Fame SC Fungicide Fame G Fungicide	11	0.18-0.36 fl oz at 21 day intervals 2.3-4.6 lb at 14-21 day intervals 0.18-0.36 fl oz at 28 day intervals	Recommended for Brown Patch. For optimum results begin applications preventatively and continue as needed (21 day intervals). To limit the potential for development of fungicide resistance use a maximum of 2 sequential applications of a QoI fungicide followed by at least an equal number of applications of another mode of action fungicide. Preventive control of light to moderate Dollar Spot infections.
	<i>fluoxastrobin</i> + <i>chlorothalonil</i> Disarm C, Fame + C	11 + M5	3-5.9 oz at 7-28 day intervals	
	<i>fluoxastrobin</i> + <i>myclobutanil</i> Disarm M	11 + 3	0.25-1 oz at 14-28 day intervals	
	<i>fluoxastrobin</i> + <i>tebuconazole</i> Fame + T	11 + 3	0.45-0.9 oz at 21-28 day intervals	
	<i>fluxapyroxad</i> Xzemplar	7	0.21-0.26 fl oz at 14-28 day intervals	For Brown Patch, Large Patch and Dollar Spot.
<i>fluxapyroxad</i> + <i>pyraclostrobin</i> Lexicon	7 + 11	0.34-0.47 fl oz at 14-28 days intervals	For Brown Patch, Large Patch and Dollar Spot.	

## TURF DISEASE CONTROL

DISEASE	FUNGICIDE	MOA	RATES (oz/1000 sq ft)	REMARKS
Brown/Large Patch ( <i>Rhizoctonia solani</i> ) and Dollar Spot ( <i>Sclerotinia homoeocarpa</i> ) (continued)	<i>iprodione</i> 18 Plus Armor Tech IP233 Chipco 26GT Chipco 26019 Eclipse ETQ Iprodione Pro 2SE Iprodione SPC Ipro2SE, Raven	2	2-4 fl oz in 2-10 gals water. Apply every 14-21 days. 1.5-2 oz at 14-21 day intervals 3-4 fl oz at 14-28 day intervals 1.5 oz = 9 Tbsp	Not for use in residential areas.
	<i>iprodione + thiophanate methyl 26/36</i> ArmorTech TMI 2020 Dovetail Lesco Twosome TM + IP SPC	2 + 1	1-4 oz at 14-21 day intervals	
	<i>iprodione + trifloxystrobin</i> Interface	2 + 11	4-6 oz at 14- 21 day intervals	
	<i>isofetamid</i> Kabuto Fungicide SC	7	0.4-0.5 fl oz at 14 day intervals	For Dollar Spot only.
	<i>mancozeb + copper hydroxide</i> Junction	M3 + M1	2-4 oz at 7-14 day intervals	
	<i>maneb</i> <i>maneb + zinc sulfate</i> <i>mancozeb</i> Dithane Fore Protect T/O Tersan LSR, etc.	M3	<b>Preventive:</b> 3-4 oz in 3-5 gals water at 7-10 day intervals <b>Curative:</b> 6-8 oz in 3-5 gals water at 7-10 day intervals 3 oz = 10 Tbsp	
	<i>metconazole</i> Tourney	3	Dollar Spot – 0.18-0.37 oz at 14-21 day intervals Brown Patch – 0.28-0.37 oz at 14-21 day intervals	Apply when conditions are favorable for disease development. <b>DO NOT</b> use on bermudagrass.
	<i>mineral oil</i> Civitas	NC	8-32 oz	Use only in conjunction with Civitas Harmonizer.
	<i>myclobutanil</i> ArmorTech Myclo 20EW Eagle 20EW Eagle 40WSP Lebanon Eagle G Myclobutanil 20EW T/O		<b>Preventive:</b> 0.6 oz at 10-28 day intervals (3 oz pkt/5000 sq ft)  Myclo 20EW 1.2-2.4 oz	<b>DO NOT</b> apply more than 7.2 oz/1000 sq ft/year.
	Engage Penstar Revere Terraclor Turfcide	14	<b>Brown Patch:</b> <b>warm season grasses</b> 16 oz in 10-15 gal water at 3-4 week intervals. <b>cool season grasses</b> 3-4 oz in 3-6 gal water at 7-10 day intervals. <b>Dollar Spot:</b> 7-10 oz in 5-10 gal water at 3-4 week intervals	

## TURF DISEASE CONTROL

DISEASE	FUNGICIDE	MOA	RATES (oz/1000 sq ft)	REMARKS
Brown/Large Patch ( <i>Rhizoctonia solani</i> ) and Dollar Spot ( <i>Sclerotinia homoeocarpa</i> ) (continued)	<i>penthiopyrad</i> Velista	7	Dollar Spot and Brown Patch – 0.3-0.5 oz at 14-21 day intervals  Large Patch – 0.7 oz at 14-28 day intervals	Begin applications at early stages of disease development. Use high rate for high disease pressure or for curative situations.  Large Patch – Make two applications in the fall as a preventative. Apply in early spring if disease pressure is high.
	<i>phosphorous acid</i> Fosphite	33	2-3 fl oz	
	<i>polyoxin D</i> Affirm Endorse	19	4 oz in a minimum of 2 gal at 14 day intervals 2.4 lb/A at 7-14 day intervals	Do not irrigate for 12 hr after application.  Not recommended for Dollar Spot.
	<i>propiconazole</i> ArmorTech PPZ143MC Banner Maxx Banner GL Kestrel Monsoon turf ProPensity 1.3ME Propiconazole SPC 14.3 Propicure 3.6F Prophecy Savvi Strider	3	Dollar Spot – 1-2 fl oz in 2-5 gals water at 14-28 day intervals  Brown Patch – 1-2 fl oz in 2-5 gals water at 14-21 day intervals  Banner GL individual packets; one packet treats 11,000-22,000 sq ft	Do not mow or irrigate treated areas until grass is completely dry. Do not use on home lawns. Bermudagrass and St. Augustinegrass can be sensitive to Banner. <b>DO NOT</b> exceed 2 fl oz/1000 sq ft every 30 days on any variety of Bermudagrass or St. Augustinegrass.  As conditions become more severe, use the shorter application schedule and the higher rate.
	<i>pyraclostrobin</i> Insignia Insignia Intrinsic	11	0.5-0.9 oz at 14-28 day intervals	For Dollar Spot, begin applications prior to or in the early stages of disease development. Use shorter specified application intervals and/or higher specified rate when prolonged favorable disease conditions exist.
	<i>pyraclostrobin + boscalid</i> Honor Honor Intrinsic	11 + 7	Brown Patch – 0.55-1.1 oz at 14-28 day intervals  Dollar Spot – 0.88-1.1 oz at 14-21 day intervals	
	<i>pyraclostrobin + triticonazole</i> Pillar	11 + 3	3 lb at 28 day intervals	<b>DO NOT</b> make more than 5 applications per year at the use rate of 3 lb/1000 sq ft.
	<i>Reynoutria sachalinensis</i> Regalia PTO	P5	1-3 fl oz at 7-14 day intervals	Plant extract. Use in a minimum of 1.5 gal water/1000 sq ft. Begin applications preventatively.
	<i>tebuconazole</i> ArmorTech 360 XL Mirage Stressguard Sipcam Clearscape Sipcam Clearscape ETO Torque	3	0.6 fl oz  Mirage: 1-2 fl oz	For prevention, begin applications when conditions are favorable for disease development. <b>DO NOT</b> make 2 consecutive applications of Torque fungicide. Alternate with another fungicide with different mode of action. A second application may be made after 28 days.  Brown Patch and Dollar Spot: Use Mirage at 14-28 day interval.  Large Patch: Begin fungicide applications preventively in the fall and spring. Make 1-2 applications when conditions are favorable for disease development.

## TURF DISEASE CONTROL

DISEASE	FUNGICIDE	MOA	RATES (oz/1000 sq ft)	REMARKS
Brown/Large Patch ( <i>Rhizoctonia solani</i> ) and Dollar Spot ( <i>Sclerotinia homoeocarpa</i> ) (continued)	<i>thiophanate methyl</i> ArmorTech TM462 Cavalier Cleary's 3336, 3336 DG Lite 3336 F, 3336 G 3336 GC, 3336 Plus Fungo Systec 1998 T-Bird 4.5L T-Bird 85 WDG T-Storm Tee-Off 4.5F	1	Wettable Powder (50%) 2 oz/5 gal water Apply at 7-10 day intervals  Dollar Spot fairways – 1 oz/5 gal water Apply at 2-4 week intervals  Flowable (46.2%) 1-2 fl oz at 10-14 day intervals  TM462 2-5.3 fl oz	
	<i>thiram</i> Spotrete F	M3	<b>Preventative:</b> 3.75 fl oz at 7-10 day intervals <b>Curative:</b> 7.5 fl oz at 3-5 day intervals	For best results use spray mix the same day it is prepared. Spray right after mowing or avoid mowing 12 hrs after application.
	<i>triadimefon</i> Bayleton 25WP Bayleton 50 Bayleton Flo Granular turf fungicide Systemic fungicide Fungicide VII	3	<b>Preventative:</b> 1 oz/2-4 gal water <b>Curative:</b> 2 oz/2-4 gal water 1 oz = 6 Tbsp <b>Preventative:</b> 1.5 lb at 15-30 day intervals <b>Curative:</b> 3 lb at 15-30 day intervals Systemic fungicide 0.5-1 oz at 15-30 day intervals Bayleton 50 and Flo 0.5-1 oz	Apply recommended rate at 15-30 day intervals. Protective activity can be longer than 30 days depending on environmental conditions.  After the application of curative rate, subsequent applications should be applied on a preventative schedule and rate.  For golf and sod. Not to be used on residential or commercial areas.
	<i>trifloxystrobin</i> Compass	11	<b>Preventative:</b> 0.1-0.2 oz in 1-2 gal of water/1000 sq ft at 14 day intervals <b>Curative:</b> 0.15-0.25 oz in 1-2 gal of water/1000 sq ft	Apply when conditions are favorable for disease development.  Apply 0.2 oz and repeat on a 21-day interval.  During periods of Dollar Spot pressure, mix Compass with fungicides labeled for Dollar Spot.
	<i>trifloxystrobin + triadimefon</i> Armada, Tartan	11 + 3	1-2 oz at 14-28 day intervals 0.6-1.2 oz at 14-28 day intervals	
	<i>triticonazole</i> Trinity Triton	3	Dollar Spot – 0.5-1 fl oz at 14-28 day intervals Brown Patch – 0.5-2 fl oz at 14-28 day intervals	2 fl oz rates may be applied if needed in transition areas of the South under heavy disease pressure.
	<i>triticonazole + chlorothalonil</i> Reserve	3 + M5	Brown Patch – 3.2-5.4 oz at 14-28 day intervals Dollar Spot – 3.2-4.5 oz at 14-28 day intervals	Brown Patch – Begin fungicide applications preventatively when conditions are favorable for disease development.  Dollar Spot – Begin fungicide applications preventatively.
	<i>vinclozolin</i> Curalan Touche	2	2 oz/5 gal water 2 oz = 8.5 Tbsp	Repeat application in 1-3 weeks while disease conditions prevail. Toxic to fish.

## TURF DISEASE CONTROL

DISEASE	FUNGICIDE	MOA	RATES (oz/1000 sq ft)	REMARKS
Fairy Ring	<i>azoxystrobin</i> Heritage 50WG Heritage TL, Heritage G Strobe, Strobe 50WG Strobe 2L	11	0.4 oz applied at 28 day intervals 2-4 lb at 14-28 day intervals	
	<i>azoxystrobin</i> + <i>acibenzolar-S-Methyl</i> Heritage Action	11 + P	0.2-0.4 oz at 14-28 day intervals	
	<i>azoxystrobin</i> + <i>propiconazole</i> Headway	11 + 3	3 oz at 28 day intervals	
	<i>azoxystrobin</i> + <i>difenconazole</i> Briskway	11 + 3	0.5-0.725 fl oz at 14-28 day intervals	For preventive control apply in early spring prior to disease development. Apply in 2-4 gal of water/1000 sq ft. Irrigate into thatch prior to the spray drying. For curative control apply as soon as possible after fairy ring symptoms appear. Apply in 2-4 gal of water, irrigate lightly. Add recommended rate of a wetting agent to the final spray. Re-apply after 28 days.
	<i>azoxystrobin</i> + <i>tebuconazole</i> ZoxyT, Strobe T	11+ 3	0.7-1.5 oz at 14-28 day intervals	
	<i>hydrogen dioxide</i> TerraCyte Pro Zerotol	NC	2-12 fl oz	Curative control may require 2-3 consecutive applications. Drench the soil to saturate root system. Use 5-10 gal/1000 sq ft.
	<i>flutolanil</i> ProStar 70WG Prostar 70 WP	7	<b>Preventive:</b> 2.2 oz at 21-28 day intervals <b>Curative:</b> 4.5 oz at first sign of activity. Repeat in 30 days. Apply in 10-50 gal water/1000 sq ft	Use of wetting agent or aeration prior to treatment may improve disease control. <b>DO NOT</b> treat more than 10,000 sq ft/A of turfgrass.
	<i>flutolanil</i> + <i>thiophanate methyl</i> Systar	7 + 1	3-6.12 oz at 21-28 day intervals	
	<i>fluoxastrobin</i> Disarm 480 SC, Disarm G Fame SC Fungicide Fame G Fungicide	11	0.36 fl oz at 28 day intervals 0.28-0.36 fl oz at 21-28 day intervals  2.3-4.6 lb at 14-28 days	
	<i>fluoxastrobin</i> + <i>chlorothalonil</i> Disarm C, Fame + C	11 + M5	4.5-5.9 oz at 21-28 day intervals	
	<i>fluoxastrobin</i> + <i>myclobutanil</i> Disarm M	11 + 3	0.5-1 oz at 21-28 day intervals	
	<i>fluoxastrobin</i> + <i>tebuconazole</i> Fame + T	11 + 3	0.45-0.9 oz at 21-28 day intervals	
	<i>fluxapyroxad</i> + <i>pyraclostrobin</i> Lexicon	7 + 11	0.47 fl oz at 28 days interval	Apply as soon as possible after fairy ring development. Fairy ring symptoms may take 2-3 weeks to disappear following application. Use 2-4 gal of spray volume/1000 sq ft and appropriate soil wetting agent at the time of application. Provide short irrigation cycle directly following treatment to move fungicide through thatch.
	<i>metconazole</i> Tourney	3	0.37 oz	Apply in 4 gal water/1000 sq ft. Symptoms may take several weeks to disappear following application. <b>DO NOT</b> use on bermudagrass.
<i>pyraclostrobin</i> Insignia, Insignia Intrinsic	11	0.5-0.9 oz at 14-28 day intervals	Use as preventative. Begin application when conditions are favorable for fungal infection; prior to disease symptom development.	

## TURF DISEASE CONTROL

DISEASE	FUNGICIDE	MOA	RATES (oz/1000 sq ft)	REMARKS
Fairy Ring (continued)	<i>pyraclostrobin + boscalid</i> Honor Honor Intrinsic	11 + 7	1.1 oz at 28 day intervals	
	<i>polyoxin D</i> Affirm Endorse	19	4 oz in minimum of 2 gal at 14 day intervals  Affirm: 2-3 applications of 1 oz rate at 7 day intervals	Make 2-3 applications. Use a penetrating wetting agent. Water in immediately after treatment.
	<i>tebuconazole</i> Torque, ArmorTech Teb360 XL Mirage Stressguard	3	0.6 fl oz 0.6-1.1 fl oz 1-2 fl oz	<b>Preventative:</b> Apply before fairy ring symptoms appear in the spring when soil temperatures consistently reach 55-60°F. Water into root zone within 4 hrs. <b>Do not</b> tank mix a wetting agent with preventative applications.  <b>Curative:</b> Water into root zone within 4 hrs. Use a wetting agent as required for penetration of active hydrophobic soil conditions. A second application after 28 days may be required.  Mirage – Apply in late winter/early spring preventatively when mean soil temperatures reach 55-60°F over 5 days at 2 inch depth.
	<i>triadimefon</i> Bayleton 25WP Bayleton 50 Bayleton Flo	3	1-2 oz or fl oz	Apply recommended rate in 2-4 gal of water in the spring prior to appearance of Fairy Ring symptoms. Before the spray dries, irrigate to wash the fungicide into the thatch/soil where the fungus is active. Repeat application 14 days later. If the 2 oz rate is used on <i>Poa annua</i> putting greens, extend the intervals to 21 days. For golf and sod. Not to be used on residential or commercial areas.
Fusarium/ Microdochium	<i>azoxystrobin</i> Heritage 50WG, G, TL, Strobe, Strobe 50WG, Strobe 2L ArmorTech Zoxy	11	0.2-0.4 oz at 14-28 day intervals 4 lb at 10-28 day intervals 7 lb single application, AmorTech Zoxy: 0.37-077 oz at 14-28 day intervals	
	<i>azoxystrobin + Acibenzolar-S-Methyl</i> Heritage Action	11 + P	0.2-0.4 oz at 14-28 day intervals	
	<i>azoxystrobin + cholorothalonil</i> Renown	11 + M5	2.5-4.5 fl oz at 14-21 day intervals	
	<i>azoxystrobin + difenconazole</i> Briskway	11 + 3	0.5-0.725 fl oz at 14-28 day intervals	
	<i>azoxystrobin + propiconazole</i> Headway	11 + 3	3-5.25 oz at 10-28 day intervals	
	<i>azoxystrobin + tebuconazole</i> ZoxyT, Strobe T	11 + 3	0.75-1.5 oz at 14-21 day intervals	
	<i>bacillus subtilis</i> Strain GB03 Companion	44	4-6 fl oz at 14-28 day intervals	



## TURF DISEASE CONTROL

DISEASE	FUNGICIDE	MOA	RATES (oz/1000 sq ft)	REMARKS
Fusarium/ Microdochium <i>(continued)</i>	<i>chlorothalonil</i> Chlorothalonil 500ZN, 720SFT, DF Daconil Action Daconil Ultrex Daconil Weatherstik Daconil Zn Echo DF Echo Dyad ETQ Evade Manicure Manicure Ultra Pegasus DFX	M5	5-5.5 oz at 21-28 day intervals	Recent label changes by manufacturers restrict use to commercial turf only. Not to be used on home lawns.
	<i>chlorothalonil + propiconazole + Fludioxonil</i> Instrata	M5 + 3 + 12	5-11 fl oz	Late fall
	<i>chlorothalonil + thiophanate methyl</i> Consys Peregrin Spectro Tee-1-up WDG	M5 + 1	Single application: 6-8 oz 3.72-5.76 at 7-14 day intervals	
	<i>chlorothalonil + thiophanate methyl + iprodione + tebuconazole</i> Enclave	M5 + 1 + 2 + 3	Blight – 3-4 fl oz at 14-21 day intervals Microdochium Patch – 7-8 fl oz at 28 day intervals	For Blight make 2 applications at 14-28 day intervals beginning when disease first appears.
	<i>fenarimol</i> Rubigan AS 11.6	3	Patch – 8 fl oz Apply 1 or 2 applications Blight – 2 fl oz at 30 day intervals	Use caution on bentgrass at high rate (See label). Irrigate with 0.5-1” of water following application.
	<i>fluazinam</i> Secure	29	0.5 fl oz at a 14 day interval	
	<i>fluopyram + trifloxystrobin</i> Exteris	7 + 11	4.135-12.6 fl oz	
	<i>fludioxonil</i> Medallion Medallion SC	12	Single application: 0.5 oz 1-2 fl oz at 7-14 day intervals	
	<i>fluoxastrobin</i> Disarm 480 SC Disarm G Fame SC Fungicide Fame G Fungicide	11	0.18- 0.36 fl oz at 14-28 day intervals 2.3-4.6 lb at 14-21 day intervals	Begin applications when conditions are favorable for disease development, prior to disease development.
	<i>fluoxastrobin + chlorothalonil</i> Disarm C, Fame + C	11 + M5	3-5.9 oz at 28 day intervals	Begin applications when conditions are favorable for disease development, prior to disease development.
	<i>fluoxastrobin + myclobutanil</i> Disarm M	11 + 3	0.25-1 oz at 14-28 day intervals	Begin applications when conditions are favorable for disease development, prior to disease development.
	<i>fluoxastrobin + tebuconazole</i> Fame + T	11 + 3	0.45-0.9 oz at 21-28 day intervals	

## TURF DISEASE CONTROL

DISEASE	FUNGICIDE	MOA	RATES (oz/1000 sq ft)	REMARKS
Fusarium/ Microdochium  (continued)	<i>flutolanil + thiophanate methyl</i> Systar	7 + 1	4-6.12 oz one application	
	<i>hydrogen dioxide</i> TerraCyte Pro Zerotol	NC	2-12 fl oz	Treat in early fall to reduce the number of dormant spores. Treat throughout the winter.
	<i>iprodione</i> 18 Plus ArmorTech IP233 Chipco 26GT Chipco 26019 Fungicide X Eclipse ETQ Iprodione Pro 2SE Iprodione SPC Ipro 2SE Raven	2	Blight – 8 fl oz repeat applications at 28 day intervals 1.5-2 oz at 14-21 day intervals 3-4 fl oz at 14-28 day intervals	Use preventative foliar applications when conditions first become favorable for disease development.  Not for use in residential areas.
	<i>iprodione + thiophanate methyl</i> 26/36 ArmorTech TMI 2020 Dovetail Lesco twosome TM + IP SPC	2 + 1	1-4 oz at 14-21 day intervals	
	<i>iprodione + trifloxystrobin</i> Interface	2 + 11	5-7 oz at 14-21 day intervals	
	<i>mancozeb + copper hydroxide</i> Junction	M3 + M	2-4 oz at 7-14 day intervals	
	<i>metconazole</i> Tourney	3	0.37-0.44 oz	Late fall.
	<i>myclobutanil</i> ArmorTech Myclo 20EW Eagle 20EW Lebanon Eagle G Myclobutanil 20EW T/O	3	0.6-2.4 oz  Myclo 20EW 1.2-2.4 oz	1 application.
	<i>PCNB</i> Engage Penstar Revere Terraclor Turfcide	14	8 oz in 10-15 gal water	Caution on bentgrass for phytotoxicity.
	<i>penthiopyrad</i> Velista	7	0.7 oz	Only one application allowed per season.
<i>polyoxin D</i> Affirm Endorse	19	4 oz in a minimum of 2 gal at 14 day intervals 2.4 lb/A at 7-14 day intervals		

**TURF DISEASE CONTROL**

<b>DISEASE</b>	<b>FUNGICIDE</b>	<b>MOA</b>	<b>RATES (oz/1000 sq ft)</b>	<b>REMARKS</b>
Fusarium/ Microdochium  (continued)	<i>propiconazole</i> ArmorTech PPZ143MC Banner Maxx Banner GL Kestrel Monsoon turf Savvi Strider ProPensity 1.3ME Prophesy, Propiconazole SPC 14.3 Propicure 3.6F	3	2-4 oz	
	<i>pyraclostrobin</i> Insignia, Insignia Intrinsic	11	0.5-0.9 oz at 14-28 day intervals	Use as preventative. Begin application when conditions are favorable for fungal infection; prior to disease symptom development.
	<i>pyraclostrobin + boscalid</i> Honor Honor Intrinsic	11 + 7	0.55-1.1 oz at 14-28 day intervals	
	<i>pyraclostrobin + tritconazole</i> Pillar	11 + 3	3 lb at 28 day intervals	<b>DO NOT</b> make more than 5 applications/year at the use rate of 3 lb/1000 sq ft.
	<i>Reynoutria sachalinensis</i> Regalia PTO	P5	1-3 fl oz at 7-14 day intervals	Use in a minimum of 1.5 gal water/1000 sq ft. Begin applications preventatively.
	<i>tebuconazole</i> ArmorTech TEB 360 XL Mirage Stressguard Sipcam Clearscape Sipcam Clearscape ETQ Torque	3	0.6 fl oz  1-2 fl oz	Apply in the fall, before anticipated turf dormancy. If turf breaks dormancy during winter months a second application may be made.
	<i>thiophanate methyl</i> ArmorTech TM462 Cavalier Cleary's 3336, 3336 DG Lite, 3336 F, 3336 G, 3336 GC, 3336 Plus Fungo Systec 1998 T-Bird 4.5L, T-Bird 85 WDG T-Storm	1	Patch – 2 oz Repeat at 5-14 day intervals  Blight – 4-8 oz Apply 2 applications at 10-14 day intervals	Water into root zone after application.
	<i>thiram</i> Spotrete F	M3	3-12 oz	
	<i>triadimefon</i> Bayleton 25WP Bayleton 50 Bayleton Flo Fungicide VII Granular turf fungicide Systemic fungicide	3	2 oz at 15 day intervals or 4 oz at 30 day intervals <b>Preventive:</b> 1.5 lb at 15-30 day intervals <b>Curative:</b> 3 lb at 15-30 day intervals Systemic fungicide 0.5-1 oz at 15-30 day intervals Bayleton 50 and Flo 1-2 oz	Apply first in mid-June or 30 days prior to time blight normally becomes evident.

## TURF DISEASE CONTROL

DISEASE	FUNGICIDE	MOA	RATES (oz/1000 sq ft)	REMARKS
Fusarium/ Microdochium  (continued)	<i>trifloxystrobin</i> Compass	11	Apply 0.2-0.25 oz	Apply when conditions are favorable for disease development, fall to early spring.
	<i>trifloxystrobin</i> + <i>triadimefon</i> Armada,Tartan	11 +3	2 oz at 14-28 day intervals 1.2 oz at 14-28 day intervals	Fall to early spring
	<i>triticonazole</i> Trinity, Triton	3	0.5-1 fl oz 0.15-0.3 fl oz	
	<i>triticonazole</i> + <i>chlorothalonil</i> Reserve	3 + M5	3.2-4.5 oz at 10-14 day intervals	
	<i>vinclozolin</i> Curalan Touche	2	2-4 oz. Repeat at 7-21 day intervals	
Gray Leaf Spot ( <i>Pyricularia</i> )	<i>azoxystrobin</i> Heritage 50WG, TL, G Strobe 50 WG, Strobe 2L ArmorTech Zoxy	11	0.2-0.4 oz at 14-28 day intervals 2-4 lb at 14-28 day intervals	
	<i>azoxystrobin</i> + <i>Acibenzolar-S-Methyl</i> Heritage Action	11 + P	0.2-0.4 oz at 14-28 day intervals	
	<i>azoxystrobin</i> + <i>chlorothalonil</i> Renown	11 + M5	2.5-4.5 fl oz at 10-14 day intervals	
	<i>azoxystrobin</i> + <i>difencconazole</i> Briskway	11 + 3	0.5-0.725 fl oz at 14-21 day intervals	
	<i>azoxystrobin</i> + <i>propiconazole</i> Headway	11 + 3	1.5-3 oz at 14-28 day intervals	
	<i>azoxystrobin</i> + <i>tebuconazole</i> ZoxyT, Strobe T	11 + 3	0.75-1.5 oz at 14-28 day intervals	
	<i>bacillus subtilis</i> Strain QST713 Rhapsody Sonnet, ArmorTech	44	0.5-2.5 fl oz at 7-10 day intervals	Apply in sufficient water to provide thorough coverage. 2 gal/1000 sq ft.
	<i>chlorothalonil</i> Chlorothalonil 500ZN, 720SFT, DF ArmorTech CLT720, CLT825 Chlorstar Daconil 2787, Action, G, Ultrex Daconil Weathstik, Zn Docket Echo DF, Echo Dyad ETQ Evade Legend Manicure, Manicure Ultra Pegasus DFX	M5	<b>Flowable</b> <b>Preventive:</b> 3-6 fl oz at 7-10 day intervals <b>Curative:</b> 6-11 fl oz at 7-10 day intervals <b>Wettable Powder (WDG90)</b> <b>Preventive:</b> 1.75-3.5 oz at 7-10 day intervals <b>Curative:</b> 3.5-6.5 oz at 7-10 day intervals	Recent label changes by manufacturers restrict use to commercial turf only. Not to be used on home lawns.

## TURF DISEASE CONTROL

DISEASE	FUNGICIDE	MOA	RATES (oz/1000 sq ft)	REMARKS
Gray Leaf Spot ( <i>Pyricularia</i> )  (continued)	<i>chlorothalonil</i> + <i>propiconazole</i> Concert Concert II	M5 + 3	3-5.5 fl oz at 7-14 day intervals 5.5-8.5 fl oz at 14-21 day intervals	
	<i>chlorothalonil</i> + <i>propiconazole</i> + <i>fludioxonil</i> Instrata	M5 + 3 + 12	2.75-6 fl oz at 10-14 day intervals	
	<i>chlorothalonil</i> + <i>thiophanate methyl</i> Consyst Peregrine Spectro Tee-1-up WDG TM + CTN SPC	M5 + 1	2-8 oz at 7-14 day intervals 2-5.76 oz	
	<i>chlorothalonil</i> + <i>thiophanate methyl</i> + <i>iprodione</i> + <i>tebuconazole</i> Enclave	M5 + 1 + 2 + 3	3-4 fl oz at 14-21 day intervals 7-8 fl oz at 28 day intervals	Apply when disease first appears. Make additional applications as needed. Allow spray to dry before watering in.
	<i>fluopyram</i> + <i>trifloxystrobin</i> Exteris	7 + 11	2.1-6 fl oz at 14-28 day interval	
	<i>fluoxastrobin</i> Disarm 480 SC, G Fame SC Fungicide Fame G Fungicide	11	0.18-0.36 fl oz at 14-28 day intervals 2.3-4.6 lb at 14-21 or 28 day intervals	Begin applications when conditions are favorable for disease development, prior to disease development.
	<i>fluoxastrobin</i> + <i>chlorothalonil</i> Disarm C, Fame + C	11 + M5	3-5.9 oz at 14-28 day intervals	Begin applications when conditions are favorable for disease development, prior to disease development.
	<i>fluoxastrobin</i> + <i>myclobutanil</i> Disarm M	11 + 3	0.25-1 oz at 14-28 day intervals	Begin applications when conditions are favorable for disease development, prior to disease development.
	<i>fluoxastrobin</i> + <i>tebuconazole</i> Fame + T	11 + 3	0.45-0.9 oz at 21-28 day intervals	
	<i>flutolanil</i> + <i>thiophanate methyl</i> Systar	7 + 1	2-3 oz. at 14 day intervals	
	<i>fludioxonil</i> Medallion Medallion SC	12	0.25-0.50 oz at 14 day intervals 1-2 fl oz at 7-14 day intervals	
	<i>fluxapyroxad</i> + <i>pyraclostrobin</i> Lexicon	7 + 11	0.34-0.47 fl oz at 14-28 day interval	
	<i>metconazole</i> Tourney	3	0.37 oz at 14-21 day intervals	Apply when conditions are favorable for disease development. <b>Do not</b> use on Bermudagrass.
mineral oil Civitas	NC	8-32 oz	Use <b>only</b> in conjunction with Civitas Harmonizer.	

## TURF DISEASE CONTROL

DISEASE	FUNGICIDE	MOA	RATES (oz/1000 sq ft)	REMARKS
Gray Leaf Spot ( <i>Pyricularia</i> ) (continued)	<i>myclobutanil</i> ArmorTech Myclo 20EW Eagle 20EW, 40WSP Lebanon Eagle G Myclobutanil 20EW T/O	3	1.2-2.4 oz	1 application.
	<i>polyoxin D</i> Affirm Endorse	19	4 oz in a minimum of 2 gal at 14 day intervals 2.4 lb/A at 7-14 day intervals	Do not irrigate for 12 hr after application.
	<i>propiconazole</i> ArmorTech PPZ143MC Banner Maxx, GL Kestrel Monsoon turf Savvi Spectator Strider ProPensity 1.3ME Prophesy Propiconazole SPC 14.3 Propicure 3.6	3	2 fl oz at 14 day intervals  Banner GL individual packets; one packet treats 11,000-22,000 sq ft	
	<i>pyraclostrobin</i> Insignia, Insignia Intrinsic	11	0.5-0.9 oz at 14-28 day intervals	Use as preventative. Begin application when conditions are favorable for fungal infection; prior to disease symptom development.
	<i>pyraclostrobin + boscalid</i> Honor Honor Intrinsic	11 + 7	0.55-1.1 oz at 14-28 day intervals	
	<i>pyraclostrobin + triticonazole</i> Pillar	11 + 3	3 lb at 28 day intervals	<b>Do not</b> make more than 5 applications/year at the use rate of 3 lb/1000 sq ft.
	<i>Reynoutria sachalinensis</i> Regalia PTO	P5	1-3 fl oz at 7-14 day intervals	Use in a minimum of 1.5 gal water/1000 sq ft. Begin applications preventatively.
	<i>tebuconazole</i> ArmorTech TEB360 XL Mirage Stressguard Sipcam Clearscape, ETQ Torque	3	0.6 fl oz  1-2 fl oz at 14-28 day intervals	Apply when conditions are favorable for disease development at 28 day intervals.
	<i>thiophanate methyl</i> ArmorTech TM462 Cavalier Cleary's 3336, 3336 DG Lite, 3336 F, 3336 G, 3336 GC, 3336 Plus Fungo Systec 1998 T-Bird 4.5L, 85 WDG T-Methyl SPC 4.5, SPC 50, G T-Storm Tee-off 4.5F	1	<b>Preventive:</b> 1 oz/5 gal water. Apply at 10-14 day intervals as needed  <b>Curative:</b> Apply 2 oz/5 gal water	

## TURF DISEASE CONTROL

DISEASE	FUNGICIDE	MOA	RATES (oz/1000 sq ft)	REMARKS
Gray Leaf Spot (Pyricularia) <i>(continued)</i>	<i>triadimefon</i> Bayleton 25WP, 50, Flo Fungicide VI Granular turf fungicide Systemic fungicide	3	<b>Preventive:</b> 1.5 lb at 15-30 day intervals <b>Curative:</b> 3 lbs at 15-30 day intervals Systemic Fungicide 0.5-1 oz at 15-30 day intervals	For golf and sod. Not to be used on residential or commercial areas.
	<i>trifloxystrobin</i> Compass	11	Apply 0.15-0.2 oz in 1-2 gal water at 14 day intervals or 0.25 oz in 1-2 gal water at 21 day intervals.	Apply when conditions are favorable for disease development.
	<i>trifloxystrobin</i> + <i>triadimefon</i> Armada, Tartan	11 + 3	1-2 oz at 14-28 day intervals 0.6-1.2 oz at 14-28 day intervals	
	<i>triticonazole</i> + <i>chlorothalonil</i> Reserve	3 + M5	3.2-4.5 oz at 14-28 day intervals	
Helminthosporium, Curvularia, Leaf Spots, Rusts, Anthracnose	<i>azoxystrobin</i> Heritage 50WG, G, TL Strobe, Strobe 50WG, Strobe 2L ArmorTech Zoxy	11	0.2-0.4 oz at 14-28 day intervals 2-4 lb at 14-28 day intervals	
	<i>azoxystrobin</i> + <i>chlorothalonil</i> Renown	11 + M5	2.5-4.5 oz at 7-10 day intervals	
	<i>azoxystrobin</i> + <i>difenconazole</i> Briskway	11 + 3	0.3-0.725 fl oz at 14-28 day intervals	14 day intervals for anthracnose; 14-28 day intervals for other leaf spots.
	<i>azoxystrobin</i> + <i>propiconazole</i> Headway	11 + 3	0.75-3 oz at 14-28 day intervals	
	<i>azoxystrobin</i> + <i>tebuconazole</i> ZoxyT, Strobe T	11 + 3	0.75-1.5 oz at 14-28 day intervals	
	<i>Bacillus licheniformis</i> EcoGuard SB 3086	44	Up to 20 oz at 3-14 day intervals	
	<i>Bacillus subtilis</i> Strain QST713 Rhapsody ArmorTech Sonnet	44	2-10 fl oz at 7-10 day intervals	Apply in sufficient water to provide thorough coverage. 2 gal/1000 sq ft are commonly used.
	<i>Bacillus subtilis</i> Strain GB03 Companion	44	4-6 fl oz 14-28 day intervals	
	<i>chlorothalonil</i> Chlorothalonil 500ZN, 720SFT, DF ArmorTech CLT720, CLT825 Chlorstar Chlorothalonil 500ZN, 720SFT, DF Daconil 2787, Action, G, Ultrex, Weatherstik, Zn Docket Echo DF, Echo Dyad ETQ ET Evade Legend Manicure, Manicure Ultra Pegasus DFX	M5	<b>Flowable</b> <b>Preventive:</b> 3-6 fl oz at 7-10 day intervals <b>Curative:</b> 6-11 fl oz at 7-10 day intervals <b>Wettable Powder (WDG90)</b> <b>Preventive:</b> 1.75-3.5 oz at 7-10 day intervals <b>Curative:</b> 3.5-6.5 oz at 7-10 day intervals	Recent label changes by manufacturers restrict use to commercial turf only. Not to be used on home lawns.

**TURF DISEASE CONTROL**

<b>DISEASE</b>	<b>FUNGICIDE</b>	<b>MOA</b>	<b>RATES (oz/1000 sq ft)</b>	<b>REMARKS</b>
Helminthosporium, Curvularia, Leaf Spots, Rusts, Anthracnose  (continued)	<i>chlorothalonil</i> + <i>propiconazole</i> Concert Concert II	M5 + 3	3-5.5 fl oz at 14-21 day intervals 5.5-8.5 fl oz at 14-28 day intervals	
	<i>chlorothalonil</i> + <i>propiconazole</i> + <i>fludioxonil</i> Instrata	M5 + 3 + 12	2.75-6 fl oz at 10-21 day intervals	
	<i>chlorothalonil</i> + <i>thiophanate methyl</i> Consyst Peregrin Spectro Tee-1-up WDG TM + CTN SPC	M5 + 1	2-8 oz at 7-21 day intervals 2-5.76 oz at 7-14 day intervals	
	<i>chlorothalonil</i> + <i>thiophanate methyl</i> + <i>iprodione</i> + <i>tebuconazole</i> Enclave	M5 + 1 + 2 + 3	3-4 fl oz at 14-21 day intervals For basal anthracnose use 4 fl oz at 14 day intervals 7-8 fl oz at 28 day intervals	Apply when disease first appears. Make additional applications as needed. Allow spray to dry before watering in.
	<i>fluzinam</i> Secure	29	0.5 fl oz at 14 day intervals	Applications should be made prior to infection or when conditions become favorable for disease development.
	<i>fludioxonil</i> Medallion Medallion SC	12	0.25-0.50 oz at 14-21 day intervals Anthracnose – 1-2 fl oz at a 14 day interval Leaf spot – 1-2 fl oz at 14-21 day intervals	
	<i>fluopyram</i> + <i>trifloxystrobin</i> Exteris	7 + 11	Anthracnose – 2.135-6 fl oz at 14-28 day interval Rust – 1.5-4.135 fl oz	
	<i>fluoxastrobin</i> Disarm 480 SC, G Fame SC Fungicide Fame G Fungicide	11	0.18-0.36 fl oz at 14-28 day intervals 2.3-4.6 lb at 14-28 day intervals	Begin applications when conditions are favorable for disease development, prior to disease development.
	<i>fluoxastrobin</i> + <i>chlorothalonil</i> Disarm C, Fame + C	11 + M5	3-5.9 oz at 14-28 day intervals	Begin applications when conditions are favorable for disease development, prior to disease development.
	<i>fluoxastrobin</i> + <i>myclobutanil</i> Disarm M	11 + 3	0.25-1 oz at 14-28 day intervals	Begin applications when conditions are favorable for disease development, prior to disease development.
	<i>fluoxastrobin</i> + <i>tebuconazole</i> Fame + T	11 + 3	0.45-0.9 oz at 21-28 day intervals	
	<i>flutolanil</i> + <i>thiophanate methyl</i> Systar	7 + 1	2-3 oz at 14 day intervals	
<i>fluxapyroxad</i> + <i>pyraclostrobin</i> Lexicon	7 + 11	0.34-0.47 fl oz at 14-28 days interval		



## TURF DISEASE CONTROL

DISEASE	FUNGICIDE	MOA	RATES (oz/1000 sq ft)	REMARKS
Helminthosporium, Curvularia, Leaf Spots, Rusts, Anthracnose  (continued)	<i>hydrogen dioxide</i> TerraCyte Pro Zerotol	NC	6-25 oz	Curative control may require 2-3 consecutive applications. Use 3-5 gal/1000 sq ft.
	<i>iprodione</i> 18 Plus ArmorTech IP233 Chipco 26GT Chipco 26019 Eclipse ETQ Iprodione Pro 2SE Iprodione SPC Ipro 2SE Fungicide X Raven	2	2-4 fl oz in 2-10 gal water Apply every 14-21 days  2 oz = 12 Tbsp  1.5-2 oz at 14-21 day intervals 3-4 fl oz at 14-28 day intervals	Not for use in residential areas.
	<i>iprodione + thiophanate methyl</i> 6/36 ArmorTech TMI 2020 Dovetail Lesco Twosome TM + IP SPC	2 + 1	1-4 oz at 14-21 day intervals	
	<i>iprodione + trifloxystrobin</i> Interface	2 + 11	5-7 oz at 14-21 day intervals	Anthracnose suppression only.
	<i>mancozeb + copper hydroxide</i> Junction	M3 + M1	2-4 oz at 5 day intervals	
	<i>maneb, maneb + zinc sulfate</i> & <i>mancozeb</i>	M3	4 oz at 10-14 day intervals	
	<i>myclobutanil</i> ArmorTech Myclo 20EW Eagle 20EW Eagle WSP 40 Golden Eagle Lebanon Eagle G Myclobutanil 20EW T/O	3	<b>Preventive:</b> 0.6 oz at 14 day intervals (3 oz pkt/5000 sq ft)	Do not graze treated areas or feed clippings to livestock.
	<i>metconazole</i> Tourney	3	0.28-0.37 oz at 14-21 day intervals	Apply when conditions are favorable for disease development. Do not use on Bermudagrass.
	<i>mineral oil</i> Civitas	NC	8-32 oz	Use only in conjunction with Civitas Harmonizer.
	<i>PCNB</i> Engage Penstar Revere Terraclor Turfcide Autilus	14	7-10 oz in 5-10 gals water at 3-4 week intervals  5-6 oz in 1-10 gals water at 7-10 day intervals	
<i>penthiopyrad</i> Velist	7	0.3-0.5 oz at 14 day intervals	Begin applications at early stages of disease development.	

**TURF DISEASE CONTROL**

<b>DISEASE</b>	<b>FUNGICIDE</b>	<b>MOA</b>	<b>RATES (oz/1000 sq ft)</b>	<b>REMARKS</b>
Helminthosporium, Curvularia, Leaf Spots, Rusts, Anthracnose <i>(continued)</i>	<i>phosphorus acid</i> Fosphite	33	2-3 fl oz	Use only as preventative treatment or when conditions are favorable for disease development.
	<i>polyoxind</i> Affirm Endorse	19	4 oz in a minimum of 2 gal at 14 day intervals. 2.4 lb/A at 7-14 day intervals	Do not irrigate for 12 hrs after application.
	<i>propiconazole</i> ArmorTech PPZ143MC Banner Maxx, Banner GL Kestrel Monsoon turf ProPensity 1.3ME Prophesy Propiconazole SPC 14.3 Propicure 3.6F Savvi Strider	3	1-2 fl oz at 14-28 day intervals  Banner GL individual packets; one packet treats 11,000-22,000 sq ft	If anthracnose is present use 2 oz rate in combination with Daconil or Chipco 26GT. Do not mow or irrigate treated areas until grass is completely dry. Do not use on home lawns. Bermudagrass and St. Augustinegrass can be sensitive to Banner. <b>Do not</b> exceed 2 fl oz/1000 sq ft every 30 days on any variety of Bermudagrass or St. Augustinegrass. On Bentgrass, do not exceed 1 oz/1000 sq ft or apply at less than 21-day intervals when temperatures exceed 80°F.
	<i>pyraclostrobin</i> Insignia Insignia Intrinsic	11	0.5-0.9 oz at 14-28 day intervals	Use as preventative. Begin application when conditions are favorable for fungal infection; prior to disease symptom development.
	<i>pyraclostrobin + boscalid</i> Honor Honor Intrinsic	11 + 7	0.55-1.1 oz at 14-28 day intervals	
	<i>pyraclostrobin + triticonazole</i> Pillar	11 + 3	3 lb at 28 day intervals	Do not make more than 5 applications/year at the use rate of 3 lb/1000 sq ft.
	<i>Reynoutria sachalinensis</i> Regalia PTO	P5	1-3 fl oz at 7-14 day intervals	Use in a minimum of 1.5 gal water/1000 sq ft. Begin applications preventatively.
	<i>tebuconazole</i> ArmorTech TEB360 XL Mirage Stressguard Sipcam Clearscape Sipcam Clearscape ETQ Torque	3	0.6 fl oz  Mirage – 1-2 fl oz at 14-28 day interval	For prevention, begin applications when conditions are favorable for disease development. Do not make two consecutive applications of Torque fungicide. Alternate with another fungicide with different mode of action. A second application may be made after 28 days.
<i>thiophanate methyl</i> ArmorTech TM462 Cavalier Cleary's 3336, 3336 DG Lite, 3336 F, 3336 G, 3336 GC, 3336 Plus Fungo Systec 1998 T-Bird 4.5L, T-Bird 85 WDG T-Methyl SPC 4.5 T-Methyl SPC 50 T-Methyl G T-Storm Tee-off 4.5F	1	<b>Preventive:</b> 1 oz/5 gal water (Anthracnose) Apply every 10-14 days as needed  <b>Curative:</b> Apply 2 oz/5 gal water		

## TURF DISEASE CONTROL

DISEASE	FUNGICIDE	MOA	RATES (oz/1000 sq ft)	REMARKS
Helminthosporium, Curvularia, Leaf Spots, Rusts, Anthracnose  (continued)	<i>thiram</i> Spotrete F	M3	<b>Preventative:</b> 3.75 fl oz at 7-10 day intervals <b>Curative:</b> 7.5 fl oz at 3-5 day intervals	For best results use spray mix the same day it is prepared. Spray right after mowing or avoid mowing 12 hrs after application.
	<i>trifloxystrobin</i> Compass	11	<b>Preventive:</b> Apply 0.1-0.15 oz at 14 day intervals <b>Curative:</b> Leaf spot – 0.15-0.25 oz in 1-2 gal water at 21-28 day intervals Rust – 0.2-0.25 oz in 1-2 gal water at 21 day intervals <b>Preventive:</b> Anthracnose – 0.15-0.2 oz at 14 day intervals in 1-2 gal water <b>Curative:</b> 0.25 oz at 21 day intervals in 1-2 gal water	Apply when conditions are favorable for disease.
	<i>triadimefon</i> Bayleton 50 Bayleton Flo	3	1 oz 1 fl oz	<b>For Anthracnose: Preventative rate</b> – Apply at 30 day intervals and repeat as necessary for seasonal control. Depending on environmental conditions, residual control may be extended to 45 days. <b>Curative rate</b> – To control existing infections. Subsequent applications should be applied on a preventative schedule and rate. For golf and sod only. Not to be used on residential or commercial areas.
	<i>trifloxystrobin + triadimefon</i> Armada Tartan	11 + 3	1-2 oz at 14-28 day intervals 0.6-1.2 oz at 14-28 day intervals	
	<i>triticonazole</i> Trinity Triton	3	0.5-1 fl oz at 14-28 day intervals	
	<i>triticonazole + chlorothalonil</i> Reserve	3 + M5	3.2-4.5 oz at 14-28 day intervals	
	<i>vinclozolin</i> Curalan Touche	2	Helminthosporium – 1-2 oz at 14-28 day intervals	
Pythium Blight, Pythium Root Rots, Pythium Root Dysfunction	<i>azoxystrobin</i> Heritage 50WG, G, TL Strobe 50 WG, Strobe 2L ArmorTech Zoxy	11	0.4 oz at 10-14 day intervals 2-4 lb at 10-14 day intervals	
	<i>azoxystrobin + Acibenzolar-S-Methyl</i> Heritage Action	11 + P	0.2-0.4 oz at 10-14 day intervals	
	<i>azoxystrobin + propiconazole</i> Headway	11 + 3	3 oz at 10-14 day intervals	
	<i>azoxystrobin + tebuconazole</i> ZoxyT, Strobe T	11 + 3	1.5 oz at 10-14 day intervals	

## TURF DISEASE CONTROL

DISEASE	FUNGICIDE	MOA	RATES (oz/1000 sq ft)	REMARKS
Pythium Blight, Pythium Root Rots, Pythium Root Dysfunction  (continued)	<i>bacillus subtilis</i> Strain GB03 Companion	44	4-6 fl oz 14-28 day intervals	
	<i>chloroneb</i> Termec SP Terraneb	14	4 oz in 3-5 gal water 4 oz = 12.5 Tbsp	
	<i>cyazofamid</i> Segway	21	0.45-0.9 fl oz at 14-21 day intervals	Apply as a preventative treatment at 0.45-0.9 fl oz in 2-4 gal of water. On established turf apply as a preventative treatment when conditions are favorable for disease development. During periods of prolonged favorable conditions use 0.45 fl oz at 14 day intervals, using another fungicide having a different mode of action between applications of Segway. For newly seeded areas use 0.45 fl oz in 2-4 gal water immediately after seeding.
	<i>etridiazole</i> Koban 30WP Terrazole	14	<b>Established Turf:</b> 2-4.5 oz in 5 gal water <b>Newly Seeded Areas:</b> 7-9 oz in 5 gal water 4 oz = 9.5 Tbsp  Terrazole: 2-4.5 oz at 10-14 day intervals	Re-treat in 5-10 days depending on weather conditions. Can cause phytotoxicity on cool season turfgrass in hot weather at low carrier volumes.
	<i>fosetyl AL (Aluminum tris)</i> Alliette 80WP ArmorTech ALT 70 Autograph Chipco Signature Signature Stressgard XTRA Fosetyl-Al 80WDG Prodigy Signature	33	4-8 oz in 1-5 gal water/1000 sq ft at 14-21 day intervals  ALT 70 – 4.6-9.2 oz	Do not mow and/or water treated areas until foliage is completely dry.  Begin preventive applications when conditions first favor disease and repeat as recommended, using 4-8 oz at 14-21 day intervals.
	<i>flouxastrobin</i> Disarm 480 SC	11	0.18-0.36 fl oz at 14 day intervals	Begin applications when conditions are favorable for disease development, prior to disease development. When conditions are conducive for heavy Pythium infections use Disarm in combination with another product labeled for Pythium control.
	<i>flouxastrobin + chlorothalonil</i> Disarm C	11 + M5	3-5.9 oz at 7-14 day intervals	
	<i>flouxastrobin + myclobutanil</i> Disarm M	11 + 3	0.25-1 oz at 14 day intervals	Use preventatively.
	<i>fluxapyroxad + pyraclostrobin</i> Lexicon	7 + 11	0.34-0.47 fl oz at 14-28 days interval	Use preventatively.
	<i>hydrogen dioxide</i> TerraCyte Pro Zerotol	NC	6-12 oz at 7 day intervals	Curative control may require 2-3 consecutive applications. Use on 3-5 gal/1000 sq ft.

## TURF DISEASE CONTROL

DISEASE	FUNGICIDE	MOA	RATES (oz/1000 sq ft)	REMARKS
Pythium Blight, Pythium Root Rots, Pythium Root Dysfunction <i>(continued)</i>	<i>mefenoxam</i> Mefenoxam 2AQ Subdue Subdue G Subdue Maxx	4	<b>Established Turf:</b> Subdue Maxx: 0.5-1 fl oz in 1-5 gal of water  <b>Newly Seeded Areas:</b> Subdue Maxx: 0.5-1 fl oz in 1-5 gal of water	Re-treat at 10-14 day intervals depending on disease pressure and weather conditions.  Apply immediately after seeding and irrigate with 0.25-0.5" water. Repeat application at 7-14 day intervals if conditions remain favorable for disease.
	<i>mancozeb + copper hydroxide</i> Junction	M3 + M1	2-4 oz at 5 day intervals	
	<i>phosphorous acid</i> Alude Fosphite Jetphiter Fiata-Stressguard	33	5-10 fl oz at 7-14 day intervals Fosphite – 2-3 fl oz Jetphiter – 3.5-5 fl oz	Apply recommended quantity of product in 1-5 gal of water. Do not irrigate or mow treated areas until spray has completely dried.
	<i>phosphate</i> Appear Magellan Phostrol Vital	33	4.1 fl oz at 14 day intervals 8.2 fl oz at 21 day intervals Appear – P. blight 3-4 fl oz at 7-14 day intervals. – P. root and crown/damping 6-8 fl oz at 7-14 day intervals.	Do not irrigate or mow treated areas until spray has completely dried. Begin preventative applications when conditions first favor disease.
	<i>propamocarb</i> Banol Lesco Banol Proplant	28	<b>Preventative:</b> 1.25-2 fl oz in 2-5 gal water  <b>Curative:</b> 3-4 fl oz in 2-5 gals water	<b>Established Turf:</b> Apply as a preventative treatment during periods of high temperature and humidity. <b>Overseeded Areas:</b> Apply after germination. Repeat at 7-21 day intervals if favorable disease conditions persist.
	<i>propamocarb + fluopicolide</i> Stellar	28 + 43	1.2 fl oz	The maximum Stellar application rate is 2.4 oz/year/1000 sq ft. <b>Overseeded Turf:</b> Apply after seed germination to prevent Pythium damping off. <b>Established Turf:</b> Apply when conditions are favorable for disease development.
	<i>pyraclostrobin</i> Insignia Insignia Intrinsic	11	0.5-0.9 oz at 14-28 day intervals	Use as preventative. Begin application when conditions are favorable for fungal infection; prior to disease symptom development.
	<i>pyraclostrobin + boscalid</i> Honor Honor Intrinsic	11 + 7	Dysfunction – 1.1 oz at 14-28 day intervals Blight – 1.1 oz at 10-14 day intervals	
	<i>pyraclostrobin + triticonazole</i> Pillar	11 + 3	3 lb at 28 day intervals	<b>DO NOT</b> make more than 5 applications per year at the use rate of 3 lb/1000 sq ft.
<i>Reynoutria sachalinensis</i> Regalia PTO	P5	1-3 fl oz at 7-14 day intervals	Use in a minimum of 1.5 gal water/1000 sq ft. Begin applications preventatively.	
Spring Dead Spot ( <i>Ophiosphaerella korrae</i> , <i>Ophiosphaerella narmari</i> , <i>Ophiosphaerella herpotricha</i> )	<i>azoxystrobin</i> Heritage 50 WG, TL, Strobe 50 WG, Strobe 2L ArmorTech Zoxy	11	0.4 oz at 28 day intervals 0.38-0.77 oz at 28 days intervals	Make 1 or 2 applications in fall or when conditions are favorable for disease development.
	<i>azoxystrobin + Acibenzolar-S-Methyl</i> Heritage Action	11 + P	0.4 oz at 28 day intervals 0.2-0.4 oz at 14-28 day intervals	

## TURF DISEASE CONTROL

DISEASE	FUNGICIDE	MOA	RATES (oz/1000 sq ft)	REMARKS
Spring Dead Spot ( <i>Ophiosphaerella korrae</i> , <i>Ophiosphaerella narmari</i> , <i>Ophiosphaerella herpotricha</i> ) (continued)	<i>azoxystrobin + propiconazole</i> Headway	11 + 3	3 oz at 14-28 day intervals	
	<i>azoxystrobin + tebuconazole</i> ZoxyT, Strobe T	11 + 3	1.5 oz at 14-28 day intervals	
	<i>chlorothalonil + thiophanate methyl + iprodione + tebuconazole</i> Enclave	M5 + 1 + 2 + 3	3-4 fl oz at 14-21 day intervals 7-8 fl oz at 28 day intervals	Apply when disease first appears. Make additional applications as needed. Allow spray to dry before watering in.
	<i>fenarimol</i> Rubigan A.S.	3	4 oz in September or 6 oz in October or November and irrigated with 0.5-1" of water	
	<i>fluoxastrobin</i> Disarm 480 SC, G, Fame SC Fungicide Fame G Fungicide	11	0.36 fl oz at 28 day intervals 2.3-4.6 lb at 14-28 day intervals	Begin applications before disease is present and continue applications while conditions for disease development are present. Make two applications 28 days apart during spring or fall.
	<i>fluoxastrobin + chlorothalonil</i> Disarm C, Fame + C	11 + M5	5.9 oz at 14-28 day intervals	
	<i>fluoxastrobin + myclobutanil</i> Disarm M	11 + 3	0.5-1 oz at 14-28 day intervals	Make 1-2 applications approximately one month prior to Bermudagrass dormancy. 0.25-0.5" of irrigation after application is recommended. Re-apply 14-28 days later.
	<i>fluoxastrobin + tebuconazole</i> Fame + T	11 + 3	0.45-0.9 oz at 21-28 day intervals	
	<i>fluxapyroxad + pyraclostrobin</i> Lexicon	7 + 11		
	<i>myclobutanil</i> ArmorTech Myclo 20EW Eagle 20EW Eagle WSP 40 Golden Eagle	3	2.4 fl oz at 28 day intervals	Make 1-2 applications in the fall before turfgrass dormancy. Make a second application one month later.
	<i>penthiopyrad</i> Velista	7		
<i>propiconazole</i> ArmorTech PPZ143MC Banner Maxx, Banner GL Kestrel Monsoon turf ProPensity 1.3ME Prophesy Propiconazole SPC 14.3 Propicure 3.6F Savvi Spectator Strider	3	4 oz at 30 day intervals  Banner GL individual packets; 1 packet treats 11,000-22,000 sq ft	Make 1-3 applications. For one application apply in September or October. For multiple applications, begin sprays in August.	

**TURF DISEASE CONTROL**

<b>DISEASE</b>	<b>FUNGICIDE</b>	<b>MOA</b>	<b>RATES (oz/1000 sq ft)</b>	<b>REMARKS</b>
Spring Dead Spot ( <i>Ophiosphaerella korrae</i> , <i>Ophiosphaerella narmari</i> , <i>Ophiosphaerella herpotricha</i> ) (continued)	<i>tebuconazole</i> ArmorTech TEB360 XL Mirage Stressguard Sipcam Clearscape Sipcam Clearscape ETQ Torque	3	0.6 fl oz  2 fl oz at 28 day interval	For prevention, apply in fall when soil temperatures reach 65°F and again in spring under similar temperature conditions or after dormancy break.  Begin applications preventatively when soil temperatures drop below 70°F at 2 inch soil depth in the fall
	<i>thiophanate methyl</i> ArmorTech TM462 Cavalier Cleary's 3336, 3336 DG Lite, 3336 F, 3336 G, 3336 GC, 3336 Plus Fungo Systec 1998 T-Methyl SPC 4.5 T-Methyl SPC 50 T-Methyl G	1	4-6 oz at 14 day intervals  ArmorTech 3.5-5.3 oz	
Take all patch/root rot ( <i>Gaeumannomyces graminis</i> )	<i>azoxystrobin</i> Heritage 50 WG, G Strobe 50 WG, Strobe 2L ArmorTech Zoxy	11	0.4 oz at 28 day intervals 2-4 lb at 28 day intervals 0.38-0.77 oz at 28 day intervals	Make 1-2 applications in fall or when conditions are favorable for disease development.
Bermuda Decline  (see fungicide labels for specific <i>Gaeumannomyces</i> species/diseases)	<i>azoxystrobin</i> + <i>Acibenzolar-S-Methyl</i> Heritage Action	11 + P	0.2-0.4 oz at 28 day intervals	
	<i>azoxystrobin</i> + <i>difenconazole</i> Briskway	11 + 3	0.5-0.725 fl oz at 28 day intervals	Begin applications prior to disease development. Make two applications in the spring and two applications 28 days apart in the fall.
	<i>azoxystrobin</i> + <i>propiconazole</i> Headway	11 + 3	3 oz at 14-28 day intervals	
	<i>azoxystrobin</i> + <i>tebuconazole</i> ZoxyT	11 + 3	1.5 oz at 14-28 day intervals	
	<i>fenarimol</i> Rubigan A.S.	3	4 oz in September or 6 oz in October or November and irrigated with 0.5-1" of water	
	<i>fluoxastrobin</i> Disarm 480 SC, G, Fame SC Fungicide, Fame G Fungicide	11	0.36 fl oz at 14 day intervals 0.36 fl oz at 28 day intervals 2.3-4.6 oz at 14-28 day intervals	Apply 1-2 applications approximately one month before turfgrass dormancy. 0.25-0.5" of direct irrigation is recommended after application.
	<i>fluoxastrobin</i> + <i>chlorothalonil</i> Disarm C, Fame + C	11 + M5	5.9 oz at 28 day intervals	
	<i>fluoxastrobin</i> + <i>myclobutanil</i> Disarm M	11 + 3	0.5-1 fl oz at 28 day intervals	
	<i>fluoxastrobin</i> + <i>tebuconazole</i> Fame + T	11 + 3	0.45-0.9 oz at 21-28 day intervals	
	<i>hydrogen dioxide</i> TerraCyte Pro Zerotol	NC	6-12 oz at 7 day intervals	Curative control may require 2-3 consecutive applications. Use on 3-5 gal/1000 sq ft.

## TURF DISEASE CONTROL

DISEASE	FUNGICIDE	MOA	RATES (oz/1000 sq ft)	REMARKS
Take all patch/root rot ( <i>Gaeumannomyces graminis</i> )	<i>fluxapyroxad + pyraclostrobin</i> Lexicon	7 + 11	0.47 fl oz at 28 days interval	Use preventively. Begin applications when conditions are favorable for fungal infection, prior to disease symptom development. Make 1-2 applications in the fall, 28 days apart, followed by 1-2 applications in the spring, 28 days apart. <b>DO NOT</b> exceed 3 applications in a 12 month period.
Bermuda Decline  (see fungicide labels for specific <i>Gaeumannomyces</i> species/diseases)  (continued)	<i>myclobutanil</i> Eagle 40WSP	3	1.2-2.4 oz at 28 day intervals (spring and fall)	
	<i>propiconazole</i> ArmorTech PPZ143MC Banner GL, Banner Maxx Kestrel Monsoon turf ProPensity 1.3ME Prophesy Propiconazole SPC 14.3 Propicure 3.6F Savvi Spectator Strider	3	4 oz at 30 day intervals.  Banner GL individual packets; one packet treats 11,000-22,000 sq ft	Make 1-3 applications. For one application apply in September or October. For multiple applications, begin sprays in August.
	<i>pyraclostrobin</i> Insignia Insignia Intrinsic	11	0.5-0.9 oz at 14-28 day intervals	Use as preventative. Begin application when conditions are favorable for fungal infection; prior to disease symptom development.
	<i>pyraclostrobin + boscalid</i> Honor Honor Intrinsic	11 + 7	Bermudagrass Decline 1.1 oz Take All Patch: 1.1 oz at 28 day intervals	<b>Bermudagrass Decline:</b> Make one application in the spring following green-up and a second application in the fall when air temperatures remain above 80°F and humidity is 75% or higher. Apply in 4 gal of water/1000 sq ft.
	<i>pyraclostrobin + triticonazole</i> Pillar	11 + 3	3 lb at 28 day intervals	<b>DO NOT</b> make more than 5 applications per year at the use rate of 3 lb/1000 sq ft.
	<i>Reynoutria sachalinensis</i> Regalia PTO	P5	1-3 fl oz at 7-14 day intervals	Use in a minimum of 1.5 gal water /1000 sq ft. Begin applications preventatively.
	<i>tebuconazole</i> ArmorTech TEB360 XL Mirage Stressguard Sipcam Clearscape Sipcam Clearscape ETQ Torque	3	0.6 fl oz  Mirage: 2 fl oz at 28-day interval	<b>Bermudagrass Decline:</b> Irrigate the area with sufficient water to move fungicide into crown and root zone of the turf. <b>Take All Patch:</b> For prevention, apply in fall when soil temperatures reach 65°F and again in spring under similar temperature conditions. Apply preventatively in the fall and spring.
	<i>trifloxystrobin + triadimefon</i> Tartan	11 + 3	For Take All Patch: 1.5-2 oz at 28 day intervals	



## TURF DISEASE CONTROL

DISEASE	FUNGICIDE	MOA	RATES (oz/1000 sq ft)	REMARKS
Take all patch/root rot <i>(Gaeumannomyces graminis)</i>  Bermuda Decline  (see fungicide labels for specific <i>Gaeumannomyces</i> species/diseases)  <i>(continued)</i>	<i>thiophanate methyl</i> Cavalier Cleary's 3336, 3336 DG Lite, 3336 F, 3336 G, 3336 GC, 3336 Plus Fungo Systec 1998 T-Methyl SPC 4.5 T-Methyl SPC 50 T-Methyl G	1	4-6 oz at 14 day intervals	
	<i>triadimefon</i> Bayleton 25WP Bayleton 50 Bayleton Flo Granular turf fungicide Systemic fungicide	3	<b>Preventative:</b> 2 oz Start sprays 2-4 weeks before symptoms reappear. Re-apply every 3-4 weeks  <b>Curative:</b> 4 oz Make 1-2 sprays at 2-3 week intervals followed by the preventative rate at 3-4 week intervals	Apply 2-4 gal of spray volume/1000 sq ft. Thoroughly water after each application.  50 and Flo; Immediately after the fungicide is applied, the area should be thoroughly irrigated to move the active ingredient down into the crown and root zone of the turf. The amount of water is dependent on the depth of the root zone. The objective is to water the fungicide into the crown and root zone. For golf and sod only. Not to be used on residential or commercial areas.
	<i>triticonazole</i> Trinity Triton	3	0.5-1 fl oz at 14-28 day intervals	Make 1-2 fall applications (September and October) and 1-2 spring applications (April and May) depending on local conditions.
	<i>triticonazole + chlorothalonil</i> Reserve	3 + M5	Take All Patch – 3.2-4.5 oz at 14-28 day intervals	Begin fungicide applications preventatively in the fall and repeat in the spring. Make 1-2 applications depending on local disease conditions, repeat under active disease conditions as needed.

## FUNGICIDES SOLD AS PRE-PACKED MIXTURES

ACTIVE INGREDIENTS	PRODUCT NAMES	ACTIVE INGREDIENTS	PRODUCT NAMES
<i>azoxystrobin + propiconazole</i>	Headway	<i>fluoxastrobin + miclobutanil</i>	Disarm M
<i>Azoxystrobin + Acibenzolar-S-Methyl</i>	Heritage Action	<i>iprodione + thiophanate methyl</i>	26/36 Fungicide, ArmorTech TMI 2020, Dovetail, Lescos twosome, TM + IP SPC
<i>azoxystrobin + chlorothalonil</i>	Renown	<i>iprodione + trifloxystrobin</i>	Interface
<i>azoxystrobin + difenconazole</i>	Briskway	<i>myclobutanil + mancozeb</i>	MANhandle
<i>azoxystrobin + tebuconazole</i>	ZoxyT, Strobe T,	<i>pyraclostrobin + boscalid</i>	Honor, Honor Intrinsic
<i>copper hydroxyde + mancozeb</i>	Junction	<i>pyraclostrobin + triticonazole</i>	Pillar
<i>chlorothalonil + propiconazole</i>	Concert, Concert II	<i>thiophanate methyl + chlorothalonil</i>	Broadcide, ConSyst, Peregrine, Spectro, Tee-1-up WDG, TM + CTN SPC
<i>chlorothalonil + tebuconazole</i>	E-Scape ETQ	<i>thiophanate methyl + flutolanil</i>	Systar
<i>chlorothalonil + fludioxonil + propiconazole</i>	Instrata	<i>thiophanate methyl + mancozeb</i>	Duosan
<i>chlorothalonil + thiophanate methyl + iprodione + tebuconazole</i>	Enclave	<i>thiophanate methyl + thiram</i>	Bromosan
<i>chlorothalonil + acibenzolar-S-methyl</i>	Daconil Action	<i>triadimefon + flutolanil</i>	Prostar plus
<i>fluopyram + trifloxastrobin</i>	Exteris		
<i>fluoxastrobin + chlorothalonil</i>	Disarm C, Fame + C	<i>triadimefon + trifloxystrobin</i>	Armada 50WGD, Armada 50WP, Tartan
<i>fluoxastrobin + tebuconazole</i>	Fame + T	<i>triticonazole + chlorothalonil</i>	Reserve

See labels for rates and specific recommendations

## MAJOR CHEMICAL GROUPS OF TURFGRASS FUNGICIDES

CHEMICAL FAMILY	COMMON NAME	TRADE NAME	TYPE/MODE OF ACTION
acylpicolides	<i>fluopicolide</i>	Stellar	Delocalization of proteins
Aromatic Hydrocarbons	<i>chloroneb</i>	Anderson's Fungicide V 6.25G, Anderson's Turf Fungicide 7.5G, Termec SP, Terraneb SP	<b>Mode of action:</b> Interferes with mitosis
	<i>etridiazol</i>	Koban 30WP, Terrazole	
	<i>PCNB</i>	Anderson's 10-0-14 Fertilizer + 15% PCNB, Autilus Anderson's FFII 15 .4G (14-3-3), Cleary's PCNB, Engage 75W, Engage 10GF, FF II, Lesco Revere 4000 4F, Lesco Revere 10G, Parflo 4F, Penstar 75WP, Penstar 15G, Penstar 4F, Revere 10G, Revere 4000, Flowable Turf, Terraclor 75%WP, Terraclor 75%WP (T&O), Turfcide 400F, Turfcide 10G	
Antibiotic	<i>polyoxind</i>	Affirm, Endorse	Localized penetrant fungicide <b>Mode of action:</b> Inhibits chitin production, which is a major component of the cell wall in many fungi; Inhibits spore germination
Benzimidazoles	<i>thiophanate methyl</i>	Anderson's Systemic Fungicide 2.3G, ArmorTech TM 462, Cavalier, Cleary's 3336 50W/WSP, 3336 2G, 3336 4.5F, 3336 GC, 3336 DG Lite, Fungo Flo AGC, Fungo 4.5F, Fungo Flo 50WSB, Lesco T-Storm (50WSP, 2G, Flowable), OHP 6672 (4.5L & 50W), Scott's Lawn Fungus Control, Systec 1998 85WDG, T-Bird 4.5L, T-Bird 85 WDG, T-Methyl SPC 4.5, T-Methyl SPC 50, T-Methyl G, Tee-off 4.5F	Acropetal penetrant <b>Mode of action:</b> Fungicide binds tubulin subunits that results in mitotic arrest
Carboximides	<i>boscalid</i>	Emerald	Acropetal penetrant fungicide Basidiomycete control <b>Mode of action:</b> Blocks activity of certain respiratory enzymes
	<i>fluopyram</i>	Part of Exteris	
	<i>flutalonil</i>	Prostar	
	<i>fluxapyroxad</i>	Xzemplar	
	<i>penthiopyrad</i>	Velista	
	<i>isofetamid</i>	Kabuto Fungicide SC	
Demethylation Inhibitors (DMI's)	<i>fenarimol</i>	Rubigan	Broad spectrum acropetal penetrant fungicide <b>Mode of action:</b> Sterol inhibitor (ergosterol). Inhibits cell membrane synthesis
	<i>myclobutanil</i>	ArmorTech Myclo 20 EW, Eagle 20 EW, Eagle 40 WSP, Lesco Eagle G, Lebanon Eagle G, Myclobutanil 20EW T/O	
	<i>propiconazole</i>	ArmorTech PPZ143MC, Banner GL 3.6 WSP, Banner Maxx 1.24 MEC, Lesco Spectator 3.6EC, Lesco Spectator Ultra 1.3 MEC, Monsoon turf, ProPensity 1.3 ME, Propiconazole SPC 14.3, Quali-pro propiconazole 14.3, Strider, Propicure 3.6F	
	<i>triadimefon</i>	Accost 1G, Anderson's Fungicide VII 0.59G, Anderson's 1% Bayleton 1G, Bayleton 25WP, Bayleton 50WSP, Bayleton Flo, Lebanon Bayleton 1G, Lesco Granular turf fungicide 1G, Lesco Systemic, Pro Bayleton, Strike 25 WP	
	<i>triticonazole</i>	Trinity, Triton	
	<i>tebuconazole</i>	ArmorTech TEB360 XL, Sipcam Clearscape, Sipcam Clearscape ETQ, Torque, Mirage Stressguard	

## MAJOR CHEMICAL GROUPS OF TURFGRASS FUNGICIDES

CHEMICAL FAMILY	COMMON NAME	TRADE NAME	TYPE/MODE OF ACTION
Dicarboximides	<i>iprodione</i>	ArmorTech IP233, Chipco 26GT, Chipco 26019, Eclipse ETQ, Lesco 18 plus, Iprodione Pro 2SE, Iprodione SPC, Ipro2SE	Localized Penetrant <b>Mode of action:</b> Affects DNA synthesis and lipid metabolism
	<i>vinclozolin</i>	Curalan, Touche	
Carbamates and Dithiocabamates	<i>mancozeb</i>	Dithane 4SC Rainshield, Dithane 75DF Rainshield, Dithane DF, Dithane DF Rainshield, Dithane F-45 Rainshield, Dithane M-45, Dithane WF Rainshield, Dithane T/O Rainshield 75WP, Dithane 37WF, Flowable Mancozeb 4, Fore, Fore Flo-XL 4F, Fore 80WP Rainshield, Formex 80W, Lesco Mancozeb 75DG, Lesco 4 Flowable Mancozeb 4F, Mancozeb + Copper, Mancozeb DG, Manzate 80WP, Manhandle, ManKocide, Manzate 75DF, Manzate Flowable Protect T/O	Protectant fungicide <b>Mode of action:</b> Enzyme inactivation
	<i>propamocarb hydrochloride</i>	Banol, Lesco Banol, Proplant	Localized penetrant <b>Mode of action:</b> Alters cell membrane function
Nitriles	<i>chlorothalonil</i>	ArmorTech CLT720, ArmorTech CLT825, Anderson's 5% ChloroStar 6F, 82.5WDG, Chlorothalonil 500ZN, 720SFT, DF, CountDown, Daconil 5G, Daconil Action, Daconil Ultrex, Daconil Weatherstik, Daconil Zn, Docket, Echo DF, Echo 500, Echo Ultimate ETQ, Echo 6F ETQ, Echo Dyad ETQ, Evade, 75WDG, Lebanon Daconil 5G, Lesco Manicure T/O, 6F, Legend, ThaloniL, Manicure, Manicure Ultra, Pegasus DFX, Ultrex 82.5WDG	Protectant Fungicide <b>Mode of action:</b> Toxic to cell membrane
Phenylamides	<i>mefenoxam</i>	Anderson's Pythium Control 1.2G, Apron XL LS, Mefenoxam 2AQ, Quell, Ridomil Gold EC, Subdue GR, Subdue Maxx, Subdue WSP, Tri-Power Selective	Acropetal penetrant fungicide <b>Mode of action:</b> Inhibits RNA synthesis
Phenylpyrrole	<i>fludioxonil</i>	Medallion	Protectant Fungicide <b>Mode of action:</b> Cell membrane toxicity, amino acids uptake inhibition
phenylpyridnamine	<i>fluazinam</i>	Secure	Protectant Fungicide <b>Mode of action:</b> Inhibits respiration
Phosphonates	<i>fosetyl-a1</i>	ArmorTech ALT70, Aliette 80WP, Aliette WDG, Chipco Signature, Prodigy Signature, Fosetyl-AI 80WGD, Lesco Prodigy Signature 80DG, Terra Aliette T/O, 80WDG	Systemic fungicide <b>Mode of action:</b> General fungitoxic effect
	<i>potassium phosphonate, phosphite</i>	Alude, Appear, Magellan, Phostrol, Vital, Jetphiter	
Strobilurins	<i>azoxystrobin</i>	Heritage, Strobe, Strobe 50WG, Strobe 2 L	Broad spectrum, systemic
	<i>flouxastrubin</i>	Disarm, Disarm C, Disarm GC, Disarm M, Fame SC Fungicide, Fame G Fungicide	Broad spectrum, systemic
	<i>trifloxytrobin</i>	Compass	Broad spectrum, localized penetrant
	<i>pyraclostrobin</i>	Insignia, Insignia Intrinsic	<b>Mode of action:</b> ATP inhibition

## BIOFUNGICIDES

Biofungicides are naturally based microbial or biochemical products. There are two types of biofungicides: (1) microbial biofungicides with an active ingredient that is a biological control agent (organism capable of attacking or competing with a pathogen or pest); and (2) plant biofungicides or plant-incorporated protectants, which are “pesticidal substances that plants produce from genetic material that have been added to the plant.”

TRADE NAME	ACTIVE INGREDIENTS	RATES (OZ/1000 SQ FT)	COMPANY
Companion	<i>Bacillus subtilis</i> Strain GB03	4-6 fl oz	Growth Products
EcoGuard SB 3086	<i>Bacillus licheniformis</i>	Up to 20 oz	Novozymes
Rhapsody Strain QST713	<i>Bacillus subtilis</i> , Strain QST 713	2-10 fl oz	Agraquest
Sonnet ArmorTech	<i>Bacillus subtilis</i> Strain QST 711	0.5-2.4 fl oz	ArmorTech
Double Nickel LC	<i>Bacillus amyloliquefaciens</i>	1-4 fl oz	Certis
Actinovate	<i>Streptomyces lydicus</i> WYEC 108	0.4-0.56 oz	Novozymes
Turfshield Plus	<i>Trichoderma harzianum</i> Rifai strain T22 <i>Trichoderma viride</i> strain G-41	1-4 lb	BioWorks
Regalia PTO	<i>Reynoutria sachalinensis</i>	Plant Extract. 1-3 fl oz	Marrone BioInnovations/Engage Agro USA

## ADDITIONAL NOTES ON TURFGRASS FUNGICIDES

### Protectant and Systemic Fungicides

There are two general types of fungicides: protectants and systemics. Protectant fungicides (sometimes called contacts), remain on the plant surfaces after application and do not penetrate the plant tissue. Systemic fungicides are absorbed into the plant and move within the plant tissue. Some fungicides are locally systemic and move only a limited distance within the plant. The dicarboximide fungicides are good examples of this group. Some systemics are moderately systemic, such as the DMI fungicides, whereas others are highly systemic and move readily through the plant’s vascular transport system (e.g., the phosphonates). Examples of highly mobile systemics include the benzimidazoles. Most systemic fungicides only move upward in plant tissues. Only one systemic fungicide (fosetyl-Al) moves bidirectionally (from leaves to roots and vice versa). Systemic fungicides sometimes can suppress the fungus after it has infected the plant, whereas protectant fungicides must be present on the plant surfaces before infection begins to be effective.

### Formulation

Several fungicidal products are available in more than one formulation. For protectant fungicides, a sprayable formulation (wetttable powder, flowable, dry flowable, water dispersible granule, emulsifiable concentrate) usually provides better disease control than a granular formulation. Sprayable formulations can be superior to granular formulations even for systemics that are not highly mobile in plant tissues. Spray equipment allows more thorough coverage of plant surfaces than does a granular spreader. More thorough coverage

can result in better control of fungi infecting foliage. If fungicide sprays are applied to control a root disease, it is often advisable to lightly irrigate before the fungicide dries to wash it into the root zone. Likewise, if granular fungicides are applied to control root diseases, apply to dry turf and irrigate after application.

### Fungicide Mixtures

Several products formulated for turf disease control are prepackaged mixtures containing two or more active ingredients. Mixtures provide some protection against fungicide resistance and typically provide a broader spectrum of activity against turfgrass diseases. Prepackaged mixtures offer convenience and assurance against incompatibility, whereas tank-mixing on site offers greater flexibility in fungicide choice and application rates.

### Fungicide Resistance

Infectious fungi sometimes develop resistance to particular fungicides, especially when a product is used repeatedly without alternating with chemically unrelated fungicides. When fungicide resistance develops, there is no value in increasing rates, shortening intervals between sprays, or using other fungicides with similar modes of action. Fungicide resistance has been confirmed in numerous instances for each of the following diseases and fungicide groups: dollar spot against benzimidazole fungicides and DMI fungicides (e.g. Bayleton, etc.), gray leaf spot against strobilurin (QoI) fungicides (e.g. Heritage, Compass, etc), and Pythium blight against phenylamide fungicides (Subdue, etc). Benzimidazoles (e.g., Cleary

## ADDITIONAL NOTES ON TURFGRASS FUNGICIDES

3336) and phenylamides (e.g., Subdue MAXX) have the highest risk of resistance. Strobilurins (e.g., Heritage) have a moderately high risk of resistance, DMIs (e.g., Bayleton) and the dicarboximides (e.g., Chipco 26GT) have a moderate risk, and the nitriles (e.g., Daconil), aromatic hydrocarbons (e.g., PCNB), and dithiocarbamates (e.g., mancozeb) have a low risk of resistance. Several general strategies are recommended to minimize the risk of fungicide resistance. First, don't rely on fungicides alone for disease control. Avoid using turfgrass varieties that are highly susceptible to common diseases. Follow good disease management practices to reduce the possibility of fungicide resistance. Limit the number of times at-risk fungicides are used during a growing season. Alternate at-risk fungicides with different fungicide groups. When using an at-risk fungicide, tank-mixing it with another fungicide from another chemical group (different mode of action) can also reduce the risk of resistance. These are general principles that can help to reduce but not eliminate risk. A fungicide-resistant pathogen population can still develop when these principles are practiced. Refer to product labels before tank-mixing products to ensure compatibility and to avoid phytotoxicity. For major chemical groups description, see "Major Chemical Groups" section located at the end of this handbook.

### Chlorothalonil Restrictions on Residential (Home) Lawns

As a result of the Food Quality Protection Act of 1996, the EPA has decided to curtail the use of fungicides containing chlorothalonil and iprodione on residential turf.

### Chlorothalonil Restrictions on Golf Courses

As of 2001, the following restrictions are in effect for the use of chlorothalonil on golf courses:

Seasonal maximum:

- 73 lb ai/A/season on greens
- 52 lb ai/A/season on tees
- 26 lb ai/A/season on fairways.

Maximum single application rate: 7.3 lb ai/A

Minimum spray intervals: 7 days

### Methods to Maximize Efficacy of Turfgrass Fungicides

- All fungicides are not equally effective on all diseases. Proper selection is very important on disease management.
- Read the label directions carefully before applying fungicide.
- Apply fungicides at the rate specified in the label.
- Use compatible tank mixes at recommended label rates.
- The best control is achieved by applying fungicides preventatively.
- Fungicides should be sprayed when air temperatures are between 60°F and 85°F (15.3°C and 29.4°C).
- Avoid turfgrass stress (drought or temperature) before and at the time of application.
- Use proper sprayer to deliver appropriate coverage.
- Fungicides should stay on the foliage for at least 6 hours for most effective control.
- Some fungicides have to be watered-in for proper place of action.
- Do not apply fungicides if rain is expected within 3-4 hours (ideally 12 hours after application).
- Delay mowing as much as possible to give the fungicide a chance to work (should follow the one-third rule).
- Use enough water when applying fungicide (usually 2 gal/1000 sq ft will give adequate coverage).
- Water pH for dilution or mix should be between 6-7.
- Do not apply fungicides when conditions are windy. Wind velocity tends to be the lowest early in the morning and late in the afternoon.
- When using granular materials, best results are obtained if soil is moist.
- Keep traffic off the area at least 2-3 hours after application.
- Be patient if an application appears to have produced no results. Some fungicide application results can be seen months later.

## NEMATODE CONTROL IN TURFGRASS

Alfredo Martinez-Espinoza, Extension Plant Pathologist, and Clint Waltz, Turfgrass Specialist (Nematicide Turf Only)

DISEASE	NEMATOCIDE	RATES	REMARKS
Nematodes	<i>abamectin</i> Avid	57 oz/A	<p><b>Special Local Needs Label for Georgia (24c).</b> For golf greens only. Avid 0.15EC is the only abamectin formulation approved for nematode control.</p> <p>Apply Avid 0.15EC as an early curative treatment (after appropriate nematode extraction, identification, and counts).</p> <p>Apply in the early morning while grass is wet with dew or irrigate prior to application with 0.1" of water. Within 1 hour following application, irrigate with 0.1" of water to move the treatments through the thatch. Do not over irrigate.</p> <p>Apply 3-4 consecutive Avid 0.15EC applications at 14-21 day intervals.</p> <p>Avid 0.15EC should be applied in 2 gal of water/1000 sq ft (approximately 100 gpa) with a non-ionic surfactant (0.25% v/v) included.</p> <p>Including Heritage (azoxystrobin) with Avid 0.15EC applications has demonstrated healthier turf.</p>
	<i>azadirachtin</i> AzaGuard	15 fl oz/A	Apply in sufficient amount of water to penetrate in the soil to a depth of 12". Repeat applications every 3-4 weeks or as needed.
	<i>Bacillus firmus</i> strain I-1582 Nortica	0.7-2.3 lb (10-30 oz)	For turf, lawns, sod farms, and golf courses. Make applications every 3 months as necessary and irrigate to a depth of 4". For warm-season grasses make the first application prior to first flush of roots (e.g. 65°F soil temperature at the 4" depth). Do not exceed a 20% concentration of the suspension (30 lb Nortica/20 gal of water or 100 lb Nortica/100 gal of water).
	<i>fluensulfone</i> Nimitz ProG	60-120 lb/A (22-44 oz/1000 sq ft)	To improve product penetration to the root zone/soil, the broadcast application should follow aerification prior to application. Irrigation is required following application with an adequate amount of water (generally 0.5 inches). For golf courses, sports fields, sod farms, commercial and residential lawns.
	<i>fluopyram</i> Indemnify	0.195-0.39 fl oz/1000 sq ft	For golf courses and sod farms.
	<i>furfural</i> MultiGuard Protect	High infestation: 8 gal/A (0.184 gal/1000 sq ft) Maintenance: 5.5-8 gal/A (0.126-0.184gal/1000 sq ft)	Irrigate to root zone. For golf courses and sod farms. Prior to application, treated area should be at 70% field capacity (i.e. well irrigated). Apply at 5.5-8 gpa (a 1:9 dilution with water). Incorporate with irrigation (0.25- 0.5") within 15 min of application. Two hour reentry following application. Up to 6 applications/year are permissible.
	<i>1,3-dichloropropene</i> Curfew	3-5 gal/A	<b>Restricted Use.</b> For golf course and athletic field use only. Must be applied by an approved applicator. Liquid soil fumigant placed in the soil a minimum of 5 inches deep. Apply 0.25-0.5" of water immediately after application. This product has a 24-hour reentry restriction and cannot be applied within 30 ft of an occupied structure. Not for use on turfgrass being grown for sale or other commercial uses as sod or seed production.
	<i>Pasteuria usage</i> Econem	2-10 lb/1000 sq ft	A minimum of 3 sequential applications may be required. Apply 0.10" of water immediately following applications.
	<i>sesame oil</i> Neo-Tec S.O.	3.5 oz/1000 sq ft	Apply Neo-Tec in the late afternoon or evening, particularly in warm weather.
	Telone II	5-10 gal/A	<b>Restricted Use Fungicide.</b> Liquid soil fumigant placed in the soil a minimum of 12" deep. Do not mow or fertilize treated areas for 5 days after application. This product cannot be applied within 100 ft of an occupied structure (Sod Production Only).

## ADDITIONAL NOTES ON NEMATODE CONTROL IN TURFGRASS

Nematodes are soil-dwelling, microscopic, colorless, unsegmented, round worms that can be plant parasitic or plant beneficial. Depending on the species of parasitic nematode and the numbers in soil, they are capable of causing turfgrass decline.

Above-ground symptoms of nematode damage begin with a yellowing of turf, followed by wilting and slow recovery from wilt, poor response of turf to fertilization and eventual thinning in irregular shapes, followed by weed invasion. These symptoms occur over months and years. While below-ground or root symptoms are characterized by short, stubby roots with few branch roots compared to healthy roots. Roots may have a dark brown color, and sometimes (with sting or stubby root nematodes) exhibit swollen root tips. In sod with severe infestations, the sod strength is low.

Soil sampling is necessary for accurate diagnosis. A quart-size sample is needed and your County Extension Agent can help you submit samples to the Extension Nematology Laboratory at The University of Georgia (2350 College Station Road, Athens GA 30602). The number of nematodes recovered from the soil sample can vary greatly, depending on the time of year and the growth stage of the plant at the time the samples are taken. Samples taken during the winter and early spring are less reliable, and some nematode species may be missed entirely. For routine assays, sample during the time of year that the turf is growing. For warm-season turfgrasses, June or July is an optimal time to detect high population densities. For cool-season grasses, late spring or early summer should detect harmful populations. If nematodes are not found in damaging numbers, it does not preclude their role if the time of year the sample was taken was unfavorable for their survival.

Most grasses can withstand moderate numbers of most kinds of nematodes. If nematode populations are high, improving turf management practices, planting a new grass type, and chemical control are management strategies. Usually a combination or integrated approach leads to the best success. Deep, infrequent watering encourages deeper rooting, allowing grass to obtain more water and nutrients than a turf having a short root system due to shallow, daily watering. Avoid excess nitrogen fertilization; this encourages lush, succulent roots conducive to nematode population buildup. Avoid stresses to turf such as mowing too short. Alleviate compacted soils and correct any nutrient deficiencies. No variety of turfgrass is known to have true resistance to all nematodes, but planting another grass species may be a choice if the new grass provides acceptable quality and is adapted to the site. Using proper management practices and the best-adapted turfgrass species is the most practical approach to nematode management.

Because crop rotation, varietal resistance, biological control and several other disease management strategies are not practical or effective for turfgrass nematode control, the use of chemical nematicides is the next available and most reliable approach to reducing parasitic nematode levels. Chemical nematicides can be applied as pre-plant fumigants and as post-plant non-fumigant contact chemicals. Fumigants are toxic to plants and are labeled for use only before establishment of the turfgrass stand. In established turfgrass, contact nematicides come in granular or spray formulations and are always watered-in immediately after application. Nematicides can be toxic to humans and animals and should be handled with all precautions indicated on the product label. No single product is effective against all nematodes on a given turfgrass species.

Soil fumigants are chemicals applied as gases or liquids that readily vaporize. They are toxic to the turfgrass but may be used to treat soil prior to seeding or planting to reduce populations of plant parasitic nematodes, weeds, fungal pathogens, and other soil-borne microorganisms. The exceptions are Curfew and Telone II, which can be applied to actively growing turfgrass if delivered below the root system (e.g. 5-12" deep). All labeled soil fumigants are Restricted Use pesticides that usually require special equipment and application by licensed professionals.

Chemical nematicides have shown best results when the turf is first stripped from the affected area, followed by thorough tilling of the soil two-weeks prior to the nematicide application, this practice allows for adequate decomposition of old roots. Additionally, tilling loosens the soil and permits more rapid and uniform diffusion of the fumigant. At the time of application the soil should be moist (not water-saturated). Too much fumigant escapes in dry soil and too little diffuses when pores are filled with water. The 4-inch soil temperature should be 50-80°F. Too much fumigant evaporates from hot soil, whereas, diffusion is too slow in cold soil. For maximum effectiveness, the treated area should be sealed immediately with a plastic tarp for several days. Nematicide applications should be made in autumn or spring, before nematode population peak and according to the product label.

The effects of nematicides are temporary. Fumigants have no residual activity; therefore nematodes which survived the treatment or were brought in on new grass can re-colonize the rootzone. Nematicide treatment cannot provide improved growing conditions unless other stresses are alleviated, and nutrients (especially potassium) and water are readily available.



# TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS

Patrick E. McCullough, Extension Agronomist – Weed Science

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>PREEMERGENCE HERBICIDES</b>						
Applications must be made prior to weed emergence or poor control will result. Recommended dates of application for crabgrass and other annual grasses are February 15-March 5 in South Georgia and March 1-20 in North Georgia. Recommended dates for annual bluegrass and selected winter annual weeds are September 1-15 in North Georgia and October 1-15 in South Georgia.						
<i>atrazine</i> Aatrex 4L Aatrex 90DG Aatrex 80W	5	1-2 qt 1.1-2.2 lb 1.2-2.5 lb	1-2 1-2 1-2	See Label	centipede, St. Augustine, dormant bermudagrass, zoysia	Atrazine provides both preemergence and postemergence control of annual broadleaf weeds. Control of summer annual grasses is weak. Aatrex formulations are labeled for applications from October 1-April 15. Avoid applications during green-up. For bermudagrass, atrazine should be applied only to dormant turf. DO NOT overseed 4 months before or 6 months after treatment. DO NOT apply within the active root zone of azaleas, camellias, boxwoods, etc. DO NOT apply more than 1 lb ai/A on hybrid bermudagrasses. Atrazine is a Restricted Use Herbicide. Refer to atrazine – POSTEMERGENCE.
<i>benefin</i> Balan 2.5G Other trade names	3	80-120 lb	2-3	12 H	Ky. bluegrass, bermudagrass, centipede, tall fescue, St. Augustine, zoysia	Controls annual grasses and selected broadleaf weeds. An additional application may be made 8 weeks after the initial treatment for continued weed control. DO NOT apply to newly sprigged grasses until these turfs are well established. DO NOT use on golf course greens. DO NOT apply Balan 2.5G in the spring to fall planted turfgrasses. Delay reseeding for 6 weeks after application for the low rate, and 12-16 weeks at the high rate.
<i>bensulide</i> Bensumec 4LF Pre-San 7G	8	1.9-3.1 gal 107-180 lb	7.5-12.5 7.5-12.5	See Label	Ky. bluegrass, bermudagrass, centipede, tall fescue, St. Augustine, zoysia	Controls annual grasses and selected broadleaf weeds. Apply high rate in fall for annual bluegrass control. Apply a light irrigation immediately after treatment. DO NOT apply to newly sprigged grasses. Delay reseeding for 4 months after treatment. May be used on bermudagrass and bentgrass greens.
<i>dimethenamid</i> Tower 6 L	15	21-32 fl oz	1-1.5	12 H	Ky. bluegrass, bahiagrass, bermudagrass, centipede, tall fescue, St. Augustine, seashore paspalum, zoysia	Controls annual grasses and broadleaf weed control. Tower may be applied to tees, fairways, roughs, and any other maintained turf areas on golf courses (except putting greens). In a single application, DO NOT apply more than the equivalent of 32 fl oz/A. For extended weed control, sequential applications can be made 5-8 weeks between applications. DO NOT apply more than 64 fl oz/year of Tower. Tower may be applied in a sequential use program with other herbicides that control emerged weeds.
<i>dimethenamid 0.75%</i> + <i>pendimethalin 1%</i> Freehand 1.75G	15 + 3	100-200 lb	1.75-3.5	12 H	bermudagrass, centipede, tall fescue, kikuyugrass, seashore paspalum, St. Augustinegrass	Apply for preemergence control of annual grassy weeds, annual broadleaf weeds, and sedges in established tolerant warm-season turfgrasses. Freehand may be applied to lawns, parks, golf courses, sod farms, athletic fields, and other turf areas. Do not apply more than 200 lb/A in a single application. Do not apply more than 400 lb/A/year. Do not apply to golf greens. Make initial applications when soil temperatures are 55°F or higher and delay winter overseeding for at least 3 months after applications. Do not apply to cool-season grasses.
<i>dithiopyr</i> Dimension 1EC Dimension Ultra 40%WSP (each 5 oz water soluble bag contains 0.125 lb of dithiopyr) Dimension 2EW	3	2 qt 0.95 lb 2 pt	0.5 0.38 0.5	See Label	Ky. bluegrass, buffalograss, bermudagrass, carpetgrass, centipede, tall fescue, zoysia, St. Augustine, seashore paspalum	Provides preemergence control of annual grasses and certain annual broadleaf weeds. Dimension will also provide postemergence control of crabgrass (when treated prior to the tillering stage of growth). Apply as a spring or fall application. For split applications, use Dimension 1EC up to 1.5 qts/A/application, Dimension 2EW up to 1.5 pt/A/application or Dimension Ultra at 0.625 lb/A/application. Bermudagrass can be overseeded with perennial ryegrass 6-8 weeks after a Dimension application. For other turfgrass areas do not reseed, overseed or sprig treated areas for 2.5-4 months after treatment (see label).

**TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS**

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASS-ES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>PREEMERGENCE HERBICIDES</b>						
<i>flumioxazin</i> Sureguard 51WDG	14	8-12 oz	0.23-0.38	12 H	bermudagrass (dormant)	Provides preemergence control of annual broadleaf weeds and annual grasses including crabgrass, goosegrass, and annual bluegrass. Flumioxazin also provides postemergence control of annual bluegrass and annual broadleaf weeds. Applications should be limited to dormant bermudagrass only. Late fall applications to partially green bermudagrass can aid in transition to dormancy. Do not apply to golf greens or actively growing turfgrasses. Do not apply more than 24 oz/A/year. The addition of a nonionic surfactant is recommended for postemergence applications.
<i>indaziflam</i> Specticle Flo 0.62L Specticle G 0.0224%	29	3-10 fl oz 100-200 lb	0.150-0.05 0.022-0.044	12 H	bahiagrass, bermudagrass, buffalograss, St. Augustinegrass, seashore paspalum, zoysiagrass	Apply for preemergence control of annual bluegrass, crabgrass, goosegrass, annual sedges, and broadleaf weeds in warm-season grasses. Use only on established turf. Do not apply to desirable cool-season grasses, golf greens, or within 15 ft of golf greens. Indaziflam may affect sensitive grasses downslope from treated areas, do not use on slopes uphill and adjacent to bentgrass or bermudagrass golf greens. Do not apply more than 18.5 fl oz of Specticle Flo/A in a 12 month period. Do not exceed 6 fl oz/A in a single application to centipedegrass and St. Augustinegrass. Other labeled warm-season grasses may be treated with up to 10 oz of product per acre in a single application. Do not apply more than 400 lb/A of Specticle G per year. See label for further information before using the herbicide.
<i>isoxaben</i> Gallery 75DF	21	0.66-1.33 lb	0.5-1	12 H	Ky. bluegrass, bermudagrass, buffalograss, centipede, tall fescue, zoysia, St. Augustine	Controls a broad spectrum of annual broadleaf weeds. Apply in the late summer or early spring prior to annual broadleaf weed seed germination. Established turf may be overseeded 60 days following a Gallery application. DO NOT use on putting greens.
<i>mesotrione</i> Tenacity 4 lb/gal	27	4-8 fl oz	0.125-0.25	12 H	Ky. Bluegrass, centipede, tall fescue, St. Augustinegrass (grown for sod)	Provides preemergence control of crabgrass, yellow foxtail and certain annual broadleaf weeds such as carpetweed and chickweed sp. Tenacity may be tank-mixed with preemergence herbicides such as Barricade for extended control of crabgrass and foxtail. Tenacity may also be applied at the time of seeding Ky. Bluegrass, centipede, or tall fescue. It may also be applied after new seedlings have been mowed 2 times or 4 weeks after emergence (whichever is longer). Do not exceed 4 fl oz/A on St. Augustine sod. Tenacity may cause temporary whitening of turfgrass foliage (see label). If Tenacity is tank-mixed with atrazine or simazine for use on St. Augustine or centipede use only 4 fl oz of Tenacity and 0.5 lb ai/A of either atrazine or simazine. Zoysia, bermudagrass and seashore paspalum are sensitive to Tenacity. Do not use on golf course putting greens and maintain a 5 ft buffer between treated areas and putting greens.
<i>metolachlor</i> Pennant Magnum 7.62 lb/gal	15	1.3-2.6 pt	1.25-2.5	24 H	bermudagrass, centipede, zoysia, St. Augustine	Controls annual sedge, yellow nutsedge and certain annual grass weeds. Split applications at intervals of 6-8 weeks will extend control. In sod fields do not apply more than 4.2 pt/A/year. For other turf sites, the maximum annual rate is 2.6 pt. DO NOT use on putting greens.
<i>oryzalin</i> Surflan 4AS Harrier 85WDG	3	1.5-2 qt 1.75-2.4 lb	1.5-2 1.5-2	24 H	bermudagrass, buffalograss, centipede, tall fescue, zoysia, St. Augustine	Controls annual grasses and selected broadleaf weeds. Apply 2 qt/A for summer annual grass control, or apply 1.5 qt/A and apply an additional 1.5 qt/A 8-10 weeks after the initial application. Split applications are recommended for improved goosegrass control and for tall fescue. DO NOT apply to newly sprigged grasses until well established. DO NOT apply to golf course greens. DO NOT make a spring application to fall planted turfgrasses. Surflan is recommended for use on healthy, established turf. Delay reseeding for 3-4 months after application.

**TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS**

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>PREEMERGENCE HERBICIDES (continued)</b>						
<i>oxadiazon</i> Ronstar 2G Oxadiazon 2G  Ronstar 50WSP Oxadiazon 50WSB Starfighter 3.17L	14	100-200 lb	2-4	12 H	Ky. bluegrass, bermudagrass, buffalograss, seashore paspalum, tall fescue, zoysia, St. Augustine bermudagrass, St. Augustine, zoysia	Controls annual grasses and selected broadleaf weeds. DO NOT apply more than 3 lb ai/A on St. Augustine. May cause temporary discoloration of bermudagrass and St. Augustine which is normally outgrown in 2-3 weeks. DO NOT apply to wet turf. Delay reseeding for 4 months after treatment. DO NOT apply to centipede or golf course greens or tees. Ronstar 50WSP and Oxadiazon 50WSB are labeled only on bermudagrass, St. Augustinegrass and zoysia. Ron star 2G may be used immediately prior or immediately aftersprigging bermudagrass or zoysiagrass at 2-3 lb ai/A to control various annual weeds. Ronstar G may also be applied 10-14 days after sprigging seashore paspalum. Ronstar 50WSP and Oxadiazon 50WSB may be applied immediately prior to or after sprigging bermudagrass. Oxadiazon is not labeled for use on home lawns.
<i>pendimethalin</i> Pendulum 2G Pendulum 3.3 EC  Pendulum AquaCap 3.8 CS	3	75-150 lb 3.6-7.2 pt  3.1-6.3 pt	1.5-3 1.5-3  1.5-3	24 H	Ky. bluegrass, bermudagrass, centipede, tall fescue, zoysia, St. Augustine	Controls annual grasses and selected broadleaf weeds. DO NOT use on newly sprigged turfgrasses. Not recommended for turfgrass that has been severely thinned due to winter stress. DO NOT reseed within 3 months of application. Use the low rate for tall fescue and Ky. bluegrass. The high rate may be used on warm season grasses. On newly seeded or sodded areas, delay application until after the fourth mowing. In established turfgrasses that have been reseeded, delay application until grass seedlings have been mowed 4 times. (This may be up to 3 months from the date of seeding.) Refer to label for information on split applications.
<i>prodiamine</i> Barricade 65WDG ProClipse 65WDG Cavalcade 65WDG StoneWall 65WDG  Barricade 4L  RegalKade 0.5G RegalKade 0.37G	3	1.15 lb    1.5 pt  100-300 lb 135-406 lb	0.75    0.75  0.5-1.5 0.5-1.5	See Label	Ky. bluegrass, bermudagrass, buffalograss, centipede, St. Augustine, seashore paspalum, zoysia, tall fescue	Controls annual grasses and broadleaf weeds. DO NOT apply to newly seeded, sprigged or sodded turfgrasses. On fall-seeded turfgrasses, delay the application for 60 days after seeding or until after the second mowing, whichever is the longer time period. Split applications, each at one-half the maximum annual labeled rate, at a 60 day interval, may also be used. DO NOT apply to golf course putting greens or tees. RegalKade and RegalKade 37 are formulated on a 32-3-12 dry fertilizer carrier. Barricade 65WDG at 0.58-1 lb/A may be applied 8-10 weeks before overseeding perennial ryegrass into bermudagrass fairways. Reseeding restrictions can range from 4-12 months, depending on the product and rate used, reseeding method and environmental conditions. Refer to the individual product label for additional information.
pronamide Kerb T/O 50WSP	3	1-2 lb	0.5-1	24 H	bermudagrass, centipede, St. Augustine, zoysia	Preemergence or postemergence applications of Kerb will control annual bluegrass. May also be used in spring to slowly remove (4-6 weeks) overseeded perennial ryegrass from warm-season turfgrasses. For this purpose, apply Kerb at the 50% spring green-up warm-season turfgrass growth stage. A light overhead irrigation is necessary to move Kerb into the weed root zone if no rainfall occurs within 24-48 hours. DO NOT apply Kerb to any cool-season turfgrass. DO NOT apply to areas that will be overseeded with cool-season turfgrasses within 90 days of treatment. Kerb is a Restricted Use Herbicide.

**TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS**

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>PREEMERGENCE HERBICIDES (continued)</b>						
<i>oxadiazon</i> Ronstar 2G Oxadiazon 2G  Ronstar 50WSP Oxadiazon 50WSB Starfighter 3.17L	14	100-200 lb	2-4	12 H	Ky. bluegrass, bermudagrass, buffalograss, seashore paspalum, tall fescue, zoysia, St. Augustine bermudagrass, St. Augustine, zoysia	Controls annual grasses and selected broadleaf weeds. DO NOT apply more than 3 lb ai/A on St. Augustine. May cause temporary discoloration of bermudagrass and St. Augustine which is normally outgrown in 2-3 weeks. DO NOT apply to wet turf. Delay reseeding for 4 months after treatment. DO NOT apply to centipede or golf course greens or tees. Ronstar 50WSP and Oxadiazon 50WSB are labeled only on bermudagrass, St. Augustinegrass and zoysia. Ron star 2G may be used immediately prior or immediately aftersprigging bermudagrass or zoysiagrass at 2-3 lb ai/A to control various annual weeds. Ronstar G may also be applied 10-14 days after sprigging seashore paspalum. Ronstar 50WSP and Oxadiazon 50WSB may be applied immediately prior to or after sprigging bermudagrass. Oxadiazon is not labeled for use on home lawns.
<i>pendimethalin</i> Pendulum 2G Pendulum 3.3 EC  Pendulum AquaCap 3.8 CS	3	75 - 150 lb 3.6-7.2 pt	1.5-3 1.5-3	24 H	Ky. bluegrass, bermudagrass, buffalograss, centipede, tall fescue, zoysia, St. Augustine	Controls annual grasses and selected broadleaf weeds. DO NOT use on newly sprigged turfgrasses. Not recommended for turfgrass that has been severely thinned due to winter stress. DO NOT reseed within 3 months of application. Use the low rate for tall fescue and Ky. bluegrass. The high rate may be used on warm season grasses. On newly seeded or sodded areas, delay application until after the fourth mowing. In established turfgrasses that have been reseeded, delay application until grass seedlings have been mowed 4 times. (This may be up to 3 months from the date of seeding.) Refer to label for information on split applications.
<i>prodiamine</i> Barricade 65WDG ProClipse 65WDG Cavalcade 65WDG StoneWall 65WDG  Barricade 4L  RegalKade 0.5G RegalKade 0.37G	3	1.15 lb	0.75	See Label	Ky. bluegrass, bermudagrass, buffalograss, centipede, St. Augustine, seashore paspalum, zoysia, tall fescue	Controls annual grasses and broadleaf weeds. DO NOT apply to newly seeded, sprigged or sodded turfgrasses. On fall-seeded turfgrasses, delay the application for 60 days after seeding or until after the second mowing, whichever is longer time period. Split applications, each at one-half the maximum annual labeled rate, at a 60 day interval, may also be used. DO NOT apply to golf course putting greens or tees. RegalKade and RegalKade 37 are formulated on a 32-3-12 dry fertilizer carrier. Barricade 65WDG at 0.58-1 lb product/A may be applied 8-10 weeks before overseeding perennial ryegrass into bermudagrass fairways. Reseeding restrictions can range from 4-12 months, depending upon the product and rate used, reseeding method and environmental conditions. Refer to the individual product label for additional information.
<i>pronamide</i> Kerb T/O 50WSP	3	1-2 lb	0.5-1	24 H	bermudagrass, centipede, St. Augustine, zoysia	Preemergence or postemergence applications of Kerb will control annual bluegrass. May also be used in spring to slowly remove (4-6 weeks) overseeded perennial ryegrass from warm-season turfgrasses. For this purpose, apply Kerb at the 50% spring green-up warm-season turfgrass growth stage. A light overhead irrigation is necessary to move Kerb into the weed root zone if no rainfall occurs within 24-48 hours. DO NOT apply Kerb to any cool-season turfgrass. DO NOT apply to areas that will be overseeded with cool-season turfgrasses within 90 days of treatment. Kerb is a Restricted Use Herbicide.

**TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS**

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>PREEMERGENCE HERBICIDES (continued)</b>						
<i>simazine</i> Princep 90DF Princep Liquid 4L Wynstar 90DF	5	1.1-2.2 lb 1-2 qt 1.1-2 lb	1-2 1-2 1-1.8	12 H	bermudagrass, centipede, St. Augustine, zoysia	Apply simazine in October or November for preemergence control of winter annual weeds. Apply December through February for late postemergence control of winter annuals. Apply low rate for annual bluegrass control; or high rate for winter annual broadleaf control. DO NOT overseed with desirable turfgrass within 4 months before or 6 months after treatment. DO NOT apply more than 1 lb ai/A on newly sprigged turfgrass or on hybrid bermudagrass such as Tiflawn, Tifway and Ormond.
<i>benefin + oryzalin</i> XL 2G	3 + 3	100-150 lb	1-1.5 benefin + 1-1.5 oryzalin	24 H	bermudagrass, centipede, tall fescue, zoysia, St. Augustine	Controls annual grasses and selected broadleaf weeds. DO NOT apply to newly sprigged grasses until well established. DO NOT apply to golf course greens. DO NOT make a spring application to fall planted turfgrasses. Delay reseeding for 6 weeks (low rate) and for 12-16 weeks (high rate) after application.
<i>benefin</i> + <i>trifluralin</i> Team Pro 0.86G  Team 2G	3 + 3	174-349 lb  100-150 lb	0.75-1.5 benefin + 0.75-1.5 Trifluralin  1.3-2 benefin + 0.7-1 trifluralin	See Label	Ky. bluegrass, bermudagrass, centipede, tall fescue, zoysia, St. Augustine	Team Pro is a dry fertilizer based product that contains 0.43% benefin and 0.43% trifluralin. The fertilizer analysis will depend on the respective company selling the product. Controls summer annual grasses and annual bluegrass. Split applications of 233 lb/A followed 10 weeks later by an additional 233 lb/A may also be used. DO NOT apply to newly sprigged grasses until well established. DO NOT apply to putting greens. Delay reseeding for 8 weeks (low rate) and for 12-16 weeks (high rate) after application.
<i>bensulide</i> + <i>oxadiazon</i> Goosegrass/Crabgrass Control 5.25% + 1.31% G	8 + 14	115 lb	6 bensulide + 1.5 oxadiazon	See Label	Ky. bluegrass, bermudagrass, tall fescue, zoysia	Controls summer annual grasses. Apply a light irrigation after treatment. DO NOT use on newly sprigged grasses until well established. Delay reseeding for 5 months after treatment. Recommended for professional applicator use. May be used on bermudagrass and bentgrass greens under conditions of heavy goosegrass infestations. See label for precautions concerning use on putting greens.
oxadiazon 1% + prodiamine 0.2% Regalstar II Regalstar G	14 + 3	200 lb	2 oxadiazon + 0.4 prodiamine	See Label	Ky. Bluegrass, bermudagrass, centipede, St. Augustine, tall fescue, zoysia	Controls annual grasses. Regalstar II is formulated on a 38-0-0 ureaform nitrogen carrier. Regalstar G does not contain fertilizer. Apply to dry foliage. Delay applications to newly sprigged bermudagrass until after stolons have rooted and the grass has filled in. DO NOT apply to putting greens.
<i>sulfentrazone</i> + <i>prodiamine</i> Echelon 4SC	14 + 3	18-36 fl oz	0.56-1.125	12 H	Ky. Bluegrass, bermudagrass, buffalograss, carpetgrass, centipede, seashore paspalum, tall fescue, zoysia	Controls annual grasses, certain annual broadleaf weeds, annual sedges, <i>kyllinga</i> sp. and yellow nutsedge. Use in established turfgrasses. May be applied after the second mowing of seeded grasses provided the grass has developed a uniform stand and a good root system. The high rate of 36 fl oz/A is recommended only for use on bermudagrass. This product can provide postemergence control of some, small annual broadleaf weeds. Do not apply to newly installed sod until the sod has rooted and exposed edges have grown in. Do not add an adjuvant or surfactant to the spray solution. In sod fields do not apply Echelon within 3 months of harvest. Echelon is not labeled for use on golf course putting greens.

**TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS**

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>PREEMERGENCE HERBICIDES (continued)</b>						
<i>amicarbazone</i> Xonerate 70WDG	5	1-10 oz	04-0.18	12 H	bahiagrass, bermudagrass, buffalograss, centipedegrass, creeping bentgrass, fine fescue, Kentucky bluegrass, Kikuyugrass, perennial ryegrass, seashore saspalum, St. Augustinegrass, zoysiagrass	Provides postemergence control of annual bluegrass and broadleaf weeds in creeping bentgrass, tall fescue, perennial ryegrass, and warm-season turfgrasses. Make applications when air temperatures range 50-80°F and do not make applications to cool-season grasses in summer or fall due to increased injury. For annual bluegrass control in creeping bentgrass, make applications a 1 oz/A on a 7 day interval for a maximum of 4 applications. In overseeded perennial ryegrass, applications from 2-4 oz/A may control annual bluegrass and broadleaf weeds. Do not apply to desirable roughstalk bluegrass turf. In tolerant warm-season turfgrass, 3-10 oz/A may be applied. Do not exceed 10 oz/A/year.
<i>atrazine</i> AAtrex 4L AAtrex 90DG AAtrex 80W	5	1-2 qt 1.1-2.2 lb 1.2-2.5 lb	1-2 1-2 1-2	See Label	centipede, St. Augustine, dormant bermudagrass, zoysia	Apply to dormant bermudagrass for annual bluegrass and winter annual broadleaf weed control. DO NOT apply during bermudagrass green-up. AAtrex formulations may be applied from October 1-April 15. DO NOT apply over the root zone of ornamental shrubs. For spurweed, apply in December or January. For Florida betony, apply in late October and follow with a second treatment in late February. DO NOT apply more than 1 lb ai/A to hybrid bermudagrass. AAtrex is a Restricted Use Herbicide.
<i>bentazon</i> Basagran T/O 4 lb/gal  Lescogran 4 lb/gal	6	1.5-2 pt	0.75 -1	48 H	Ky. bluegrass, bermudagrass, centipede, tall fescue, zoysia, St. Augustine	Apply to emerged, actively growing yellow nutsedge. Use 2 pt/A and repeat the application 7-14 days later. Thorough spray coverage is essential for acceptable control. DO NOT mow 3 days before or after application. Other weeds controlled include annual sedges and dayflower. Add a crop oil concentrate at 2 pt/A to the spray mix. Bentazon is not recommended for use on putting greens.
<i>bentazon</i> + <i>atrazine</i> Prompt 5L 2.5 + 2.5 lb/gal	6 + 5	1.8-2.4 pt	0.6-0.75 + 0.6-0.75	See Label	centipede, St. Augustine, zoysia	Controls several broadleaf weeds. For yellow nutsedge, initially apply Prompt at 3.5 pt/A and follow 7-10 days later with Basagran at 2 pt/A. Apply no earlier than 10 days after sprigging or plugging turfgrasses. On newly sprigged turfgrasses and hybrid bermudagrass, Prompt may cause temporary injury.
<i>bispyribac-sodium</i> Velocity 17.6SG	2	6 oz	06	12 H	bermudagrass overseeded with perennial ryegrass on golf course fairways	Apply Velocity between February 1 and March 15 to bermudagrass overseeded the previous fall with perennial ryegrass for annual bluegrass control and seedhead suppression. Earlier or later applications may decrease efficacy or increase risk of injury to perennial ryegrass. The first application should be made as soon as annual bluegrass seedhead begins to emerge from the leaf sheath. Apply a second application at the same rates 14-21 days after the first application. DO NOT apply if air temperatures are less than 50°F, or if maximum temperatures are expected to be less than 50°F, for the first 3 days after application. Two applications as described above will be needed for control. Chlorosis (yellowing) will typically occur on perennial ryegrass between 7-21 days after application. Not recommended for use on other cool-season turfgrasses. Velocity should not be applied in late spring after bermudagrass begins active growth. DO NOT mow or irrigate for 24 hours after application.

**TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS**

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>POSTMERGENCE HERBICIDES (continued)</b>						
<i>bromoxynil</i> Buctril 2 lb/gal	6	1.5 pt	0.375	24 H	Ky. bluegrass, bermudagrass, tall fescue, zoysia, St. Augustine	Labeled for use on non-residential turfgrasses. May be used on newly sprigged or newly seeded grasses. Apply as a summer or winter treatment to control seedling annual broadleaf weeds. Buctril is a contact herbicide and uniform spray coverage is essential.
<i>carfentrazone</i> Quick Silver T&O 1.9 lb/gal  QuickSilver 1.03 lb/gal	14	0.9-2.1 fl oz  0.8-2 fl oz	0.013-0.031	Until Dry	Ky. bluegrass, tall fescue, bermudagrass, centipedegrass, seashore paspalum, St. Augustinegrass, zoysiagrass water-soluble 5 ml bag	Controls numerous broadleaf weeds including plantains, chickweeds, dandelion, thistles, lawn burweed, henbit, corn speedwell, purslanes and spotted spurge. QuickSilver may also be applied to newly seeded, sodded or sprigged turfgrasses. To expand the weed spectrum, QuickSilver may be tank-mixed with numerous other postemergence herbicides. Aim formulations are registered for use only on seed and sod farms. Add a nonionic surfactant at 0.125-0.25% v/v to the spray mix.
<i>carfentrazone</i> 0.04 lb/gal + 2,4-D 0.52 lb gal + MCP P 0.2 lb/gal + dicamba 0.05 lb/gal SpeedZone-Southern	14 + 4	2-5pt	–	48 H	Ky. bluegrass, tall fescue, bermudagrass, centipedegrass, seashore paspalum, St. Augustinegrass, zoysiagrass	Controls a wide range of broadleaf weeds, including spotted spurge. May be applied after the second mowing in newly established cool-season turfgrasses, or 4 weeks after sprigging or sodding of warm-season turfgrasses. DO NOT reseed until 1 week after application. DO NOT apply at air temperatures >90° F. DO NOT apply during the spring green-up of St. Augustinegrass, or to Floratam, BitterBlue and other improved varieties of St. Augustinegrass.
<i>carfentrazone</i> 0.04 lb/gal + MCPA 2.21 lb gal + MCP P (0.44 lb/gal) + dicamba 0.22 lb/gal PowerZone	14 + 4	2-6 pt	–	48 H	Ky. bluegrass, tall fescue, bermudagrass, zoysiagrass	Controls a wide range of broadleaf weeds, including spotted spurge. May be applied after the second mowing in newly-established cool-season turfgrasses, or 4 weeks after sprigging or sodding of warm-season turfgrasses. DO NOT reseed until 2 weeks after application. DO NOT apply at air temperatures >90°F.
<i>carfentrazone</i> 0.05 lb/gal + 2,4-D 1.53 lb gal + MCPA 0.48 lb/gal + dicamba 0.14 lb/gal SpeedZone	14 + 4	2-5 pt	–	48 H	Ky. bluegrass, tall fescue, bermudagrass, zoysiagrass	Controls a wide range of broadleaf weeds, including spotted spurge. May be applied after the second mowing in newly-established cool-season turfgrasses, or 4 weeks after sprigging or sodding of warm-season turfgrasses. DO NOT reseed until 2 weeks after application. DO NOT apply at air temperatures >90°F.
<i>chlorsulfuron</i> Corsair 75DF	3	1-5.33 oz	0.05-0.25	See Label	Ky. bluegrass, bermudagrass, centipede, St. Augustine, zoysia	Particularly effective for the control of “clump-type” tall fescue. Labeled only as spot treatment in lawns, but may be applied as a broadcast application on golf courses. Add a nonionic surfactant at 0.25-0.33 fl oz/gal of spray mix. DO NOT apply to ryegrass or tall fescue being grown as a turfgrass.

**TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS**

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>POSTMERGENCE HERBICIDES (continued)</b>						
<i>clpyralid</i> Lontrel 3 lb/gal	4	0.25-1.33 pt	0.09-0.5	12 H	Ky. bluegrass, bermudagrass, buffalograss, centipedegrass, St. Augustinegrass, tall fescue, zoysia	Effectively controls numerous broadleaf weeds that belong to the aster and legume families . Control of other broadleaf weed species is poor. Sold in combination with triclopyr as Confront. Clopyralid is not labeled for use on residential turfgrasses.
<i>2,4-D</i> Weedar 64 3.8 lb/gal Other trade names	4	See Label	0.5-2	See Label	Ky. bluegrass, bermudagrass, centipede, tall fescue, zoysia	Amine formulations of 2,4-D are non-volatile and are safer than ester formulations to use near ornamentals. Apply to small and actively growing broadleaf weeds as a summer or winter treatment. To control wild garlic/onion, use 2 lb ai/A plus surfactant. Make first application in late November or early December and follow with a second application in February or March. Repeat this schedule for 3 consecutive years to control this weed. DO NOT apply 2,4-D to St. Augustinegrass. DO NOT apply more than 0.5 lb ai/A of 2,4-D to centipede. DO NOT allow spray drift to contact the foliage of ornamentals.
<i>2,4-D</i> + <i>MCPP</i> + <i>dicamba</i> Three-way Trex-San Triplet Other trade names	4	See Label	0.75 + 0.4 + 0.08	See label	Ky. bluegrass, bermudagrass, tall fescue, zoysia	Several commercial formulations are available. Refer to individual labels for the recommended amount of formulated product. Controls a broader spectrum of broadleaf weeds than 2,4-D alone. DO NOT spray when turfgrass is emerging from winter dormancy. Low rates of Triplet products may be used on St. Augustine or centipede. Avoid applications if air temperatures exceed 85°F. Delay reseeding for 4 weeks after treatment.
<i>2,4-D</i> + <i>MCPP</i> + <i>2,4-DP</i> Triamine Dissolve	4	See Label	See Label	See Label	Ky. bluegrass, tall fescue, bermudagrass, centipedegrass, St. Augustinegrass, zoysiagrass	Refer to individual labels for recommended amount of formulated product. Controls a broader spectrum of weeds than 2,4-D alone. DO NOT spray at air temperatures greater than 85°F and when warm-season turfgrasses are growing under stress conditions. Delay reseeding for 4 weeks after treatment. Avoid applications when warm-season turfgrasses are emerging from winter dormancy.
<i>2,4-D</i> + <i>clpyralid</i> + <i>dicamba</i> Millennium Ultra	4	2-3 pt	–	48 H	Ky. bluegrass, tall fescue, bermudagrass, zoysiagrass	Controls a broader spectrum of weeds than 2,4-D alone. DO NOT mow 1-2 days before or after application. Delay application to newly seeded grasses until after 3-4 mowings. Delay reseeding for 3-4 weeks after application. DO NOT spray when air temperatures are >90°F. Not recommended for use on centipedegrass and St. Augustinegrass. Avoid applications during the spring transition of warm-season turfgrasses. Not labeled for use on residential turfgrasses.
<i>2,4-D</i> + <i>fluroxypyr</i> + <i>dicamba</i> Escalade	4	2-3 pt	–	48 H	Ky. bluegrass, tall fescue, bermudagrass, zoysiagrass	Controls a broader spectrum of weeds than 2,4 -D alone. DO NOT mow 1-2 days before or after application. Delay application to newly seeded grasses until after 3-4 mowings. Delay reseeding for 3-4 weeks after application. DO NOT spray when air temperatures are >90°F. Not recommended for use on centipedegrass and St. Augustinegrass. Avoid applications during the spring transition of warm-season turfgrasses.



**TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS**

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>POSTMERGENCE HERBICIDES (continued)</b>						
2,4-D + <i>triclopyr</i> Turflon II Amine 2.8 + 1.1 lb/gal	4	1-2 qt	0.7 + 0.3 to 1.4 + 0.6	See Label	Ky. bluegrass, tall fescue	Controls a broader spectrum of weeds than 2,4 -D alone. NOT RECOMMENDED for warm-season grasses. Apply in spring or fall months when weeds are actively growing. Newly seeded turf should be mowed 3 times before application. DO NOT reseed until 3 weeks after application. Repeat applications are recommended for corn speedwell, ground ivy, woodsorrel, parsley-piert and wild violets.
2,4-D + <i>triclopyr</i> + <i>Sulfentrazone</i> + <i>dicamba</i> T Zone 1.75 + 0.5 + 0.06 + 0.2 lb/gal	4 + 14	2-4 pt	0.44 + 0.125 + 015 + 05-0.88 + 0.25 + 03 + 0.1	24 H	Ky. bluegrass, bahiagrass (DORMANT)  bermudagrass (DORMANT)  ryegrass, tall fescue, zoysia (DORMANT)	Apply to cool-season turfgrasses for broadleaf weed control and suppression. Apply to fully DORMANT bermudagrass, bahiagrass, or zoysiagrass only and DO NOT apply to bentgrasses or greens. T Zone is labeled for yellow nutsedge suppression. Add more sulfentrazone with this product to increase activity on sedges. DO NOT apply when temperatures exceed 85°F or if turf is under stress from drought, heat or disease.
<i>dicamba</i> Vanquish 4 lb/gal	4	0.5-1 pt	0.25-0.5	24 H	Ky. bluegrass, bermudagrass, centipede grass, tall fescue, zoysia	Apply to small and actively growing broadleaf weeds as a summer or winter treatment. Provides better control of henbit, knotweed, lespedeza, clovers, docks and woodsorrel than 2,4-D. Repeat treatment if necessary. DO NOT apply to St. Augustinegrass. DO NOT use over the root zone of ornamental trees and shrubs.
<i>diclofop-methyl</i> Illoxan 3EC	1	1-1.4 qt	0.75-1	See Label	bermudagrass (golf courses only)	Illoxan may be used for goosegrass control on bermudagrass golf courses. Use the high rate for goosegrass with 1-2 tillers. Lower rates may be used on smaller goosegrass. DO NOT mow for 24-36 hours after application. Control requires 2-3 weeks. May cause temporary phytotoxicity (7-10 days). DO NOT mix with other pesticides or fertilizers as control will be reduced. DO NOT overseed treated areas for at least 2 months after the last application. Illoxan is a Restricted Use Pesticide.
<i>diquat</i> Reward 2 lb/gal	22	1-2 pt	0.25-0.5	24 H	Dormant bermudagrass	Controls certain winter annual broadleaf weeds, such as little barley, annual bluegrass, henbit and Carolina geranium in dormant bermudagrass in lawns, parks and golf courses. A nonionic surfactant at 0.25% v/v should be added to the spray mix. Apply only to dormant bermudagrass.
<i>ethofumesate</i> Prograss 1.5EC	8	See Label	See Label	12 H	bermudagrass (dormant), tall fescue, perennial ryegrass, Ky. bluegrass	Apply Prograss in fall for pre- and postemergence control of annual bluegrass in perennial ryegrass and tall fescue. Prograss can be applied to dormant bermudagrass in the fall 1-2 weeks after emergence of perennial ryegrass for the control of annual bluegrass. An additional application at 1 lb ai/A at 21-28 day intervals may be required to maintain control. The initial treatment may cause immediate browning of bermudagrass that is not completely dormant. DO NOT apply Prograss after Jan. 15 to overseeded bermudagrass. Applications after this date can severely delay bermudagrass growth in the spring. Prograss is not labeled for use on golf course putting greens.

**TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS**

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>POSTMERGENCE HERBICIDES (continued)</b>						
<i>ethofumesate</i> Prograss 1.5EC + Atrazine numerous formulations	8 + 5	2 gal + 2 lb ai/A	3 + 2	12 H  See Label	St. Augustinegrass	Prograss + atrazine may be used to control bermudagrass in St. Augustinegrass. Make the first application in mid-March when bermudagrass initiates green-up. Repeat application 30 days later. Application timing is critical for control. Temporary St. Augustinegrass stunting may occur. Avoid improper overlapping of the spray pattern.
<i>fenoxaprop</i> Acclaim Extra 0.57 lb./gal.	1	13-39 fl oz	06-0.17		Ky. bluegrass, fine and tall fescue, zoysia	Controls annual grasses. Apply in late spring or early summer to weedy grasses in the 3-leaf (low rate) to 5-tiller (high rate) growth stage. Repeat application at 14 days if weed regrowth has occurred and no turfgrass in jury is present. DO NOT tank mix Acclaim with phenoxy containing herbicides. Fescues and ryegrasses may be seeded immediately after application. Acclaim may be used on newly plugged zoysia and seedling fescues and perennial ryegrasses that are 4 weeks old. Acclaim Extra + Turflon Ester tank-mixtures can be used to control bermudagrass in tall fescue and zoysiagrass.
<i>flazasulfuron</i> Katana 25WG	2	0.25-3 oz		12 H	Bermudagrass, Centipedegrass, Zoysiagrass	Flazasulfuron (Katana) is a selective herbicide for removal of overseeded cool-season grasses as well as control of annual and perennial grasses, sedges, and broadleaf weeds in bermudagrass, zoysiagrass and certain other warm-season turfgrasses. Flazasulfuron has postemergence and some preemergence activity and may be used on golf courses (fairways, roughs, and tees) and the following non-residential turf areas: industrial parks, tank farms, sod farms, seed farms, cemeteries, professionally managed college and professional sports fields and commercial lawns for control of cool-season grasses and weeds from tolerant grasses. The maximum yearly application rate is 9 oz/A. Use only on labeled turfgrasses or severe injury may result. Do not apply to newly seeded, sodded, or sprigged turfgrass until well established. Allow at least 2 weeks from the last application to the time of overseeding when applied at 1.5 oz/A. Allow 4 weeks for rates above 1.5 oz/A.
<i>florasulam</i> Defendor 0.42 lb/gal	2	4 fl oz/A	013 lb ai	4 H	Bahiagrass Bentgrass Bermudagrass Centipedegrass Kentucky Bluegrass Perennial Ryegrass St. Augustinegrass Seashore Paspalum Tall Fescue Zoysiagrass	Apply for postemergence control of annual and perennial broadleaf weeds in established turfgrass, including residential lawns, golf courses, sports fields, sod farms and commercial turfgrass areas. Apply with a nonionic surfactant when florasulam is applied alone. Make applications in a minimum of 20 gal/A of spray solution. Do not apply more than 12 fl oz/A/year. Do not make repeat treatments within four weeks of initial applications. Do not apply to golf greens.
<i>fluazifop-butyl</i> Fusilade II 2 lb/gal	1	3-6 fl oz	0.05-0.10	12 H	tall fescue, zoysiagrass	Use to control common and hybrid bermudagrass in zoysiagrass and tall fescue. Tank-mix with Turflon Ester to improve control of bermudagrass. In zoysiagrass, apply 3-4 fl oz/A plus 0.25% v/v nonionic surfactant. Make the first application around June 1, and repeat every 20-30 days. Reduce the rate to 2-3 fl oz/A in the late summer. In tall fescue, apply 5-6 fl oz/A plus 0.25% v/v nonionic surfactant in the spring (April-May) as bermudagrass begins to green-up. Repeat the application in September-October. DO NOT apply to tall fescue during the hot summer months. Some injury (discoloration) will occur on tall fescue for up to 14 days after application.

**TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS**

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>POSTMERGENCE HERBICIDES (continued)</b>						
<i>flumioxazin</i> Sureguard 51WDG	14	8-12 oz	0.23-0.38	12 H	Dormant bermudagrass	Provides preemergence control of annual broadleaf weeds and annual grasses including crabgrass, goosegrass, and annual bluegrass. Flumioxazin also provides postemergence control of annual bluegrass and annual broadleaf weeds. Applications should be limited to dormant bermudagrass only. Late fall applications to partially green bermudagrass can aid in transition to dormancy. Do not apply to golf greens or actively growing turfgrasses. Do not apply more than 24 oz/A/year. The addition of a nonionic surfactant is recommended for postemergence applications.
<i>fluroxypyr</i> Spotlight 1.5 lb/gal	4	0.67-1.33 pt	0.125-0.25		Ky. bluegrass, tall fescue, bermudagrass, centipedegrass, zoysiagrass, St. Augustinegrass	Controls numerous broadleaf weeds including common purslane, chickweed(s), white clover, ground ivy and woodsorrel. Apply to newly seeded turf after 2-3 mowings or to established turf. To broaden weed spectrum, Spotlight can be mixed with other labeled turf herbicides. Use Spotlight on bermudagrass and St. Augustinegrass only at 0.67 pt/A and only if some injury can be tolerated. Not recommended for use on golf course putting greens.
<i>foramsulfuron</i> Revolver 0.19 lb/gal	2	0.75-1.5	013-04	12 H	bermudagrass, zoysiagrass	Apply Revolver for: a) control of undesirable cool-season grasses (including tall fescue); b) control of emerged annual bluegrass 1 week before overseeding bermudagrass with perennial ryegrass; c) postemergence control of goosegrass in late spring and early summer; and d) spring transition of bermudagrass overseeded the previous fall with cool-season turfgrasses. For tillered goosegrass, make 2 applications at the high rate 7-14 days apart. A tank-mix of Revolver at 26.2 fl oz + MSMA (normal rate) applied twice 3-4 weeks apart will control dallisgrass. Late summer and early fall applications of this tank-mix usually provide better control than earlier applications. DO NOT apply Revolver within 2 weeks of sprigging. Revolver is rainfast within 2 hours of application.
<i>glufosinate</i> Finale 1 lb/gal	10	3-6 qt/A		12 H	Dormant bermudagrass	Controls numerous winter annual broadleaf weeds and annual bluegrass in completely dormant bermudagrass. DO NOT apply during spring green-up.
<i>glyphosate</i> Roundup Pro 4 lb/gal	9	0.75 pt	0.375	4 H	Dormant bermudagrass	APPLY ONLY TO DORMANT BERMUDAGRASS. Controls annual bluegrass. Apply in 5-20 gal water/A. DO NOT apply during green-up or to actively growing bermudagrass.
<i>halosulfuron</i> SedgeHammer 75DF	2	0.67-1.33 oz	0.031-0.062	12 H	Ky. bluegrass, bermudagrass, centipede, St. Augustine, tall fescue, zoysia, seashore paspalum	Controls yellow and purple nutsedge, and suppresses green kyllinga. A second application may be needed 6-10 weeks after the initial application. Apply at the 3-8 leaf nutsedge growth stage. Add a nonionic surfactant at 0.5% v/v (2 qt/100 gal). DO NOT mow 2 days before or after application. DO NOT apply to golf course putting greens.

**TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS**

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>POSTMERGENCE HERBICIDES (continued)</b>						
<i>imazaquin</i> Image 70DG	2	8.6-11.4 oz	0.37-0.5	12 H	bermudagrass, centipede, zoysia, St. Augustine	Controls nutsedges, wild garlic and selected broadleaf weeds. Add a nonionic surfactant at 1 qt/100 gal. The addition of M SMA (bermudagrass only) will aid in control of nutsedges and escaped weedy grasses. Two applications per year, at an interval of 6-8 weeks, will be needed to control purple nutsedge. DO NOT apply when turfgrass is emerging from winter dormancy. Image will severely injure fescues and ryegrasses. DO NOT apply to newly planted or sprigged lawns or golf greens.
MCPA (51%) + <i>fluroxypyr</i> (6%) + <i>dicamba</i> (4%) Change Up	4	2-3 pt	See Label	48 H	Ky. bluegrass, tall fescue, bermudagrass, bentgrass, carpetgrass, centipede,grass, ryegrass, St. Augustinegrass, zoysiagrass	Apply for broadleaf weed control in warm and cool-season grasses in residential lawns, nonresidential lawns, sod, and golf turf. Do not apply to golf greens and tees. Do not use on "Floritam," "Bitterblue", and other improved St. Augustinegrass varieties. Avoid applications during excessively hot or dry periods. Do not mow for 1-2 days before and after applications. Do not apply to newly seeded grasses or when temperatures exceed 90° F if turf injury is unacceptable.
<i>MCPA</i> + <i>MCPP</i> + <i>2,4-DP</i> Triamine II Tri-Ester II Trimec Encore	4	See Label	See Label	See Label	Ky. bluegrass, tall fescue, bermudagrass, centipede,grass, St. Augustinegrass, zoysiagrass	Refer to individual labels for recommended amount of formulated product. Controls a broader spectrum of weeds than 2,4-D alone. DO NOT spray at air temperatures greater than 85°F, and when warm-season turfgrasses are growing under stress conditions. Delay reseeding for 4 weeks after treatment. Trimec Encore is not labeled on St. Augustine.
<i>MCPA</i> + <i>triclopyr</i> + <i>dicamba</i> Cool Power HorsePower	4	See Label	See Label	See Label	Ky. bluegrass, tall fescue, bermudagrass, zoysiagrass	Controls a broader spectrum of weeds than 2,4-D alone. Cool Power is an ester formulation of MCPA + triclopyr + dicamba primarily for use during the cool winter months. HorsePower contains amine formulations of these herbicides. DO NOT mow 1-2 days before or after application. Delay application to newly seeded grasses until after 3-4 mowings. Delay reseeding for 3-4 weeks after application. Avoid applications during the spring transition of warm-season turfgrasses
<i>MCPA</i> + <i>MCPP</i> + <i>dicamba</i> Tri-Power	4	See Label	See Label	See Label	Ky. bluegrass, tall fescue, bermudagrass, zoysiagrass	Controls a broader spectrum of weeds than 2,4 -D alone. DO NOT mow 1-2 days before or after application. Delay application to newly seeded grasses until after 3-4 mowings. Delay reseeding for 3-4 weeks after application. Avoid applications during the spring transition of warm-season turfgrasses unless a slight delay in green-up can be tolerated.
<i>MCPP</i> + <i>2,4-D</i> + <i>dicamba</i> Trimec Southern	4	See Label	0.7 + 0.4 + 0.08	48 H	Ky. bluegrass, bermudagrass, centipede, tall fescue, zoysia, St. Augustine	Controls a broader spectrum of weeds than 2,4-D alone. DO NOT spray when turfgrass is emerging from winter dormancy. Avoid application if air temperatures exceed 85°F. Delay reseeding for 4 weeks after application. Refer to label for rates for St. Augustine and centipede.

**TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS**

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>POSTMERGENCE HERBICIDES (continued)</b>						
<i>metribuzin</i> Sencor 75 Turf	5	0.67 lb	0.5	See Label	bermudagrass	Dormant bermudagrass: Apply to emerged winter annual weeds. Make only 1 application/season. Actively growing bermudagrass: Apply to bermudagrass that is actively growing and not under stressed conditions. Controls goosegrass and selected annual weeds. DO NOT make more than 2 applications/season. Sencor may cause temporary discoloration. Delay mowing treated areas for at least 3 days.
<i>metribuzin</i> Sencor 75 Turf + <i>MSMA</i> Several trade names	5 + 17	2.6 dry oz + See Label	0.125 + 2	See Label	bermudagrass	This tank mix provides better control of goosegrass than the use of MSMA alone. Apply ONLY to established bermudagrass that is actively growing and not under stressed conditions. Two applications spaced 7-10 days apart may be necessary for acceptable control.
<i>metsulfuron</i> Manor 60DF Blade 60DF Various 60DF	2	0.25-1 oz	0.009-0.037	See Label	Ky. bluegrass, bermudagrass, centipede, St. Augustine, zoysia	Controls a wide range of broadleaf weeds, 'Pensacola' bahiagrass and wild garlic/onion. May also be used to hasten the spring transition of bermudagrass overseeded with perennial ryegrass to bermudagrass. Add a nonionic surfactant at 0.25% v/v. DO NOT exceed 0.5 oz on centipede or Kentucky bluegrass. DO NOT overseed for 8 weeks after application, or plant woody ornamentals in treated areas for 1 year after application. Not recommended for use on tall fescue.
<i>metsulfuron</i> + <i>sulfentrazone</i> Blindside 66WDG (6% + 66%)	2 + 14	3.25-10 oz	0.13-0.41 (0.01 + 0.12 to 0.038 + 0.375)	12 H	bermudagrass centipedegrass St. Augustinegrass tall fescue zoysiagrass	Apply for selective post-emergence control of annual grasses, broadleaf weeds and sedges in established turf areas including, but not limited to, residential, commercial and institutional lawns, athletic fields, commercial sod farms, golf course fairways and golf course roughs. Best weed control results will be obtained when no rainfall or irrigation occurs within 24 hours after application. If no rainfall or irrigation occurs within 7 days after applications in the amount of 0.5", then irrigation of at least 0.5" is recommended. Do not apply to tall fescue at temperatures above 75°F. Do not apply to centipedegrass during spring transition. Use the lowest rate for tall fescue. Do not apply to golf course putting greens, collars or tees. Do not use on turfgrass other than those listed on the label or turfgrass under stress. See product label for further information before use.
<i>MSMA</i> Bueno 6 6 lb/gal Daconate 6 6 lb/gal Other trade names  <i>DSMA</i> DSMA Liquid 3.6 lb/gal Weed-E-Rad 360 3.6 lb/gal Other trade names	17	2.7 pt 2.7 pt  1 gal 1 gal	2 2  3.6 3.6	See Label	Ky. bluegrass, bermudagrass, tall fescue	These herbicides control emerged annual grasses, bahiagrass, and dallisgrass and provide fair control of nutsedge. Multiple applications spaced 7-10 days apart are needed for acceptable control. Temporary discoloration of turf will occur. May be applied to newly sprigged bermudagrass at the above rates. On new stands of fescue, apply 1/2 rate after 3 mowings. Add a surfactant according to label directions. Zoysiagrass cultivars vary in tolerance to MSMA. "Meyer" is more tolerant than "Emerald" or "Matrella". DO NOT apply to centipede or St. Augustine.

**TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS**

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>POSTMERGENCE HERBICIDES (continued)</b>						
<i>penoxsulam</i> + <i>sulfentrazone</i> + 2,4-D + <i>dicamba</i> Avenue South	2 + 4 + 14	3-6 pt	–	48 H	bermudagrass, buffalograss centipedegrass, Kentucky bluegrass, ryegrass, seashore paspalum, St. Augustinegrass, tall fescue, zoysiagrass	Provides postemergence control of annual and perennial broadleaf weeds in established residential and non-residential turf including lawns, parks, golf courses, sports facilities, and sod farms. Do not apply this product to golf greens, collars, tees, bentgrass, carpetgrass, dichondra, legumes, and lawns where desirable clovers are present. Applications made when ambient temperatures are above 90°F (85°F for St. Augustinegrass) may cause undesirable turf injury. Environmental conditions and certain spray tank, liquid fertilizers, and tank mixtures containing other emulsifiable concentrates may reduce the selectivity on turfgrass. Do not collect grass clippings for use as mulch around plants. Do not broadcast apply to bare ground or paved surfaces.
<i>pronamide</i> Kerb T/O 50WSP	3	1.5-3 lb	0.75-1.5	24 H	bermudagrass, centipede, St. Augustine, zoysia	Pronamide will control emerged annual bluegrass, corn speedwell, and common chickweed. Increase rate as annual bluegrass approaches maturity. Pronamide acts slowly (3-5 weeks) on seedling-mature annual bluegrass. DO NOT apply to any cool season grass. A light overhead irrigation is necessary to move Kerb into the weed root zone if not rainfall occurs within 24-48 hours. Kerb is a Restricted Use Herbicide.
<i>quinclorac</i> Drive 75DF  Drive XLR8 1.5 SL	4	1 lb  64 fl oz	0.75  0.75	12 H	Ky. bluegrass, bermudagrass, seashore paspalum, tall fescue, zoysiagrass	Provides excellent control of crabgrass, barnyardgrass and clovers with 1 application. Multiple applications will also provide control of torpedograss. Add methylated seed oil at 1.5 pts/A to the spray mix. DO NOT mow 2 days before or after application. Drive may also be applied before, at, and during seedling emergence of bermudagrass, tall fescue and zoysiagrass. DO NOT add an adjuvant until 28 days after emergence. Apply under conditions of good soil moisture. For best results do not irrigate for 24 hours after application. DO NOT apply to bahiagrass, carpetgrass, St. Augustinegrass or centipede. DO NOT apply to exposed feeder roots of ornamental trees and shrubs.
<i>quinclorac</i> 0.75 lb/gal + 2,4-D 1 lb/gal + <i>dicamba</i> 0.125 lb/gal Qunicept	4	7-8 pt	0.66 + 0.88 + 0.1- 0.75 + 1 + 0.125	48 H	bentgrass, bermudagrass, Ky. bluegrass, buffalograss, tall fescue, ryegrass, zoysiagrass	Apply to residential and nonresidential cool-season turfgrasses for broadleaf weed control and suppression or control of grassy weeds. Apply lower rates on bermudagrass and zoysiagrass and DO NOT apply to greens. Controls young barnyardgrass, crabgrass, and foxtails but repeat applications may be needed for complete control of mature plants. DO NOT apply when temperatures exceed 90° F or if turf is under stress from drought, heat, or disease.
<i>quinclorac</i> + <i>dicamba</i> + <i>MCP</i> One-Time 2.45 SL	4	21-64 fl oz	0.25 + 0.03 + 0.12-0.75 + 0.1 + 0.375	48 H	Ky. bluegrass, bentgrass, bermudagrass, seashore paspalum, tall fescue, zoysiagrass	Controls broadleaf weeds, barnyardgrass, crabgrass, foxtails, and torpedograss in cool and warm-season turfgrasses. Repeat application may be needed for grassy weed control. DO NOT apply more than 128 fl oz/A in 1 year or more than 2 applications/year. DO NOT apply to golf course collars, greens, or turf grown for sod. DO NOT apply to fine fescue, bahiagrass, St. Augustinegrass, or centipede.

**TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS**

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>POSTMERGENCE HERBICIDES (continued)</b>						
<i>quinclorac</i> + <i>carfentrazone</i> Square One 70WDG 0.66 + 0.04	4 + 14	8-18 oz	0.35-0.79  (0.33 + 0.02 to 0.75 + 0.05)	12 H	bermudagrass bluegrasses buffalograss fine fescue perennial ryegrass tall fescue seashore paspalum zoysiagrass	Apply for postemergence control of annual grasses and broadleaf weeds in established turf areas including residential, commercial and institutional lawns, athletic fields, commercial sod farms, golf course fairways and golf course roughs. SquareOne is absorbed by shoots, foliage and roots and can be applied to several turfgrasses 7 days or more after emergence by both seeding and sprigging (See Label). Application to zoysiagrass should be delayed until at least 14 days after emergence to avoid extended discoloration. Slight discoloration may be observed immediately after application for hybrid bermudagrass, however, normal turf color returns by 12 days after emergence if no other stresses are present. Areas treated with SquareOne may be seeded or overseeded 1 day following application. This product may be applied to established sod. See product label for further information before use.
<i>rimsulfuron</i> Tran Xit GTA 25DF	2	1-2 oz	0.016-0.032	See Label	bermudagrass, centipedegrass, zoysiagrass	May be used: a) to control annual bluegrass before overseeding bermudagrass with perennial ryegrass or <i>Poa trivialis</i> ; b) to control annual bluegrass and certain weeds in non-overseeded bermudagrass, centipedegrass and zoysiagrass; and c) to remove perennial ryegrass or <i>Poa trivialis</i> from bermudagrass in the late spring. Add a nonionic surfactant at 0.25% v/v. Apply 10-14 days in late summer or early fall before overseeding bermudagrass. DO NOT apply after overseeding, or to bentgrass putting greens. To hasten spring transition on overseeded bermudagrass, apply at the 60-75% green-up growth stage of bermudagrass, or approximately 2-3 weeks before transition is desired. DO NOT apply to residential lawns, cool-season turfgrasses or to newly sprigged or sodded bermudagrass.
<i>sethoxydim</i> Segment 1 lb/gal	1	1.5-2.25 pt	0.19-0.28	12 H	centipede, fine fescue	Apply sethoxydim only to centipede and fine fescues (creeping red, Chewings, hard fescue). Other turfgrasses, including tall fescue, will be severely injured by sethoxydim. Controls annual grasses and suppresses bahiagrass growth. Apply no sooner than 3 weeks after green-up. DO NOT exceed 1.5 pt/A on seedling centipede. DO NOT mow 7 days prior to or after application. Two applications per season may be used in seedling and established centipede. For bahiagrass suppression, repeat treatment 10-14 days after the first application.
<i>sulfentrazone</i> 0.06 lb/gal + 2,4-D 1.4 lb/gal + MCPP 0.5 lb/ gal + dicamba 0.22 lb/gal Surge	14 + 4	2.75-4 pt	–	48 H	Ky. bluegrass, tall fescue, bermudagrass, zoysiagrass	Controls a wide range of broadleaf weeds, including spotted spurge. This product will also provide some suppression of small, actively growing yellow nutsedge. May be applied after the second mowing in newly established cool-season turfgrasses, or 4 weeks after sprigging or sodding warm-season turfgrasses. DO NOT reseed until 3 weeks after application. DO NOT apply at air temperatures >90° F, or during the spring transition of warm-season turfgrasses.
<i>sulfentrazone</i> Dismiss 4.0SC Spartan 4F	14	4-12 fl oz	0.125-0.375	12 H	Ky. bluegrass, tall fescue, bermudagrass, centipedegrass, St. Augustinegrass, seashore paspalum, zoysiagrass	Controls nutsedges, annual sedges, kyllinga species and a wide range of broadleaf weeds. Apply to established grasses, or to newly established grasses (seeded or sodded) after the second mowing. Treated areas may be reseeded or sodded 3 months after application. Overseeding with perennial ryegrass may be done 6 weeks after application if slight injury to ryegrass can be tolerated. Do not apply Dismiss within 3 months of sod harvest. Dismiss is not recommended for use on golf course putting greens. Spartan is labeled for use only on seed and sod farms.

**TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS**

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>POSTMERGENCE HERBICIDES (continued)</b>						
<i>sulfentrazone</i> 0.06 lb/gal + <i>quinclorac</i> 0.5 lb/gal + <i>2,4-D</i> 0.88 lb/gal + <i>dicamba</i> 0.09 lb/gal Q4, Q4 Plus	14 + 4	7-8 pt	0.05 + 0.04 + 0.77 + 0.08 to 0.06 + 0.5 + 0.88 + 0.09	48 H	Ky. bluegrass, tall fescue, bermudagrass buffalograss, ryegrass, zoysiagrass	Apply to cool-season turfgrasses for broadleaf weed control and suppression or control of grassy weeds. DO NOT apply to bentgrasses or greens. See labels for use on warm-season grasses. Controls young barnyardgrass, crabgrass, and foxtails but repeat applications will be needed for complete control of mature plants. DO NOT apply when temperatures exceed 90°F or if turf is under stress from drought, heat, or disease.
<i>thiencarbazon</i> + <i>iodosulfuron</i> + <i>dicamba</i> Celsius 68WG	2 + 4	2.5-4.9 oz	See Label	24 H	bahiagrass, bermudagrass, Centipedegrass, St. Augustinegrass, zoysiagrass	This product is intended for commercial application (licensed applicators only) to residential lawns, commercial lawns, golf courses, sports fields, parks, campsites, recreational areas, residential lawns, roadsides, school grounds, cemeteries, and sod farms to control annual and perennial broadleaf weeds and grasses in warm-season grasses. For certain weeds, a second application made 2-4 weeks later may be needed for complete weed control (see label). Total amount of product applied in a calendar year must not exceed 7.4 oz/A See label before use. Do not apply to areas with desirable carpetgrass or bahiagrass.
<i>thiencarbazon-methyl</i> 10% + <i>foramsulfuron</i> 20% + <i>halosulfuron</i> 31% Tribute Total 61% WDG	2	1-3.2 oz	0.006-0.02	12 H	bermudagrass	Provides selective, postemergence control of annual and perennial grassy weeds, sedges and kyllingas, and broadleaf weeds growing in well-established bermudagrass. Use only on commercial and residential turf including golf courses (excluding greens and overseeded tees), residential and commercial lawns, sports fields, cemeteries, parks, campgrounds, recreational areas, roadsides, school grounds, and sod farms. For postemergence control of dallisgrass in well-established bermudagrass, use 3.2 oz/A and include the addition of a methylated seed soil and ammonium sulfate. Make an application in late summer/early fall while the weeds are still actively growing and not under stress. Follow up with a second application after 4-6 weeks. Tribute Total also controls annual bluegrass, overseeded ryegrass, creeping bentgrass, and other weeds. See label for further information.
<i>topramezone</i> Pylex 2.8 lb/g	27	1-2 fl oz/A	0.023-0.046 lb ai	12 H	Centipedegrass Fine Fescue Kentucky Bluegrass Perennial Ryegrass Tall Fescue	Apply for postemergence control of crabgrass, goosegrass, foxtails, clovers, and other broadleaf weeds. Repeat applications with triclopyr in late summer will suppress bermudagrass in tall fescue. Labeled use areas include commercial lawns, golf courses, sod farms, parks, residential turf, and athletic fields. Apply with crop oil concentrate or methylated seed oil at 0.5-1%v/v. Treatments may be made before seeding tolerant turfgrass species, but do not apply within 28 days after seeding. Do not apply more than 2 fl oz/A/ application. Do not apply more than 4 fl oz/A (0.089 lb ai/A)/year. Do not apply to golf greens.



**TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS**

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>POSTMERGENCE HERBICIDES (continued)</b>						
<i>triclopyr</i> Turflon Ester Ultra 4 lb/gal	4	1-2 pt	0.5-1	12 H	tall fescue, zoysiagrass	Controls wild violet, ground ivy, yellow woodsorrel and selected other broadleaf weeds. Tank mix with recommended rates of Fusilade II or Acclaim Extra to suppress bermudagrass in tall fescue and zoysia. Repeat the application 3-4 times at intervals of 4 weeks. Do not apply to other turfgrass species, unless injury can be tolerated. Areas treated with Turflon Ester can be reseeded 3 weeks after application.
<i>triclopyr + clopyralid</i> Confront 2.25 + 0.75 lb/gal	4	1-2 pt	0.3 + 0.1 to 0.6 + 0.2	48 H	Ky. bluegrass, bermudagrass, centipede grass, tall fescue, zoysiagrass	Controls a wide range of broadleaf weeds. Repeat the application in approximately 4 weeks if necessary. Repeat treatments will also be necessary for the control of violets and woodsorrel. Newly seeded turf should be mowed 2-3 times before treatment. DO NOT water for 6 hours after application or apply at air temperatures >85°F. DO NOT apply to exposed roots of shallow rooted trees and shrubs. DO NOT reseed for 3 weeks after application. Not labeled for use on residential turfgrasses.
<i>trifloxysulfuron-sodium</i> Monument 75 DG	2	0.33-0.56 oz	0.015-0.026	12 H	bermudagrass, zoysiagrass	Controls nutsedges, green kyllinga, annual bluegrass, tall fescue, torpedograss and certain broadleaf weeds in established bermudagrass and zoysiagrass. Monument is not recommended for use on other turfgrass species. Not labeled for use on home lawns. Add a nonionic surfactant at 0.25-0.5% v/v to the spray mix. Monument at rates of 0.1-0.3 oz/A may be used as a spring transition aid for the removal of perennial ryegrass and <i>Poa trivialis</i> . Avoid mowing for 1-2 days before and after application. For nutsedges repeat the application at 4-6 weeks if regrowth is observed. DO NOT overseed bermudagrass with cool-season turfgrasses for 3 weeks after application.
<b>TURF RENOVATION</b>						
<i>glyphosate</i> Roundup Pro 4 lb/gal	9	1-5 qt	1-5	4 H	Existing vegetation	Apply to areas that are being renovated (establishment of desirable turfgrass) to kill existing vegetation. Refer to Round up Pro label for recommended rates for specific species. Apply to actively growing bermudagrass when seedheads appear. Repeat treatment may be required for complete control. Tillage or renovation techniques (vertical mowing, coring, slicing) should be delayed for 7 days after treatment. Avoid contact of spray with ornamentals.
<b>PREEMERGENCE HERBICIDES – GOLF COURSE PUTTING GREENS</b>						
<i>bensulide</i> Bensumec 4LF Pre-San 7 G)	8	1.9-3.1 gal 107-180 lb	7.5-12.5 7.5-12.5	See Label	bentgrass, bermudagrass	Controls annual grasses and selected broadleaf weeds. Apply high rate in fall for annual bluegrass control. Apply a light irrigation immediately after treatment. DO NOT apply to newly sprigged grasses. Delay reseeding for 4 months after treatment.
<i>pronamide</i> Kerb T/O 50WSP	3	1-2	0.5-1	24 H	bermudagrass	Preemergence or postemergence applications of Kerb will control annual bluegrass. Apply to non-overseeded bermudagrass greens. Do not apply closer than 90 days before overseeding cool-season grasses unless deactivation with activated charcoal is planned. To deactivate Kerb with activated charcoal, such as Gro-Safe, use 10 lb charcoal/1000 sq ft. Reseed no sooner than 7 days after charcoal application. A light overhead irrigation is necessary to move Kerb into the weed root zone if no rainfall occurs within 24 hours. DO NOT apply Kerb to any cool-season turfgrass. Kerb is a Restricted Use Herbicide.

**TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS**

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>PREEMERGENCE HERBICIDES – GOLF COURSE PUTTING GREENS (continued)</b>						
<i>siduron</i> Tupersan 50 WP	7	4-24 lb	2-12	4 H	creeping bentgrass	May be applied at the time of seeding or to established creeping bentgrass for crabgrass spp. control. Siduron does not control goosegrass or annual bluegrass. Irrigate within 3 days of application with 0.5" of water/A if rainfall does not occur. Tupersan at 1 lb/1000 sq ft may be used as band treatment along the perimeter of creeping bentgrass putting greens to suppress stolon growth of bermudagrass. Make the initial application in the March/April time frame. Repeat applications can be made at 4-5 week intervals.
<i>fenarimol</i> Rubigan 1AS Patchwork 0.78G	N/A	See Label See Label	See Label See Label	12 H	overseeded bermudagrass	Fenarimol is a systemic fungicide that reduces the infestation level of annual bluegrass. May be applied as a sequential treatment to bermudagrass greens that are overseeded with perennial ryegrass, <i>Poa trivialis</i> or bentgrass. Sequential treatments should be applied at intervals of 10-14 days. Use the triple application program if bentgrass or <i>Poa trivialis</i> is used for overseeding. For double applications, apply 6 fl oz of Rubigan AS or 6 lb of Patchwork/1000 sq ft with the last application 2 weeks prior to overseeding ryegrass. For triple applications, apply 4 fl oz of Rubigan AS or 4 lb Patchwork/1000 sq ft with the last application 2 weeks prior to overseeding ryegrass or 4 weeks prior to overseeding bentgrass or <i>Poa trivialis</i> . A single application of Rubigan AS at 2 fl oz or Patchwork at 2 lb/1000 sq ft in January or February will help to maintain annual bluegrass control. Rubigan will not control perennial bluegrass.
<i>bensulide</i> + <i>oxadiazon</i> Goosegrass/Crabgrass Control 5.25% + 1.31% G	8 + 14	115 lb	6 bensulide + 1.5 oxadiazon	See Label	bentgrass, bermudagrass	Controls summer annual grasses. Apply a light irrigation after treatment. DO NOT use on newly sprigged grasses until well established. Delay reseeding for 5 months after treatment. On putting greens overseeded with perennial ryegrass or <i>Poa trivialis</i> apply 0.5 the maximum labeled rate to dry turf. Apply an additional application at 0.5 the maximum labeled rate to dry turf 10-14 days later. See label for precautions concerning use on putting greens.
<b>POSTEMERGENCE HERBICIDES – GOLF COURSE PUTTING GREENS</b>						
<i>carfentrazone</i> QuickSilver 1.9 lb/gal  QuickSilver 1.03 lb/gal water-soluble 5 ml bag	14	6.7 fl oz  use 3-4 5 ml bags/ 2,000 sq ft	0.1	Until Dry	bentgrass	Apply to creeping bentgrass putting greens and tees for the control of silvery-thread moss ( <i>Byrum argenteum</i> ). Repeat the application in 2 weeks. Add a nonionic surfactant at 0.25% v/v. Apply at a spray volume of >100 gpa. Transitory injury (yellowing) may occur when applied to bentgrass stressed from temperatures higher than 90°F, disease and soil moisture stress.
<i>diclofop-methyl</i> Illoxan 3EC	1	1-1.4 qt	0.75-1	See Label	bermudagrass	Illoxan may be used for goosegrass control on bermudagrass golf greens, tees and fairways. Use the high rate for goosegrass with 1-2 tillers. Lower rates may be used on smaller goosegrass. DO NOT mow for 24-36 hours after application. Control requires 2-3 weeks. May cause temporary phytotoxicity (7-10 days). DO NOT tank mix with other pesticides or fertilizers as control will be reduced. DO NOT overseed treated areas for at least 2 months after the last application.

**TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS**

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>POSTEMERGENCE HERBICIDES – GOLF COURSE PUTTING GREENS (continued)</b>						
<i>foramsulfuron</i> Revolver 0.19 lb/gal	2	8.8-26.2 fl oz	0.013-0.04	12 H	bermudagrass	Apply Revolver for: a) control of emerged annual bluegrass 1 week before overseeding bermudagrass with perennial ryegrass; b) postemergence control of goosegrass in late spring and early summer; c) postemergence control of annual bluegrass in non-overseeded putting greens; and d) spring transition of bermudagrass overseeded the previous fall with cool-season turfgrasses. For tillered goosegrass, make 2 applications at the high rate 7-14 days apart. DO NOT apply Revolver within 2 weeks of sprigging. Revolver is rainfast within 2 hours of application. Revolver must be allowed to dry on bermudagrass foliage before traffic is allowed through treated areas. Revolver is NOT recommended for use on creeping bentgrass greens.
<i>mecoprop</i> MCP-4 Amine	4	2.5 pt	1.25	See Label	bentgrass, bermudagrass	Apply to small and actively growing broadleaf weeds as a summer or winter treatment. Avoid spray drift to ornamentals tree, shrub or flower foliage. DO NOT water for 24 hours after application. Delay mowing 2-3 days before or after application. DO NOT apply during conditions of drought, high temperatures (>90° F) or very wet weather. Weekly applications at one-half recommended rates will provide better control of knotweed than a single application at normal use rates. DO NOT reseed for 3-4 weeks after application.
<i>rimsulfuron</i> Tran Xit GTA 25DF	2	1-2 oz	0.016-0.032	See Label	bermudagrass	May be used: a) to control annual bluegrass before overseeding bermudagrass with perennial ryegrass or <i>Poa trivialis</i> ; b) to control annual bluegrass in non-overseeded bermudagrass; and c) to remove perennial ryegrass or <i>Poa trivialis</i> from bermudagrass greens in the late spring. Add a nonionic surfactant at 0.25% v/v. Apply 10-14 days in late summer or early fall before overseeding bermudagrass. DO NOT apply after overseeding, or to bentgrass putting greens. To hasten spring transition on overseeded bermudagrass, apply at the 60%-75% green-up growth stage of bermudagrass, or approximately 2-3 weeks before transition is desired. Irrigate within 2 hours of a TranXit application and then follow normal irrigation schedule. TranXit is NOT recommended for use on creeping bentgrass putting greens.
<i>MCPP</i> + <i>2,4-D</i> + <i>dicamba</i> Trimec Bentgrass	4	2.7 pt	0.5 + 0.15 + 0.06	See Label	bentgrass	Apply to small and actively growing broadleaf weeds when air temperatures are less than 80°F. DO NOT water for 24 hours after application. DO NOT apply if bentgrass is showing the effects of environmental stresses.

**TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS**

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<b>POSTEMERGENCE HERBICIDES – GOLF COURSE PUTTING GREENS (continued)</b>						
<i>trifloxysulfuron-sodium</i> Monument 75DG	2	0.33-0.56 oz	0.015-0.026	12 H	bermudagrass	Controls nutsedges, annual sedges, kyllinga species, and certain broadleaf weeds in established bermudagrass putting greens. Applications should be made to actively growing bermudagrass after 100% spring green-up. Monument is not recommended for use on creeping bentgrass. Add a nonionic surfactant at 0.25-0.5% v/v to the spray mix. Monument at rates of 0.1-0.3 oz/A may be used as a spring transition aid for the removal of perennial ryegrass and <i>Poa trivialis</i> . Avoid mowing for 1-2 days before and after application. For nutsedges repeat the application at 4-6 weeks if regrowth is observed. DO NOT overseed bermudagrass with cool-season turfgrasses for 3 weeks after application.
<i>sulfosulfuron</i> Certainty 75WDG	2	0.75-2 oz	0.04-0.09	12 H	Bermudagrass Centipedegrass Seashore Paspalum St. Augustinegrass Zoysiagrass	Sulfosulfuron controls nutsedges, annual sedges, kyllinga species, tall fescue, and certain broadleaf weeds in warm-season turfgrasses. Add a nonionic surfactant at 0.25% v/v to the spray mix. Avoid mowing for 1-2 days before and after application. For nutsedges repeat the application at 4-10 weeks if regrowth is observed. Sulfosulfuron may be applied 7-10 days before overseeding bermudagrass with perennial ryegrass. DO NOT use on putting greens.  DO NOT use on tall fescue or other cool-season grasses.

# TURFGRASS GROWTH REGULATORS FOR PROFESSIONAL MANAGERS

Patrick E. McCullough, Extension Agronomist – Weed Science

CHEMICAL	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<i>mefluidide</i> Embark 2S		1.5-4 pt	0.38-1	See label	Ky. bluegrass, centipede, tall fescue, common bermudagrass	Use the low rate on Ky. bluegrass, centipede and tall fescue. Use the high rate on common bermudagrass. Mowing 3 weeks after application to centipede will extend the period of seedhead suppression. Apply after uniform spring green-up but prior to seedhead emergence. Suppresses vegetative and seedhead development. Recommended for turfgrasses on difficult-to-mow sites. Not recommended for turfgrasses when maintained under intensive management systems. <b>DO NOT</b> mow 2 days prior to or after application. Remove clippings prior to application. The addition of a nonionic surfactant (0.25% v/v) may enhance suppression; however, temporary discoloration may increase. <b>DO NOT</b> apply within 4 growing months of seeding or reseed within 3 days of an application. Embark requires an 8-hour rain-free period for optimum activity.
<i>maleic hydrazide</i> Retard 2.25 lb/gal.		1.3 gal	3	12 H	bahiagrass, Ky. bluegrass, Tall fescue, Common bermudagrass	Apply after uniform spring green-up but prior to seedhead emergence. Suppresses vegetative growth and seedhead development. If seedheads have already formed, mow 1 week after application to remove emerged seedheads. Recommended for turfgrasses on difficult-to-mow sites. Not recommended for turfgrasses when maintained under intensive management systems. Remove clippings prior to application. <b>DO NOT</b> apply to turf less than 3 years old and delay reseeding for 3 days. <b>DO NOT</b> add a surfactant. Maleic hydrazide requires a 12-hour rain-free period for optimum activity.
<i>paclobutrazol</i> Trimmit 2SC		See label	See label	12 H	hybrid bermudagrass, St. Augustinegrass	Recommended for hybrid bermudagrass golf course fairways, tees and roughs, and St. Augustinegrass. Apply in spring after uniform green-up. Do not seed within 6 weeks prior to or 2 weeks after application. Do not aerify or drag greens with steel mats while under growth regulation effects. Not recommended for use on common bermudagrass. <b>DO NOT</b> sprig within 4 weeks of application. On newly sprigged or sodded turf delay application until the sod has firmly rooted or sprigs have achieved complete soil coverage.
<i>flurprimidol</i> Cutless 50W		See label	See label	See label	bermudagrass, (Tift 419, 328 & common), zoysiagrass	Cutless may be used on medium-high quality, well maintained turfgrasses. Refer to label for rates for different bermudagrass cultivars and zoysiagrass. Apply after full spring green-up (usually mid-May–mid-June) for the first application. An additional application may be made in the late summer to bermudagrasses only. Treated areas should receive 0.5” of rainfall or irrigation within 24 hours of application. Make uniform application with a boom-type sprayer and avoid overlaps.

**TURFGRASS GROWTH REGULATORS FOR PROFESSIONAL MANAGERS**

CHEMICAL	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
<i>trinexapac-ethyl</i> Governor Groom PGR 1 MC Primo 1MC Primo 25 WSB T-Nex 1 AQ		See label	See label	See label	bahiagrass, Ky. Bluegrass, bermudagrass, centipedegrass, tall fescue, St. Augustinegrass, zoysiagrass bentgrass putting greens, bermudagrass putting greens	Apply to actively growing turfgrasses. The rate of application is dependent upon turfgrass species and desired length of growth suppression. Refer to the label for additional information. Repeat applications may be made as soon as the treated turfgrass resumes growth. Trinexapac-ethyl is foliage-absorbed and is rainfast within one hour of application. Trinexapac-ethyl does not require the addition of a surfactant. Trinexapac-ethyl may cause temporary yellowing (about one week). Trinexapac-ethyl is labeled for use on home lawns, commercial lawns, golf courses, golf course putting greens, sod farms, athletic fields, cemeteries and other similar areas. Additionally, trinexapac-ethyl may be applied to bermudagrass to enhance establishment of cool-season turfgrasses (overseeding). Apply before verticutting, scalping, spiking or other similar operations. Apply 1-5 days before overseeding. Trinexapac-ethyl may also be used for growth regulation of grasses around monuments and structural materials. At normal dilution rates, trinexapac-ethyl does not stain brass, bronze, concrete, marble, granite and other types of stone.
<i>trinexapac-ethyl</i> 0.11 lb/gal + <i>flurprimidol</i> 0.44 lb/gal + <i>paclobutrazol</i> 0.44 lb/gal (Musketeer)		18-40 oz	0.015 to 0.034 + 0.062-0.14 + 0.062-0.14	See label	Ky. Bluegrass, bermudagrass, bentgrass putting greens, bermudagrass, perennial ryegrass	Apply to actively growing turfgrass for growth regulation and annual bluegrass suppression. Do not apply to residential lawns. Do not apply to bermudagrass golf greens or overseed putting greens. Do not apply to saturated soils or areas where annual bluegrass is desired turfgrass. Do not exceed 580 fl oz/A/year. Do not apply for commercial sod or seed production.
<i>flurprimidol</i> + <i>trinexapac-ethyl</i> Legacy 1.1 + 0.41 lb/gal		See Label	See Label	12 H	Bentgrass, KY bluegrass, perennial ryegrass, bermduagrass, seashore paspalum, zoysiagrass	Flurprimidol + trinexapac-ethyl (Legacy) can be applied to actively growing turf for clipping management and annual bluegrass suppression. Apply Legacy for annual bluegrass suppression in fairway height bentgrass at 8-15 fl oz/A in early spring upon active turfgrass growth. Repeat applications of 8-20 fl oz/A of Legacy should be made at 3-6 week intervals until late summer or early fall. Apply 15-25 fl oz/A for annual bluegrass suppression in Kentucky bluegrass and perennial ryegrass mixtures mowed at fairway heights. Reduced rates of Legacy should be considered in bentgrass fairways with high populations of annual bluegrass or when temporary annual bluegrass discoloration cannot be tolerated. For both warm and cool-season grasses, applications should be discontinued a minimum of 4 weeks before the onset of inactive growth or winter dormancy.
<i>flurprimidol</i> Cutless 50W		0.25-0.5 lb	0.125-0.25	12 H	bentgrass putting greens	Apply to actively growing bentgrass putting greens to suppress annual bluegrass. Apply in the spring after 3-4 mowings or in the fall. If necessary, repeat the application at 3-6 week intervals. <b>DO NOT</b> exceed 2 lb ai/A per growing season. Make the final fall application 8 weeks before the onset of winter dormancy. Delay reseeding for 2 weeks after application.
<i>paclobutrazol</i> Trimmit 2SC		6.4-16 fl oz	0.1-0.25	See label	bentgrass and bermudagrass putting greens	Used on creeping bentgrass greens to suppress annual bluegrass. Apply in the spring at least one month before the onset of high air temperatures. Repeat applications can be made at 4-6 week intervals. For late summer and early fall applications, apply Trimmit at least one month before hard frost. Do not use on bermudagrass greens except for winter overseeding enhance- ment (see Label).
prohexadione-Ca (Anuew) 27.5%		1.8-44 oz	0.031-0.76	See label	Ky. Bluegrass, bermudagrass, bentgrass, perennial ryegrass	Apply to actively growing turfgrasses for growth regulation and clipping management. Anuew is absorbed by turfgrass foliage and is rainfast within 1 hour. Use of a non-ionic surfactant may improve spray coverage of the turf foliage to maximize efficacy. Do not apply more than 26 oz/1000 sq ft/year.

## TURFGRASS WEED RESPONSE TO HERBICIDES

	atrazine	benefin	bensulide	dithiopyr	dimethenamid	ethofumesate	indaziflam	isoxaben	mesotrione	oryzalin	oxadiazon	pendimethalin	flumioxazin	proflamifam
<b>PREEMERGENCE</b>														
<b>PERENNIAL WEEDS</b>														
bahiagrass	F	P	P	P	P	P	p	P		P	P	P	P	P
bermudagrass	P	P	P	P	P	P-G	p	P	P	P	P	P	P	P
dallisgrass	P	P	P	P	P	P	P	P	P	P	P	P	P	P
nutsedge, purple	P	P	P	P	P	P	p	P	P	P	P	P	P	P
nutsedge, yellow	P	P	P	P	F	P	P	P	F	P	P	P		P
tall fescue	F	P	P	P	P	F	p	P	P	P	P	P		P
wild garlic/onion	P	P	P	P	P	P		P		P	P	P	P	P
<b>PANNUAL GRASSES</b>														
annual bluegrass	E	E	F	G	F	G-E	E	P	P	G	G	G	E	E
crabgrass	F	E	E	G-E	F	P	G-E	P	F	E	E	E	E	E
crowfootgrass		G	G			P			G	G	G	G		
goosegrass	P	F	F	F	G	P	G-E	P	P-F	F-G	E	F-G	G	G
sandbur		F	G			P		P		G	F	G		
<b>BROADLEAF WEEDS</b>														
carpetweed	E			G-E				G-E	E	G-E	G-E	G-E		G-E
chamberbitter (niruri)	G				G			G-E						
common chick weed	E	G	P	G	G		E	E	G	G	P	G	E	G
corn speedwell	E	E	P	G				G			G	E		
cudweed	E	P						F		P	P	P		
dandelion	F	P	P	P			P	P		P	P	P	G-E	P
dichondra	F	P	P	P				P		P	P	P		P
docks	G	P	P	P				P		P	P	P		P
doveweed	G	P	P		G	P	G			P	P	P		
Florida betony	E	P	P							P	P	P		
ground ivy		P	P	P				P		P	P	P		P
henbit	E	G	P	G	G		G-E	E	G-E	G	P	G	E	G
hop clovers	E	P	P		G		G-E		G-E		G		E	

Key: E – Excellent control (90%-100%); G – Good control (80%-89%); F – Fair control (70%-79%); P – Poor control (< 70%); A blank space indicates weed response is not known.

**TURFGRASS WEED RESPONSE TO HERBICIDES**

	<b>atrazine</b>	<b>benefin</b>	<b>bensulide</b>	<b>dithiopyr</b>	<b>dimethenamid</b>	<b>ethofumesate</b>	<b>indaziflam</b>	<b>isoxaben</b>	<b>mesotrione</b>	<b>oryzalin</b>	<b>oxadiazon</b>	<b>pendimethalin</b>	<b>flumioxazin</b>	<b>prodiamine</b>
<b>PREEMERGENCE</b>														
<b>BROADLEAF WEEDS</b>														
knotweed	E		G		G			G		F	G			
lespedeza	E			E			F							P
mallow, bristly		P	P	P				P		P	P	P		P
mock strawberry		P	P	P				P		P	P	P		P
mouseear chickweed		E	P		G		G-E	G	G	P	P	G	E	
mugwort		P	P	P				P	P	P	P	P		P
mustards	E		G								E			
parsley piert	E	P	E				G	E			G	P	G	
pennywort	F	P	P		G					P	P	P		
plantains	G	P	P	P			G-E			P	P	P	G	P
purslane, common	G			G				E	G-E		G	G		G
spurges	E	P	P	G	G			E		P	P	F		
spurweed (burweed)	E	P	P	P				G		F	P	G		P
VA buttonweed		P	P	P			P	P		P	P	P		P
violets		P	P	P				P		P	P	P		P
white clover	E	P	P	P	G		G	P	G-E	P	P	P	F	P
yellow woodsorrel	E	P	P	P	G			G		F	G	F	P	P

Key: E – Excellent control (90%-100%); G – Good control (80%-89%); F – Fair control (70%-79%); P – Poor control (< 70%); A blank space indicates weed response is not known.



**TURFGRASS WEED RESPONSE TO HERBICIDES**

	pronamide	simazine	atrazine	bentazon	bromoxynil	2,4-D	2,4-D + 2,4-DP	2,4-D + MCPP + dicamba	triclopyr
	PREEMERGENCE		POSTEMERGENCE						
<b>PERENNIAL WEEDS</b>									
bahiagrass	P	P	P-F	P	P	P	P	P	P
bermudagrass	P	P	P	P	P	P	P	P	P
dallisgrass	P	P	P	P	P	P	P	P	P
nutsedge, purple	P	P	P	P	P	F	P	P	P
nutsedge, yellow	P	P	P	G	P	F	P	P	P
tall fescue	G	F	F	P	P	P	P	P	P
wild garlic/onion	P	P	P	P	P	G	G	G	P
<b>ANNUAL GRASSES</b>									
annual bluegrass	E	E	E	P	P	P	P	P	P
crabgrass	F	F	F	P	P	P	P	P	P
crowfootgrass			P	P	P	P	P	P	P
goosegrass	P	P	P	P	P	P	P	P	P
sandbur			F	P	P	P	P	P	P
<b>BROADLEAF WEEDS</b>									
carpetweed	G	G-E	G-E			G	G-E	G-E	G
chamberbitter (niruri)			G	P		P			
common chick weed	E	E	E	G	P	P	G	G	E
corn speedwell	G	G	E	P	G	F	F	F	G
cudweed	P		G		G	G-E	G-E	E	F
dandelion	P	P	F	P	P	E	G	G	G
dichondra	P	P	F	P	P	G	G	G	F-G
docks	P	P	G	P		F	F	G	F-G
doveweed	P	G	G-E	P	P	F	F	F-G	F
Florida betony	P	P	F-G	P	P	F	G	G	G
ground ivy	P	P		P	P	P-F	F	F	G
henbit	P	E	E	P	G	P	G	G	E
hop clovers	P	E	E		F	F	E	G	E

Key: E – Excellent control (90%-100%); G – Good control (80%-89%); F – Fair control (70%-79%); P – Poor control (< 70%); A blank space indicates weed response is not known.

**TURFGRASS WEED RESPONSE TO HERBICIDES**

	pronamide	simazine	atrazine	bentazon	bromoxynil	2,4-D	2,4-D + 2,4-DP	2,4-D + MCPP + dicamba	triclopyr
	PREEMERGENCE		POSTEMERGENCE						
BROADLEAF WEEDS									
knotweed		G	E		F	P	F	G	F
lespedeza		E	E			P-F	G	G	G
mallow, bristly	P	P		P		F	F-G	F-G	G
mock strawberry	P	P		P		P	P	G	
mouseear chickweed	G		G	P		P-F	G	G	G
mugwort	P	P		P		P	F	P-F	P-F
mustards			E	G	G	E	G	G	F
parsley piert	P	G	E	G	G	P	P	F	E
pennywort	P	P	F	P	P	G	G	G	F
plantains	P	P	F	P	P	E	G	G	F
purslane, common		G	G	G-E		G	G	G-E	G
spurges		G	E	P	F	F	G	G	F
spurweed (burweed)	P	E	E	E	G	G	E	G	F
VA buttonweed	P	P	P	P	G	P	P	P	P
violets	P	P		P		P	P-F	P-F	F-G
white clover	P	G	E	P		F	G	G	F-G
yellow woodsorrel	P	P	G	P	F	P	P-F	F	F

Key: E – Excellent control (90%-100%); G – Good control (80%-89%); F – Fair control (70%-79%); P – Poor control (< 70%); A blank space indicates weed response is not known.

**TURFGRASS WEED RESPONSE TO HERBICIDES**

	<b>dicamba</b>	<b>fenoxaprop</b>	<b>glyphosate</b>	<b>imazaquin</b>	<b>MCPP</b>	<b>MSMA DSMA</b>	<b>metribuzin</b>	<b>pronamide</b>	<b>sethoxydim</b>	<b>simazine</b>	<b>Thiencarbazon + foramsulfuron + halosulfuron</b>	<b>Thiencarbazone + iodosulfuron + dicamba</b>
<b>POSTEMERGENCE</b>												
<b>PERENNIAL WEEDS</b>												
bahiagrass	P	G	G	P	P	F	P	P	F	P		F
bermudagrass	P	F-G	E	P	P	P	P	P	F	P	P	P
dallisgrass	P	P	E	P	P	F-G	P	P	P	P	G	F
nutsedge, purple	P	P	G	G	P	F	P	P	P	P		P
nutsedge, yellow	P	P	E	F-G	P	F	P	P	P	P	E	P
tall fescue	P	P	E	P-F	P	P	F	E	P-F	F	E	P
wild garlic/onion	F	P	G	E	P	P	P	P	P	P		
<b>ANNUAL GRASSES</b>												
annual bluegrass	P	P	E	P-F	P	P	G	E	P	G-E	G	P
crabgrass	P	G-E	E	P	P	E	F	P	E	P	F-G	P
crowfootgrass	P	G-E	E	P	P	E	G	P	F-G	P		P
goosegrass	P	G-E	E	P	P	F	G	P	G	P	G-E	P
sandbur	P	G	E	F	P	G	G	P	G	P		
<b>BROADLEAF WEEDS</b>												
carpetweed	E	P	E		F		G-E		P			
chamberbitter (niruri)		P	E	P		P-F			P			
common chick weed	E	P	E	E	G	P	G	G	P	E		E
corn speedwell	F	P	E	P	P	P	E	G	P	E		E
cudweed	E	P	G	F		F-G			P			G-E
dandelion	E	P	E		E	P		P	P	P		G-E
dichondra	G	P	E		F	P		P	P	P		
docks	E	P	E		P	P		P	P	P		G
doveweed	P	P	G				F	P	P	P	F-G	F
Florida betony	G	P	E		G	P		P	P	P		
ground ivy	G	P	G		F	P		P	P	P		
henbit	E	P	E	G	G	P	G	P	P	E		E

Key: E – Excellent control (90%-100%); G – Good control (80%-89%); F – Fair control (70%-79%); P – Poor control (< 70%); A blank space indicates weed response is not known.

**TURFGRASS WEED RESPONSE TO HERBICIDES**

	<b>dicamba</b>	<b>fenoxaprop</b>	<b>glyphosate</b>	<b>imazaquin</b>	<b>MCPP</b>	<b>MSMA DSMA</b>	<b>metribuzin</b>	<b>pronamide</b>	<b>sethoxydim</b>	<b>simazine</b>	<b>Thiencarbazono + foramsulfuron + halosulfuron</b>	<b>Thiencarbazono + iodosulfuron + dicamba</b>
<b>POSTEMERGENCE</b>												
hop clovers	E	P	E		E	P	G		P	E		E
knotweed	E	P	E		F	P	G		P			
lespedeza	E	P	E		G	P	E		P		P	F
mallow, bristly	E	P				P		P	P	P		
mock strawberry	G	P				P		P	P	P		
mouseear chickweed	E	P	E	G	G	P	E	P	P	P		G-E
mugwort	P-F	P	G		P	P		P	P	P		
mustards	E	P	E		F	P	F	P	P	G		
parsley piert	E	P	E	G	F	P	E	P	P	E		G
pennywort	E	P	E		E	P		P	P	P		
plantains	F	P	E		F	P		P	P	P		G-E
purslane, common	G	P	F		F				P	P		G
spurges	G	P	E		F	P	E		P			
spurweed (burweed)	E	P	E	E	F	P	G	P	P	E		
Star-of-Bethlehem	P	P	F	P	P	P	P	P	P	P		
VA buttonweed	F	P	G		P	P		P	P	P	F-G	G-E
violets	F	P			P	P		P	P	P		
white clover	E	P	F	F	E	P	F	P	P	P		E
yellow woodsorrel	G	P	E		F	G		P	P	P		

Key: E – Excellent control (90%-100%); G – Good control (80%-89%); F – Fair control (70%-79%); P – Poor control (< 70%); A blank space indicates weed response is not known.

**TURFGRASS WEED RESPONSE TO HERBICIDES**

	<b>isoxaben</b>	<b>metsulfuron</b>	<b>clopyralid</b>	<b>fluroxypyr</b>	<b>triclopyr + clopyralid</b>	<b>diclofop</b>	<b>amicarbazone</b>	<b>topramezone</b>	<b>flumioxazin</b>
<b>Time of application</b>	<b>PRE</b>	<b>POSTEMERGENCE</b>							
<b>PERENNIAL WEEDS</b>									
bahiagrass	P	G-E	P	P	P	P		P	
bermudagrass	P	P	P	P	P	P	P	F	P
dallisgrass	P	P	P	P	P	P	P	P	P
nutsedge, purple	P	P	P	P	P	P	P		P
nutsedge, yellow	P	P	P	P	P	P	P		P
tall fescue	P	P	P	P	P	P	P	P	P
wild garlic/onion	P	E	P			P			P
<b>ANNUAL GRASSES</b>									
annual bluegrass	P	P	P	P	P	P	P	P	G
crabgrass	P	P	P	P	P	P	P	G-E	
crowfootgrass		P	P	P	P				
goosegrass	P	P	P	P	P	G-E	P	G-E	
sandbur	P	P	P	P	P	P			
<b>BROADLEAF WEEDS</b>									
carpetweed	G-E	P			P	P			
chamberbitter (niruri)	G-E	G	P			P			
common chick weed	E	E	P	G	E	P			G-E
corn speedwell	G	E			P	P	G	G-E	G-E
cudweed	F	E	E		G-E	P		G-E	F
dandelion	P	E	F	F-G	E	P		P	P-F
dichondra	P	P			E	P			
docks	P	E	G		E	P			
doveweed		P	P		P	P			
Florida betony		G-E	P		G	P			
ground ivy	P			G	G-E	P			
henbit	E	G		F-G	E	P	E		G-E

Key: E – Excellent control (90%-100%); G – Good control (80%-89%); F – Fair control (70%-79%); P – Poor control (< 70%); A blank space indicates weed response is not known.

**TURFGRASS WEED RESPONSE TO HERBICIDES**

	<b>isoxaben</b>	<b>metsulfuron</b>	<b>clopyralid</b>	<b>fluroxypyr</b>	<b>triclopyr + clopyralid</b>	<b>diclofop</b>	<b>amicarbazone</b>	<b>topramezone</b>	<b>flumioxazin</b>
	<b>PRE</b>	<b>POSTEMERGENCE</b>							
<b>BROADLEAF WEEDS (continued)</b>									
hop clovers		P-F	E	G	E	P	G-E		G
knotweed	G	E		G		P			
lespedeza		E	P		E	P		P	
mallow, bristly	P	G				P			
mock strawberry	P					P			
mouseear chickweed	G	E	P	G	E	P	G		G
mugwort	P		G			P			
mustards		F	P			P			
parsley piert	E		P			P	G-E		F-G
pennywort		G			E	P			
plantains		G		F-G	E	P		P	P
purslane, common	E	F-G				P			
spurges	E	E			F-G	P	G-E		
spurweed (burweed)	G	E	E		E	P			
star-of-Bethlehem	P	P	P		P	P			
VA buttonweed	P	F		F	F	P			
violets	P	G-E			F-G	P			
white clover	P	E	E	G-E	E	P		P-F	P
yellow woodsorrel	G	G		G	F-G	P			

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**TURFGRASS WEED RESPONSE TO HERBICIDES**

	<b>foramsulfuron</b>	<b>flazasulfuron</b>	<b>trifloxysulfuron sodium</b>	<b>carfentrazone</b>	<b>rimsulfuron</b>	<b>halosulfuron</b>	<b>sulfentrazone</b>	<b>sulfosulfuron</b>
<b>POSTEMERGENCE</b>								
<b>PERENNIAL WEEDS</b>								
bahiagrass	P		F	P	P	P	P	P
bermudagrass	P	P	P	P	P	P	P	P
dallisgrass	F <sup>1</sup>	P	P-F	P	P	P	P	P
nutsedge, purple	P	E	E	P	P	G-E	P-F	G-E
nutsedge, yellow	P	E	E	P	P	G-E	E	G-E
tall fescue	G-E	G-E	G-E	P	G	P	P	G
wild garlic/onion			G-E	P		P	F	P-F
<b>ANNUAL GRASSES</b>								
annual bluegrass	E	G-E	E	P	E	P	P	F-G
crabgrass	P	P-F	P-F	P	P	P	P	P
crowfootgrass	P		P	P		P	P	
goosegrass	G	P	P	P	P	P	P	P
sandbur	P		P	P			P	
<b>BROADLEAF WEEDS</b>								
carpetweed			F-G	G-E			G	
chamberbitter (niruri)								
common chick weed		E		G	G		G	E
corn speedwell				G			G	P
cudweed		G	G					
dandelion		E	E	G			P	P
dichondra		P	E					
docks						G		
doveweed								P
Florida betony	E		E	P-F				
ground ivy			F-G	G			F	

Key: E – Excellent control (90%-100%); G – Good control (80%-89%); F – Fair control (70%-79%); P – Poor control (< 70%); A blank space indicates weed response is not known.

**TURFGRASS WEED RESPONSE TO HERBICIDES**

	<b>foramsulfuron</b>	<b>flazasulfuron</b>	<b>trifloxysulfuron sodium</b>	<b>carfentrazone</b>	<b>rimsulfuron</b>	<b>halosulfuron</b>	<b>sulfentrazone</b>	<b>sulfosulfuron</b>
<b>POSTEMERGENCE</b>								
<b>BROADLEAF WEEDS</b>								
henbit	E		E	G	G		G	P
hop clovers	F	E	G				G	
knotweed	P						G	
lespedeza							P	
mallow, bristly			P					
mock strawberry								
mouseear chickweed							G	
mugwort								
mustards								G-E
parsley piert	P	G	G-E		G-E		G	
pennywort			G					
plantains		F-G	P				G	
purslane, common				F				
spurges		F-G	E	F	G-E		F-G	
spurweed (burweed)	P		E				G	G-E
star-of-Bethlehem				G-E			G-E	
VA buttonweed			F-G					F-G
violets			G				P	
white clover	F	E	G				P	G-E
yellow woodsorrel			E				G	G

Key: E – Excellent control (90%-100%); G – Good control (80%-89%); F – Fair control (70%-79%); P – Poor control (< 70%); A blank space indicates weed response is not known.