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INSECT CONTROL IN COMMERCIAL TURF

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. 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. The pyrethroid class of active ingredients (those ending in “thrin,” with an MOA 3A) are all off patent and available in hundreds of products. The brand names listed are examples and are not intended as endorsements.

Restricted entry intervals (REI) listed are for sod farm use. For landscape sites and golf courses, 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.

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TURF

PESTS	INSECTICIDE	MOA	RATE	REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
Imported Fire Ants/ Ants	BAIT TREATMENTS				<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>Broadcast Bait Treatments: 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>Individual Mound Treatments: Do not disturb mounds before treatment. Drenches: 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. Granules: Scatter granules around the edge of the nest, not on top. Dusts: Dust evenly over top mound.</p> <p>Many generic formulations of the pyrethroid insecticides are available for use on commercial turf.</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/ —	
	MOUND DRENCH TREATMENTS				
	<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>deltamethrin</i> DeltaGard GC 5SC	3A	1.5 fl oz/gal		
	<i>imidacloprid</i> + <i>bifenthrin</i> Allectus GC SC (golf courses & sod farms only) Allectus SC (landscape turf only)	4A + 3A	0.33 fl oz/gal 0.33 fl oz/gal	12 H/ —	
	<i>lambda-cyhalothrin</i> Scimitar CS (landscape turf only)	3A	0.5 fl oz/2.5 gal	12 H/ —	
	<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/ —	
	DRY MOUND TREATMENTS				
	<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/ —		

PESTS	INSECTICIDE	MOA	RATE	REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
Imported Fire Ants/ Ants <i>(continued)</i>	DRY MOUND TREATMENTS <i>(continued)</i>				
	<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</i> + <i>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.
	BROADCAST TREATMENTS				
	<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>cyfluthrin</i> Tempo SC Ultra (landscape turf only) Tempo WP Ultra (landscape turf only) Tempo WP GC (golf courses & sod farms only)	3A	8 ml/1000 sq ft 5–10 g (1–2 scoops)/1000 sq ft 1 packet/7,800 sq ft	12 H/ —	Many formulations and brand names available.
	<i>deltamethrin</i> DeltaGard GC 5SC DeltaGard T&O 5SC (landscape turf only) DeltaGard G (landscape turf only)	3A	1.5 fl oz/gal 1.5 fl oz/gal 1.5 fl oz/gal	12 H/ —	Many formulations and brand names available.
	<i>fipronil 0.01%</i> Chipco Top Choice	2B	2 lb/1000 sq ft	24 H/ —	
	<i>fipronil</i> + <i>bifenthrin</i> + <i>lambda-cyhalothrin</i> Taurus Trio	2B + 3A	2lb/1000 sq ft	24 H (sod farms)	REI for Taurus Trio labeled for 24 H for sod farms, or until material has been watered in (landscapes and other sites).
	<i>imidacloprid</i> + <i>bifenthrin</i> Allectus GC SC Allectus SC (landscape turf only) Allectus GC Allectus G (landscape turf only)	4A + 3A	1.32–1.65 fl oz/1000 sq ft 1.32–1.65 fl oz/1000 sq ft 1.7–2.9 lb/1000 sq ft 1.7–2.9 lb/1000 sq ft	12 H/ —	Many formulations and brand names available.
	<i>lambda-cyhalothrin</i> Scimitar CS (landscape turf only) Scimitar GC	3A	7 ml/1000 sq ft 7 ml/1000 sq ft	12 H/ —	

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PESTS	INSECTICIDE	MOA	RATE	REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS	
Bees and Wasps (burrowing)	<i>acephate</i> Surrender, others	1B	1–2 tsp/hole (do not exceed this amount in 1 sq ft)	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>acephate</i> Orthene 75WP	1B	1–2 tsp/hole (do not exceed this amount in 1 sq ft)	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>chlorantraniliprole</i> Acelepryn	28	8–20 oz	4 H/ —		
	<i>clothianidin</i> Arena 50WDG Arena 0.5G	4A	8 oz/A 50 lb/A	12 H/ —		
	<i>clothianidin</i> + <i>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>imidacloprid</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</i> + <i>bifenthrin</i> Allectus GC SC Allectus GC	4A + 3A	RUP 0.4–1.65 fl oz/1000 sq ft 1.7–2.9 lb/1000 sq ft	12 H/ —		
	<i>tetraniliprole</i> Tetrino	28	0.367–0.735 fl oz/1000 sq ft (16–32 fl oz /A)			Not for sod farms.
	<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. Post-application irrigation required. 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.					

PESTS	INSECTICIDE	MOA	RATE	REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
Chinch bugs	<i>acephate</i> Orthene 75WP Orthene 97 (golf courses & sod farms only)	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 <i>bifenthrin</i> (Talstar, Bifen), with cross-resistance to other pyrethroids expected. Rotation of chemistries is, therefore, important.
	<i>clothianidin</i> Arena 50WDG Arena 0.5G	4A	10.67 oz/A 66.67 lb/A	12 H/ —	In most cases, irrigate turf area prior to application unless noted otherwise on the product label. 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> + <i>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>cyfluthrin</i> Tempo SC Ultra (landscape turf only) Tempo WP Ultra (landscape turf only) Tempo 20 WP (golf course only)	3A	8 ml/1000 sq ft 7.7–15.4 oz/A 1 packet/7,800 sq ft		Many formulations and brand names available.
	<i>deltamethrin</i> DeltaGard T&O 5SC (landscape turf only) DeltaGard GC 5SC DeltaGard G (landscape turf only) 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		Many formulations and brand names available.
	<i>dimotefuran</i> Zylam 20 SG	4A	1 oz/1000 sq ft	12 H/ —	
	<i>imidacloprid</i> + <i>bifenthrin</i> Allectus SC (landscape turf only) 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 (landscape turf only) Scimitar GC	3A	19.2 oz/A 19.2 oz/A		Many formulations and brand names available.
	<i>trichlorofon</i> Dylox 420 SL	1B	4.6–6.9 fl oz/1000 sq ft (200–300 fl oz/A)		Post-application irrigation required.
Ground Pearls	None				No effective chemical control. Practice good management.

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Millipedes, sowbugs and pillbugs	<i>bifenthrin</i> Talstar F, GC, G	3A	0.25–0.5 fl oz/1000 sq ft	12 H/ —	Many formulations and brand names available.
	various pyrethroids*		See label		
Mites/ Eriophyid mites	none				No effective miticides are labeled.
Mole Crickets	<i>acephate</i> Orthene 75WP Orthene 97 (golf courses & sod farms only)	1B	1–1.9 oz/1000 sq ft 0.8–1.4 oz/1000 sq ft	24 H/ —	Best results with early instar nymphs. Fipronil 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>Indoxacarb</i> , <i>acephate</i> , and the <i>bifenthrin</i> + <i>imidacloprid</i> combination baits are available for use against larger nymphs in late summer.
	<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/ —	
	<i>clothianidin</i> Arena 50WDG Aloft LC SC	4A	Suppression only 10.67 oz/A 11.65–23.3 oz/A	12 H/ —	
	<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 <i>imidacloprid</i> are less effective, particularly on larger nymphs and adults. <i>Imidacloprid</i> should be applied at or just before egg hatch. <i>Clothianidin</i> is less susceptible to photodegradation than <i>imidacloprid</i> .
	<i>deltamethrin</i> DeltaGard GC 5SC DeltaGard T&O Granular (landscape turf only)	3A	0.6–0.9 fl oz/1000 sq ft 2–3 lb/1000 sq ft		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. Rates of Chipco Choice higher than 12.5 lb/A must be applied through slit-seed (subsurface) application equipment.
	<i>fipronil</i> Chipco Choice	2B	2 lb/1000 sq ft	24 H/ —	Hundreds of brands contain <i>imidacloprid</i> as an active ingredient, and formulations vary widely in concentration. Read labels carefully.
	<i>fipronil</i> + <i>bifenthrin</i> + <i>lambda-cyhalothrin</i> Taurus Trio	2B + 3A	2lb/1000 sq ft	24 H (sod farms)	REI for Taurus Trio labeled for 24 H for sod farms, or until material has been watered in (landscapes and other sites)
	<i>imidacloprid</i> Merit 75WSP Merit 0.5G (not for sod farms)	4A	1.6 oz/8,250 sq ft 1.8 lb/1000 sq ft	12 H/ —	
	<i>lambda-cyhalothrin</i> Scimitar CS (landscape turf only)	3A	Nymphs: 7 ml/1000 sq ft Adults: 14 ml/1000 sq ft		Many formulations and brand names available.
	<i>lambda-cyhalothrin</i> Scimitar GC	3A	Nymphs: 7 ml/1000 sq ft Adults: 14 ml/1000 sq ft	12 H	Many formulations and brand names available.
	<i>permethrin</i> Astro (landscape turf only)		1.6 fl oz/gal	12 H	
	<i>trichlorfon</i> Dylox 420 SL Dylox 6.2 G	1B	4.6–6.9 fl oz/1000 sq ft 3 lb/1000 sq ft		

PESTS	INSECTICIDE	MOA	RATE	REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
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. Cut grass to its recommended height and remove clippings prior to application.
	<i>bifenthrin</i> Onyx	3A	0.07–0.15 fl oz/ 1000 sq ft	12 H/ —	
	<i>deltamethrin</i> DeltaGard GC 5SC	3A	0.2–0.4 fl oz/1000 sq ft <i>or</i> 8.75–17.5 fl oz/A	12 H/	Many formulations and brand names available.
	DeltaGard T&O 5 SC (landscape turf only)		0.2–0.4 fl oz/1000 sq ft <i>or</i> 8.75–17.5 fl oz/A		
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 (golf course & sod farm only)	1B	0.4–0.9 oz/1000 sq ft	24 H/ —	
	<i>bifenthrin</i> Talstar GC Flowable	3A	RUP 0.25–0.5 fl oz/1000 sq ft <i>or</i> 10 fl oz/A	12 H/ —	A number of chemicals listed for control are broad-spectrum and fairly economical, especially <i>acephate</i> , and several labeled pyrethroids. Treat in late afternoon. DO NOT cut grass for 1–3 days after application. Bt is not toxic to non-lepidopterous pests.
	<i>cyfluthrin</i> Tempo SC Ultra (landscape turf only) Tempo 20 WP (golf courses only)	3A	4–8 ml/1000 sq ft <i>or</i> 6–12 fl oz/A 55 g/7,800–11,000 sq ft	12 H	Many formulations and brand names available.
	<i>deltamethrin</i> DeltaGard GC 5SC	3A	0.2–0.4 fl oz/1000 sq ft <i>or</i> 8.75–17.5 fl oz/A		Many formulations and brand names available.
	<i>chlorantraniliprole</i> Acelepryn	28	2–16 oz/A	4 H/ —	
	<i>clothianidin</i> + <i>bifenthrin</i> Aloft LCSC	4A + 3A	11.65–23.3 fl oz/A	12 H/ —	
	<i>lambda-cyhalothrin</i> Scimitar CS (landscape turf only)	3A	3.4–7 ml/1000 sq ft <i>or</i> 5–10 fl oz/A	12 H	
	<i>spinosad</i> Conserve 1SC	5	0.25–0.8 fl oz/ 1000 sq ft <i>or</i> 10–35 fl oz/A	4 H/ —	
	<i>tetraniliprole</i> Tetrino	28	0.367–0.735 fl oz/1000 sq ft (16–32 fl oz /A)		Not for sod farms.
<i>trichlorfon</i> Dylox 420 SL	1B	4.6–6.9 fl oz <i>or</i> 200–300 fl oz/A		Post application irrigation required.	



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TURF

PESTS	INSECTICIDE	MOA	RATE	REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
White Grubs (Japanese Beetle, Chafers, Green June Beetle)	<i>chlorantraniliprole</i> Acelepryn	28	8–16 oz/A	4 H/ —	Best results can be expected if early instars are treated. 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>imidacloprid</i> + <i>bifenthrin</i> Allectus GC	4A + 3A	2.3–2.9 lb/1000 sq ft		Identification of pest grub species is important for effective control recommendations. Consult your Cooperative Extension county agent. Pyrethroids are excellent for June beetle control, less effective on other species. Generally good adult control. Curative control of older larvae is excellent with <i>trichlorfon</i> for most grub species.
	<i>clothianidin</i> Arena 50WDG Arena 0.5G	4A	8 oz/A 50 lb/A	12 H/ —	
	<i>dinotefuran</i> Zylam 20 SG	4A	1 oz/1000	12 H/ —	
	Dylox 6.2 G	1B	3 lb/1000 sq ft or 130 lb/A		Not for sod farms. Must be watered in on day of application. Do not enter area until water-in has dried.
	<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</i> + <i>bifenthrin</i> Allectus SC (landscape turf only)	4A + 3A	RUP 1.32–1.65 fl oz/1000 sq ft	12 H/ —	
	<i>tetraniliprole</i> Tetrino	28	0.367–0.735 fl oz/1000 sq ft (16–32 fl oz /A)		Not for sod farms.
	<i>trichlorfon</i> Dylox 420 SL	1B	4.6–6.9 fl oz Or 200–300 fl oz/A		Post application irrigation required.
<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/ —		

*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*.

DISEASE	FUNGICIDE	MOA	RATES (OZ/1000 SQ FT)	REMARKS
Algae	<i>benzovindiflupyr + difenoconazole</i> Ascernity	7 + 3	1.0 fl oz at 14-day intervals	For optimum control of algae Ascernity should be tank mixed or alternated with a fungicide containing Daconil, such as Daconil Action, Daconil Weather-Stik, Daconil Ultrex, Concert or Renown.
	<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>chlorothalonil + boscalid</i> Encartis	M5 + 7	3–4 fl oz at 14-day intervals	When colonies of algae are well established, dry out the affected area. Once dry, spike or verticut to enhance turfgrass recovery in conjunction with Encartis.
	<i>copper hydroxide</i> Kocide 54DF	M1	16 oz	1 application.
	<i>fluazinam</i> Secure Rotator	29	0.5 fl oz at 14-day intervals	For algal scum (filamentous blue-green algae/cyanobacteria).
	<i>fluazinam + acibenzolar-S-methyl</i> Secure Action	29 + P01	0.5 fl oz at 14-day intervals	Golf courses only.
	<i>fluazinam + tebuconazole</i> Traction	29 + 3	1.3 flo oz at 14-day intervals	Golf courses only.
	<i>fluxapyroxad</i> Xzemplar	7	0.21–0.26 fl oz at 14–28-day intervals	
	<i>hydrogen dioxide/hydrogen peroxide</i> Zerotol TerraCyte Pro PERpose Plus	NC	6–25 oz	Curative control may require 2–3 consecutive applications. PERpose Plus Preventative: Dilute 1 fl oz/1 gal of water. Apply diluted 1–10 gal of solution to 1000 sq ft. Curative: Dilute 5–10 fl oz in 5 gal of water. Apply 5–10 gal of dilute solution to 1000 sq ft. Note: PERpose Plus label also includes control for brown patch, dollar spot, Anthracnose, fairy ring, Pythium, summer patch, Rhizoctonia, Fusarium, leaf spot, and slime mold. Check label for individual disease.
	<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.

DISEASE	FUNGICIDE	MOA	RATES (OZ/1000 SQ FT)	REMARKS
Anthracnose, Helminthosporium, Curvularia, Leaf Spots, Rusts	<i>azoxystrobin</i> Heritage 50WG, G, TL Strobe, Strobe 50WG, Strobe 2L ArmorTech Zoxy Artavia	11	0.2–0.4 oz at 14–28-day intervals 2–4 lb at 14–28-day intervals	
	<i>azoxystrobin + chlorothalonil</i> Renown	11 + M5	2.5–4.5 oz at 7–10-day intervals	
	<i>azoxystrobin + 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 + propiconazole</i> Headway	11 + 3	0.75–3 oz at 14–28-day intervals	
	<i>azoxystrobin + 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>benzovindiflupyr + difenoconazole</i> Ascernity	7 + 3	2.0 fl oz Rusts at 14–21-day intervals All others at 14-day intervals	Use preventatively. Begin applications when conditions are favorable for disease infection, prior to disease symptom development.
	<i>chlorothalonil + boscalid</i> Encartis	M5 + 7	3–4 fl oz at 14-day intervals	Begin applications prior to or in the early stages of disease development. Use a shorter application interval and/or higher rate when prolonged favorable disease conditions exist.
	<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	Flowable Preventive: 3–6 fl oz at 7–10-day intervals Curative: 6–11 fl oz at 7–10-day intervals Wettable Powder (WDG90) Preventive: 1.75–3.5 oz at 7–10-day intervals Curative: 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.
	<i>chlorothalonil + 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 + propiconazole + fludioxonil</i> Instrata Versagard	M5 + 3 + 12	2.75–6 fl oz at 10–21-day intervals	

DISEASE	FUNGICIDE	MOA	RATES (OZ/1000 SQ FT)	REMARKS
Anthracnose, Helminthosporium, Curvularia, Leaf Spots, Rusts (continued)	<i>chlorothalonil + 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 + thiophanate methyl + iprodione + 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>cyazofamid + azoxystrobin</i> Union	21 + 11	2.9–5.75 fl oz at 14–28-day intervals	
	<i>fluazinam</i> Secure, Rotator	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>fluazinam + acibenzolar-S-methyl</i> Secure, Action	29 + P01	0.5 fl oz at 14-day intervals	Golf courses only.
	<i>fluazinam + tebuconazole</i> Traction	29 + 3	1.3 fl oz at 14-day intervals	Golf courses only.
	<i>fludioxonil</i> Medallion Medallion SC	12	0.25–0.50 oz at 14–21-day intervals Anthracnose—1–2 fl oz at 14-day intervals Leaf spot—1–2 fl oz at 14–21-day intervals	
	<i>fluindapyr + flutriafol</i> Kalida	7 + 3	0.25–0.4 fl oz at 7–14-day intervals for Anthracnose 14–21-day intervals for leaf spot and rusts	
	<i>fluopyram + trifloxystrobin</i> Exteris	7 + 11	Anthracnose—2.135–6 fl oz at 14–28-day intervals 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 + 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 + 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	
	<i>flutolanil + thiophanate methyl</i> Systar	7 + 1	2–3 oz at 14-day intervals	
	<i>flutriafol</i> Rayora	3	0.7–1.4 fl oz at 14–21-day intervals	For use on golf courses, in lawns and landscaped areas around public, industrial and commercial properties. Check the entire label for restrictions.
<i>fluxapyroxad + pyraclostrobin</i> Lexicon	7 + 11	0.34–0.47 fl oz at 14–28-days intervals		
<i>hydrogen dioxide/ hydrogen peroxide</i> TerraCyte Pro Zerotol PERpose Plus	NC	6–25 oz	Curative control may require 2–3 consecutive applications. Use 3–5 gal/1000 sq ft. PERpose Plus Preventative: Dilute 1 fl oz/1 gal of water. Apply diluted 1–10 gal of solution to 1000 sq ft. Curative: Dilute 5–10 fl oz in 5 gal of water. Apply 5–10 gal of dilute solution to 1000 sq ft.	

■ TURF DISEASE CONTROL

TURF

DISEASE	FUNGICIDE	MOA	RATES (OZ/1000 SQ FT)	REMARKS
Anthracnose, Helminthosporium, Curvularia, Leaf Spots, Rusts (continued)	<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 at 14–21-day intervals 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>isofetamid + tebuconazole</i> Tekken	7 + 3	3.0 fl oz	
	<i>mancozeb + copper hydroxide</i> Junction	M3 + M1	2–4 oz at 5-day intervals	
	<i>maneb, maneb + zinc sulfate + mancozeb</i>	M3	4 oz at 10–14-day intervals	
	<i>mandestrobin</i> Pinpoint	11	0.31 at 14-day intervals	
	<i>mefentrifluconazole</i> Maxtima	3	0.4–0.6 fl oz at 14-day intervals	
	<i>mefentrifluconazole + pyraclostrobin</i> Navicon	3 + 11	0.7–0.85 fl oz at 14–28-day intervals	
	<i>myclobutanil</i> ArmorTech Myclo 20EW, Eagle 20EW, Eagle WSP 40 Golden Eagle, Lebanon Eagle G, Myclobutanil 20EW T/O	3	Preventive: 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.
	PCNB Autilus, Engage, Penstar Revere, Terraclor Turfcide	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	
	PCNB + tebuconazole Oreon Premion	14 + 3	4–8 fl oz for anthracnose 6–8 fl oz for rust at 14–28-day intervals	

DISEASE	FUNGICIDE	MOA	RATES (OZ/1000 SQ FT)	REMARKS
Anthracnose, Helminthosporium, Curvularia, Leaf Spots, Rusts (continued)	<i>penthiopyrad</i> Velista	7	0.3–0.5 oz at 14-day intervals	Begin applications at early stages of disease development.
	<i>phosphorus acid</i> Appear Appear II 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. Do not 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.
	prothioconazole Densicor	3	0.196 fl oz at 14–21-day intervals	
	<i>pydiflumetofen + azoxystrobin + propiconazole</i> Posterity XT	7 + 11 + 3	1.5–3.0 fl oz at 14–28-day intervals	Use preventatively. Begin applications when conditions are favorable for disease development, prior to disease development.
	<i>pydiflumetofen + azoxystrobin + propiconazole</i> Posterity Forte	7 + 11 + 3	0.63–0.84 fl oz at 14–21-day intervals	For Bipolaris leaf spot only.
	<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 intervals	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.	

DISEASE	FUNGICIDE	MOA	RATES (OZ/1000 SQ FT)	REMARKS
Anthracnose, Helminthosporium, Curvularia, Leaf Spots, Rusts (continued)	<i>thiophanate methy</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	<p>Preventive: 1 oz/5 gal water (Anthracnose) Apply every 10–14 days as needed</p> <p>Curative: Apply 2 oz/5 gal water</p>	
	<i>thiram</i> Spotrete F	M3	<p>Preventative: 3.75 fl oz at 7–10-day intervals Curative: 7.5 fl oz at 3–5-day intervals</p>	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	<p>Preventive: Apply 0.1–0.15 oz at 14-day intervals Curative: 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 Preventive: Anthracnose—0.15–0.2 oz at 14-day intervals in 1–2 gal water Curative: 0.25 oz at 21-day intervals in 1–2 gal water</p>	Apply when conditions are favorable for disease.
	<i>triadimefon</i> Bayleton 50 Bayleton Flo	3	1 oz 1 fl oz	For Anthracnose: Preventative rate —Apply at 30-day intervals and repeat as necessary for seasonal control. Depending on environmental conditions, residual control may be extended to 45 days. Curative rate —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	

DISEASE	FUNGICIDE	MOA	RATES (OZ/1000 SQ FT)	REMARKS
Brown/Large Patch (<i>Rhizoctonia solani</i>) and Dollar Spot (<i>Sclerotinia homoeocarpa</i>)	azoxystrobin Heritage 50WG, Heritage G Heritage TL, Strobe ArmorTech Artavia	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.
	azoxystrobin + acibenzolar-S-methyl Heritage Action	11 + P	0.2–0.4 oz at 14–28-day intervals	Not Recommended for Dollar Spot.
	azoxystrobin + chlorothalonil Renown	11 + M5	2.5–4.5 fl oz at 7–28-day intervals	
	azoxystrobin + difenconazole 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	
	azoxystrobin + propiconazole Headway	11 + 3	0.75–3 oz at 14–28-day intervals	
	azoxystrobin + tebuconazole 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	
	boscalid 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	
benzovindiflupyr + difenoconazole Ascernity	7 + 3	1.0 fl oz at 14–21-day intervals	For large patch of all warm-season turfgrasses, make 1 or 2 applications in fall prior to infection. A spring application during green-up may be required based on length of the infection period. Initiate first application for large patch/zoysia patch when soil temperature at a 2–4" depth averages 65°F.	

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>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	FLOWABLE 40.4% Preventive: Brown Patch—3–6 fl oz at 7–10-day intervals Dollar Spot—3–6 fl oz at 7–14-day intervals Curative: Brown Patch—6–11 fl oz at 7–10-day intervals Dollar Spot—6–11 fl oz at 7–14-day intervals WETTABLE POWDER (WDG90) Preventive: 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 Curative: 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>boscalid</i> Encartis	M5 + 7	For dollar spot 3–4 fl oz at 14–21-day intervals For large patch 4 fl oz at 21–28-day intervals	Begin applications prior to or in the early stages of disease development. Use a shorter application interval and/or higher rate when prolonged favorable disease conditions exist.
	<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 Versaguard	M5 + 3 + 12	2.75–6 fl oz at 21–28-day intervals	
	<i>chlorothalonil</i> + <i>thiophanate methyl</i> Consyst, Peregrine, Tee-1-upWDG, 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/hydrogen peroxide</i> Zerotol, TerraCyte Pro PERpose Plus	NC	6–25 oz	Curative control may require 2–3 consecutive applications. PERpose Plus Preventative: Dilute 1 fl oz/1 gal of water. Apply diluted 1–10 gal of solution to 1000 sq ft. Curative: Dilute 5–10 fl oz in 5 gal of water. Apply 5–10 gal of dilute solution to 1000 sq ft.
	<i>fluazinam</i> Secure Rotator	29	0.5 fl oz at 14-day intervals	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>fluazinam</i> + <i>acibenzolar-S-methyl</i> Secure, Action	29 + P01	0.5 fl oz at 14-day intervals	Golf courses only. For both Dollar Spot and Brown/Large Patch.
	<i>fluazinam</i> + <i>tebuconazole</i> Traction	29 + 3	1.3 flo oz at 14-day intervals	Golf courses only.

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>fludioxonil</i> Medallion Medallion SC Pendant	12	0.5–0.9 oz at 14–28-day intervals 0.75–2 fl oz at 7–14-day intervals For Pendant use at 0.5 oz	Use as preventative. Begin application when conditions are favorable for fungal infection; prior to disease symptom development.
	<i>fluindapyr + flutriafol</i> Kalida	7 + 3	0.25–0.4 fl oz at 14–21-day intervals for dollar spot 21–28-day intervals for large patch	For large patch apply 2 preventative treatments when soil temperatures at 2" depth reach 50°F for 5 consecutive days. Irrigation is recommended after treatment to incorporate product.
	<i>fluopyram + trifloxystrobin</i> Exteris	7 + 11	Brown Patch—2.1–6.0 fl oz at 14–28-day intervals Dollar Spot—1.5–4.13 fl oz at 7–28-day intervals	Brown Patch: Lightly water-in application to move fungicide into thatch for increased effectiveness.
	<i>flutolanil</i> ProStar 70WG Prostar WP	7	Preventive: 2.2 oz at 21–28-day intervals Curative: 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.
	Pedigree		Preventive: 2.2–3.5 fl oz at 14–21-day intervals Curative: 4.4 fl oz. Repeat in 14 days	For BP, LP, Leaf and Sheath Leaf Spot.
	<i>flutolanil + thiophanate methyl</i> Systar	7 + 1	2–3 oz at 14–30-day intervals	
	<i>flutriafol</i> Rayora	3	BP = 0.7–1.4 fl oz at 14–21-day intervals LP = 0.7–1.4 at 28-day intervals	For use on golf courses, in lawns and landscaped areas around public, industrial and commercial properties. Check the entire label for restrictions. For LP = Apply when soil temps at 2-inch depth are between 55°F and 60°F. Two applications are needed for best results.
	<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 + chlorothalonil</i> Disarm C, Fame + C	11 + M5	3–5.9 oz at 7–28-day intervals	
	<i>fluoxastrobin + myclobutanil</i> Disarm M	11 + 3	0.25–1 oz at 14–28-day intervals	
	<i>fluoxastrobin + 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 + pyraclostrobin</i> Lexicon	7 + 11	0.34–0.47 fl oz at 14–28-days intervals	For Brown Patch, Large Patch, and Dollar Spot.
	<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	

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 + 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	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>isofetamid + tebuconazole</i> Tekken	7 + 3	3.0 fl oz	
	<i>mandestrobin</i> Pinpoint	11	0.17–0.31 at 14–21-day intervals	For Dollar Spot and Brown Patch.
	<i>mancozeb + copper hydroxide</i> Junction	M3 + M1	2–4 oz at 7–14-day intervals	
	<i>maneb, maneb + zinc sulfate, mancozeb</i> Dithane Fore Protect T/O Tersan LSR, etc.	M3	Preventive: 3–4 oz in 3–5 gals water at 7–10-day intervals Curative: 6–8 oz in 3–5 gals water at 7–10-day intervals 3 oz = 10 Tbsp	
	<i>mefentrifluconazole</i> Maxtima	3	0.6 fl oz at 14 days on Brown Ring Patch; 0.2–0.4 fl oz at 14–28 for DS	
	<i>mefentrifluconazole + pyraclostrobin</i> Navicon	3 + 11	0.7– 0.85 fl oz at 14–28 days for BP, LP and RSLs; 0.7 fl oz for BRP	
	<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. DO NOT 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		Preventive: 0.6 oz at 10–28-day intervals (3 oz pkt/5000 sq ft) Myclo 20EW 1.2–2.4 oz	DO NOT apply more than 7.2 oz/1000 sq ft/year.
	PCNB Engage Penstar Revere Terraclor Turfcide Premion	14	Brown Patch: warm season grasses 16 oz in 10–15 gal water at 3–4-week intervals cool season grasses 3–4 oz in 3–6 gal water at 7–10-day intervals Dollar Spot: 7–10 oz in 5–10 gal water at 3–4-week intervals	
<i>PCNB + tebuconazole</i> Oreon	14 + 3	6–8 fl oz at 14–28-day intervals		

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 Prophesy 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. DO NOT 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>prothioconazole</i> Densicor	7	0.196 fl oz at 14–21-day intervals	
	<i>pydiflumetofen</i> Posterity	7	0.08–0.32 fl oz at 21–28-day intervals	For dollar spot only. Apply high rates under heavy disease pressure. Golf courses only.
	<i>pydiflumetofen + azoxystrobin + propiconazole</i> Posterity XT	7 + 11 + 3	1.5–3.0 fl oz at 14–28-day intervals	Use preventatively. For LP, make one or two applications in the fall prior to infection or when conditions are favorable for infection.
	<i>pydiflumetofen + azoxystrobin + propiconazole</i> Posterity Forte	7 + 11 + 3	BP=0.63–0.84 fl oz at 14–21-day intervals DS=0.42–0.84 fl oz at 21–28-day intervals LP and ZP=0.84 fl oz make one or two applications 14 or 21 days after first application, depending on disease pressure	
	<i>pyraclostrobin</i> 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>pyrclostrobin + triticonazole</i> Pillar	11 + 3	3 lb at 28-day intervals	DO NOT 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.

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>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. DO NOT 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 intervals. Large Patch: Begin fungicide applications preventively in the fall and spring. Make 1–2 applications when conditions are favorable for disease development.
	<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	Preventative: 3.75 fl oz at 7–10-day intervals Curative: 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	Preventative: 1 oz/2–4 gal water Curative: 2 oz/2–4 gal water 1 oz = 6 Tbsp Preventative: 1.5 lb at 15–30-day intervals Curative: 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	Preventative: 0.1–0.2 oz in 1–2 gal of water/1000 sq ft at 14-day intervals Curative: 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.

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 + acibenzolar-S-Methyl</i> Heritage Action	11 + P	0.2–0.4 oz at 14–28-day intervals	
	<i>azoxystrobin + propiconazole</i> Headway	11 + 3	3 oz at 28-day intervals	
	<i>azoxystrobin + 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 + tebuconazole</i> ZoxyT, Strobe T	11+ 3	0.7–1.5 oz at 14–28-day intervals	
	<i>benzovindiflupyr + difenoconazole</i> Ascernity	7+3	1.0 fl oz at 14–28-day intervals	For preventative control of fairy ring, apply early in the spring prior to development of symptoms. Apply in 2–4 gallons water per 1000 sq ft. Irrigate into thatch prior to spray drying. Repeat the application within 14–28 days after first application. For curative control, apply as soon as possible after fairy ring symptoms develop. Apply in 2–4 gallons water per 1000 sq ft, irrigate lightly after application. Add the specified rate of a wetting agent to the final spray. Severely damaged or thin turf may require reseeding. Fairy ring symptoms may take 2 to 3 weeks to disappear following application. If the area is hydrophobic use wetting agents and irrigate prior to application(s) of Ascernity. Reapplication after 28 days may be required in some cases.
	<i>cyazofamid + azoxystrobin</i> Union	21 + 11	5.75 fl oz at 28-day intervals	
	<i>fluindapyr + flutriafol</i> Kalida	7 + 3	0.25–0.4 fl oz at 14–28-day intervals	Apply 2 preventative treatments when soil temperatures at 2" depth are consistently between 55°F and 60°F. Applications should be made using at least 3 gal of water per 1000 sq ft, or treatments should be incorporated with irrigation after application.
	<i>fluopyram + prothioconazole + propamocarb</i> Resilia	7 + 3 +28	4.0 fl oz at 14–28 day intervals	Apply Resilia preventatively when conditions are favorable for target pest activity. Do not exceed 4.0 fl oz per 1000 sq ft per application. Do not exceed 16 oz per 1000 sq ft per year.
	<i>flutolanil</i> ProStar 70WG Prostar 70 WP	7	Preventive: 2.2 oz at 21–28-day intervals Curative: 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. DO NOT treat more than 10,000 sq ft/A of turfgrass.
	Pedigree		For Pedigree use 3.25 fl oz preventative 6.6 fl oz curative at 30-day intervals	Use 2–5 gal of water.
	<i>flutolanil + 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 + chlorothalonil</i> Disarm C, Fame + C	11 + M5	4.5–5.9 oz at 21–28-day intervals	
<i>fluoxastrobin + myclobutanil</i> Disarm M	11 + 3	0.5–1 oz at 21–28-day intervals		
<i>fluoxastrobin + tebuconazole</i> Fame + T	11 + 3	0.45–0.9 oz at 21–28-day intervals		

TURF DISEASE CONTROL

TURF

DISEASE	FUNGICIDE	MOA	RATES (OZ/1000 SQ FT)	REMARKS
Fairy Ring (continued)	<i>fluxapyroxad + pyraclostrobin</i> Lexicon	7 + 11	0.47 fl oz at 28-day intervals	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>hydrogen dioxide</i> TerraCyte Pro, Zeritol	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>hydrogen peroxide</i> PERpose Plus			
	<i>isofetamid + tebuconazole</i> Tekken	1 + 3	0.47 fl oz at 28-day intervals	
	<i>mandestrobin</i> Pinpoint	11	0.31 at 21-day intervals	Do not make more than 2 apps of Pinpoint without alternating to a non-resistant group for resistance management.
	<i>mefentrifluconazole</i> Maxtima	3	0.8 fl oz at 28-day intervals	Including a soil wetting agent prior to or at application can improve product movement downward.
	<i>mefentrifluconazole + pyraclostrobin</i> Navicon	3 + 11	0.85 fl oz at 28-day intervals	
	<i>metconazole</i> Tourney	11	0.37 oz	Apply in 4 gal water/1000 sq ft. Symptoms may take several weeks to disappear following application. DO NOT use on bermudagrass.
	<i>PCNB + tebuconazole</i> Oreon Premion	14 + 3	6–8 fl oz at 14–28-day intervals	Initiate applications preventatively in late winter/early spring when soil temperatures average 55–60°F over 5 days at a 2 in depth. Water-in the treatment to the depth at which fairy ring is present.
	<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>prothioconazole</i> Densicor	3	0.196 fl oz at 14–21-day intervals	Water-in before the spray dries to move the fungicide into the thatch/soil where the fungus is active.
	<i>pydiflumetofen</i> Posterity	2	0.16 –0.32 fl oz at 21–28-day intervals	Apply when conditions become favorable for disease development. Add the recommended rate of a wetting agent. Golf courses only.
	<i>pydiflumetofen + azoxystrobin + propiconazole</i> Posterity XT	7 + 11 + 3	1.5–3.0 fl oz at 14–28-day intervals	Apply in 2–4 gal of water per 1000 sq ft. Add the recommended rate or wetting agent to the final spray and irrigate immediately after application with ½ to ¼ inch of water.
	<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	1.1 oz at 28-day intervals	
	<i>tebuconazole</i> Torque, ArmorTech Teb360 XL Mirage Stressguard	3	0.6 fl oz 0.6–1.1 fl oz 1–2 fl oz	Preventative: Apply before fairy ring symptoms appear in the spring when soil temperatures consistently reach 55–60° F. Water into root zone within 4 hrs. Do not tank mix a wetting agent with preventative applications. Curative: 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.

DISEASE	FUNGICIDE	MOA	RATES (OZ/1000 SQ FT)	REMARKS
Fusarium/ Microdochium	azoxystrobin Heritage 50WG, G, TL, Strobe, Strobe 50WG, Strobe 2L ArmorTech Zoxy Artavia	11	0.2–0.4 oz at 14–28-day intervals 4 lb at 10–28-day intervals 7 lb single application, ArmorTech Zoxy: 0.37–0.77 oz at 14–28-day intervals	
	azoxystrobin + acibenzolar-S-methyl Heritage Action	11 + P	0.2–0.4 oz at 14–28-day intervals	
	azoxystrobin + chlorothalonil Renown	11 + M5	2.5–4.5 fl oz at 14–21-day intervals	
	azoxystrobin + difenconazole Briskway	11 + 3	0.5–0.725 fl oz at 14–28-day intervals	
	azoxystrobin + propiconazole Headway	11 + 3	3–5.25 oz at 10–28-day intervals	
	azoxystrobin + propiconazole Contend B	11 + 3	4.5 oz	Apply in late fall on a single application.
	azoxystrobin + tebuconazole ZoxyT, Strobe T	11 + 3	0.75–1.5 oz at 14–21-day intervals	
	Bacillus subtilis Strain GB03, Companion	44	4–6 fl oz at 14–28-day intervals	
	benzovindiflupyr + difenoconazole Ascernity	7 + 3	1.0 fl oz at 14-day intervals	
	benzovindiflupyr + difenoconazole Contend A	7 + 3	For Microdochium pink snow mold only at 1.0 fl oz	Apply in late fall on a single application.
	chlorothalonil 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.
	chlorothalonil + propiconazole + fludioxonil Instrata	M5 + 3 + 12	5–11 fl oz	Late fall.
	chlorothalonil + propiconazole + PCNB FFIII fungicide	M5+3+14	3.3–6.6 lb	Fall/late winter.
	chlorothalonil + thiophanate methyl Consyst, Peregrin Spectro, Tee-1-up WDG	M5 + 1	Single application: 6–8 oz 3.72–5.76 at 7–14-day intervals	
	chlorothalonil + thiophanate methyl + iprodione + tebuconazole 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.
fenarimol 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.	
fluazinam Secure, Rotator	29	0.5 fl oz at a 14-day intervals		

TURF DISEASE CONTROL

TURF

DISEASE	FUNGICIDE	MOA	RATES (OZ/1000 SQ FT)	REMARKS
Fusarium/ Microdochium (continued)	<i>fluazinam + acibenzolar-S-methyl</i> Secure, Action	29 + P01	0.5 fl oz at a 14-day intervals	Golf courses only.
	<i>fluazinam + tebuconazole</i> Traction		1.3 flo oz at a 14-day intervals	Golf courses only.
	<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	
	<i>flutolanil + thiophanate methyl</i> Systar	7 + 1	4–6.12 oz one application	
	<i>hydrogen dioxide/hydrogen peroxide</i> Zerotol TerraCyte Pro PERpose Plus	NC	6–12 fl oz	Curative control may require 2–3 consecutive applications.
	<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, Lescro 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>isofetamid + tebuconazole</i> Tekken	7 + 3	3.0 fl oz	
	<i>mancozeb + copper hydroxide</i> Junction	M3 + M	2–4 oz at 7–14-day intervals	

DISEASE	FUNGICIDE	MOA	RATES (OZ/1000 SQ FT)	REMARKS
Fusarium/ Microdochium (continued)	<i>mefentrifluconazole + pyraclostrobin</i> Navicon	3 + 11	0.7–0.85 fl oz at 14–28-day intervals	
	<i>metconazole</i> Tourney	3	0.37–0.44 oz	Late fall.
	<i>myclobutanol</i> ArmorTech Myclo 20EW Eagle 20EW Lebanon Eagle G Myclobutanol 20EW T/O	3	0.6–2.4 oz Myclo 20EW 1.2–2.4 oz	1 application.
	PCNB Engage, Penstar Revere, Terraclor Turfcide	14	8 oz in 10–15 gal water	Caution on bentgrass for phytotoxicity.
	<i>PCNB + tebuconazole</i> Oreon, Premion	14 + 3	6–8 fl oz at 28-day intervals	
	<i>penthiopyrad</i> Vesta	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	
	<i>propiconazole</i> ArmorTech PPZ143MC Banner Maxx, Banner GL Kestrel, Monsoon turf Savvi, Strider, ProPensity 1.3ME Prophecy, Propiconazole SPC 14.3 Propicure 3.6F	3	2–4 oz	
	<i>pydiflumetofen</i> Posterity		0.08–0.16 fl oz at 14–28-day intervals	Golf courses only.
	<i>pydiflumetofen + azoxystrobin + propiconazole</i> Posterity XT	7 + 11 + 3	1.5–3.0 fl oz at 14–28-day intervals	Use preventatively.
	<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	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.	

DISEASE	FUNGICIDE	MOA	RATES (OZ/1000 SQ FT)	REMARKS
Fusarium/ Microdochium (continued)	tebuconazole 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.
	thiophanate methyl 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.
	thiram Spotrete F	M3	3–12 oz	
	triadimefon 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 Preventive: 1.5 lb at 15–30-day intervals Curative: 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.
	trifloxystrobin Compass	11	Apply 0.2–0.25 oz	Apply when conditions are favorable for disease development, fall to early spring.
	trifloxystrobin + triadimefon Armada, Tartan	11 + 3	2 oz at 14–28-day intervals 1.2 oz at 14–28-day intervals	Fall to early spring.
	triticonazole Trinity, Triton	3	0.5–1 fl oz 0.15–0.3 fl oz	
	triticonazole + chlorothalonil Reserve	3 + M5	3.2–4.5 oz at 10–14-day intervals	
	vinclozolin Curalan, Touche	2	2–4 oz. Repeat at 7–21-day intervals	
	Gray Leaf Spot (Pyricularia)	azoxystrobin Heritage 50WG, TL, G Strobe 50 WG, Strobe 2L ArmorTech Zoxy Artavia	11	0.2–0.4 oz at 14–28-day intervals 2–4 lb at 14–28-day intervals
azoxystrobin + acibenzolar-S-methyl Heritage Action		11 + P	0.2–0.4 oz at 14–28-day intervals	
azoxystrobin + chlorothalonil Renown		11 + M5	2.5–4.5 fl oz at 10–14-day intervals	
azoxystrobin + difenconazole Briskway		11 + 3	0.5–0.725 fl oz at 14–21-day intervals	
azoxystrobin + propiconazole Headway		11 + 3	1.5–3 oz at 14–28-day intervals	

DISEASE	FUNGICIDE	MOA	RATES (OZ/1000 SQ FT)	REMARKS
Gray Leaf Spot (<i>Pyricularia</i>) (continued)	<i>azoxystrobin + 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 at 2 gal/1000 sq ft.
	<i>benzovindiflupyr + difenoconazole</i> Ascernity	7 + 3	1.0 fl oz at 14-day intervals	
	<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	Flowable Preventive: 3–6 fl oz at 7–10-day intervals Curative: 6–11 fl oz at 7–10-day intervals Wettable Powder (WDG90) Preventive: 1.75–3.5 oz at 7–10-day intervals Curative: 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.
	<i>chlorothalonil + boscalid</i> Encartis	M5 + 7	3–4 fl oz at 14-day intervals	Begin applications prior to or in the early stages of disease development. Use a shorter application interval and/or higher rate when prolonged favorable disease conditions exist.
	<i>chlorothalonil + 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 + propiconazole + fludioxonil</i> Instrata Versagard	M5 + 3 + 12	2.75–6 fl oz at 10–14-day intervals	
	<i>chlorothalonil + 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 + 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>cyazofamid + azoxystrobin</i> Union	21 + 11	2.9 to 5.75 fl oz at 14–28-day intervals	
	<i>fluazinam + tebuconazole</i> Traction	29 + 3	1.3 flo oz at a 14-day intervals	Golf courses only.
<i>fluopyram + trifloxystrobin</i> Exteris	7 + 11	2.1–6 fl oz at 14–28-day intervals		

■ TURF DISEASE CONTROL

TURF

DISEASE	FUNGICIDE	MOA	RATES (OZ/1000 SQ FT)	REMARKS
Gray Leaf Spot (<i>Pyricularia</i>) (continued)	<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 + 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 + 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	
	<i>flutolanil + 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>flutriafol</i> Rayora	3	0.7–1.4 fl oz at 14–21-day intervals	For use on golf courses, in lawns and landscaped areas around public, industrial and commercial properties. Check the entire label for restrictions. Apply when soil temps at 2-inch depth are between 65°F and 70°F. Two applications are needed for best results.
	<i>fluxapyroxad + pyraclostrobin</i> Lexicon	7 + 11	0.34–0.47 fl oz at 14–28-day intervals	
	<i>isofetamid + tebuconazole</i> Tekken	7 + 3	3.0 fl oz	
	<i>mefentrifluconazole + pyraclostrobin</i> Navicon	3 + 11	0.85 fl oz at 14–28-day intervals	
	<i>metconazole</i> Tourney	3	0.37 oz at 14–21-day intervals	Apply when conditions are favorable for disease development. Do not use on Bermudagrass.
	mineral oil Civitas	NC	8–32 oz	Use only in conjunction with Civitas Harmonizer.
	<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>PCNB + tebuconazole</i> Oreon, Premion	14 + 3	6–8 fl oz at 14–28-day intervals	
	<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.

DISEASE	FUNGICIDE	MOA	RATES (OZ/1000 SQ FT)	REMARKS
Gray Leaf Spot (<i>Pyricularia</i>) (continued)	<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>prothioconazole</i> Densicor	3	0.196 fl oz at 14–21-day intervals	
	<i>pydiflumetofen + azoxystrobin + propiconazole</i> Posterity XT	7 + 11 + 3	1.5–3.0 fl oz at 14–28-day intervals	Use preventatively.
	<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, 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	Preventive: 1 oz/5 gal water Apply at 10–14-day intervals as needed Curative: Apply 2 oz/5 gal water	
	<i>triadimefon</i> Bayleton 25WP, 50, Flo Fungicide VI Granular turf fungicide Systemic fungicide	3	Preventive: 1.5 lb at 15–30-day intervals Curative: 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 + 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 + chlorothalonil</i> Reserve	3 + M5	3.2–4.5 oz at 14–28-day intervals		

DISEASE	FUNGICIDE	MOA	RATES (OZ/1000 SQ FT)	REMARKS
Pythium Blight, Pythium Root Rots, Pythium Root Dysfunction	<i>azoxystrobin</i> Heritage 50WG, G, TL Strobe 50 WG, Strobe 2L ArmorTech Zoxy Artavia	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	
	<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>cyazofamid + azoxystrobin</i> Union	21 + 11	2.9–5.75 fl oz at 14–28-day intervals	
	<i>etridiazole</i> Koban 30WP Terrazole	14	Established Turf: 2–4.5 oz in 5 gal water Newly Seeded Areas: 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>Fluopyram + prothioconazole + propamocarb</i> Resilia	7+3 +28	4.0 fl oz at 14–21 day intervals	Apply Resilia preventatively when conditions are favorable for target pest activity. Do not exceed 4.0 fl oz per 1000 sq ft per application. Do not exceed 16 oz per 1000 sq ft per year.
	<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.	

DISEASE	FUNGICIDE	MOA	RATES (OZ/1000 SQ FT)	REMARKS
Pythium Blight, Pythium Root Rots, Pythium Root Dysfunction <i>(continued)</i>	<i>fluxapyroxad + pyraclostrobin</i> Lexicon	7 + 11	0.34–0.47 fl oz at 14–28-day intervals	Use preventatively.
	<i>hydrogen dioxide/hydrogen peroxide</i> TerraCyte Pro Zerotol PERpose Plus	NC	6–12 oz at 7-day intervals	Curative control may require 2–3 consecutive applications. Use on 3–5 gal/1000 sq ft. PERpose Plus Preventative: Dilute 1 fl oz/1 gal of water. Apply diluted 1–10 gal of solution to 1000 sq ft. Curative: Dilute 5–10 fl oz in 5 gal of water. Apply 5–10 gal of dilute solution to 1000 sq ft.
	<i>mefenoxam</i> Mefenoxam 2AQ Subdue Subdue G Subdue Maxx	4	Established Turf: Subdue Maxx: 0.5–1 fl oz in 1–5 gal of water Newly Seeded Areas: 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>mefentrifluconazole + pyraclostrobin</i> Navicon	3 + 11	0.85 fl oz at 14–28-day intervals	
	<i>mancozeb + copper hydroxide</i> Junction	M3 + M1	2–4 oz at 5-day intervals	
	Metalaxyl Regulate select		Preventative: 0.5-1 fl oz at 10–21 day interval 1–2 fl oz at 14 day interval	Apply as a preventative treatment at 0.5–1 fl oz in 1–5 gal of water per 1000 sq ft. Re-treat at 10–21 day intervals. During periods of prolonged conditions favorable for disease development, use 1–2 fl oz on a 14-day schedule.
	<i>phosphorous acid</i> Alude Fosphite Jetphiter Fiata-Stressguard Reliant	33	5–10 fl oz at 7–14-day intervals Fosphite—2–3 fl oz Jetphiter—3.5–5 fl oz Reliant—5.0–10.0 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 Appear II 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	Preventative: 1.25–2 fl oz in 2–5 gal water Curative: 3–4 fl oz in 2–5 gals water	Established Turf: Apply as a preventative treatment during periods of high temperature and humidity. Overseeded Areas: Apply after germination. Repeat at 7–21-day intervals if favorable disease conditions persist.
	<i>pycarbutrazox</i> Serata	U17	0.6–0.8 fl oz at 14–21-day intervals	For root rots/dysfunction apply 2–4 gal of water per 1000 sq ft with ground equipment, follow with ½ inch of irrigation.
	<i>pydiflumetofen + azoxystrobin + propiconazole</i> Posterity XT	7+ 11 + 3	3.0 fl oz at 14-day intervals For Pythium root dysfunction 3 fl oz at 21–28-day intervals	Use preventatively. For Pythium root dysfunction apply when mean daily soil temps are between 55°F and 70°F. Irrigate with 0.1 and 0.2 inch of water within 24 hrs after application.
	<i>propamocarb + fluopicolide</i> Stellar	28 + 43	1.2 fl oz	The maximum Stellar application rate is 2.4 oz/year/1000 sq ft. Overseeded Turf: Apply after seed germination to prevent Pythium damping off. Established Turf: 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.	

TURF DISEASE CONTROL

DISEASE	FUNGICIDE	MOA	RATES (OZ/1000 SQ FT)	REMARKS
Pythium Blight, Pythium Root Rots, Pythium Root Dysfunction (continued)	<i>pyraclostrobin</i> + <i>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</i> + <i>triticonazole</i> Pillar	11 + 3	3 lb at 28-day intervals	DO NOT 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 TL, Strobe 50 WG, Strobe 2L ArmorTech Zoxy Artavia	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</i> + <i>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	
	<i>azoxystrobin</i> + <i>propiconazole</i> Headway	11 + 3	3 oz at 14–28-day intervals	
	<i>azoxystrobin</i> + <i>tebuconazole</i> ZoxyT, Strobe T	11 + 3	1.5 oz at 14–28-day intervals	
	<i>benzovindiflupyr</i> + <i>difenoconazole</i> Ascernity	7 + 3	1.0 fl oz at 14–28-day intervals	Apply 1 or 2 applications approximately one month prior to bermudagrass dormancy. 1/8" to 1/4" of irrigation directly after application is recommended. Reapply 14 to 28 days later.
	<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>fluindapyr</i> + <i>flutriafol</i> Kalida	7 + 3	0.25–0.4 fl oz at 21–28-day intervals	Apply 2 preventative treatments when soil temperatures at 2" depth are consistently below 70°F.
	<i>fluopyram</i> + <i>prothioconazole</i> + <i>propamocarb</i> Resilia	7 + 3 + 28	4.0 fl oz at 14–28 day intervals	Apply Resilia preventatively when conditions are favorable for target pest activity. Do not exceed 4.0 fl oz per 1000 sq ft per application. Do not exceed 16 oz per 1000 sq ft per year.
	<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</i> + <i>chlorothalonil</i> Disarm C, Fame + C	11 + M5	5.9 oz at 14–28-day intervals	
	<i>fluoxastrobin</i> + <i>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, and 0.25–0.5" of irrigation after application is recommended. Re-apply 14–28 days later.
	<i>fluoxastrobin</i> + <i>tebuconazole</i> Fame + T	11 + 3	0.45–0.9 oz at 21–28-day intervals	
	<i>flutriafol</i> Rayora	3	0.7–1.4 fl oz at 21–28-day intervals	For use on golf courses, in lawns and landscaped areas around public, industrial and commercial properties. Check the entire label for restrictions.
	<i>fluxapyroxad</i> + <i>pyraclostrobin</i> Lexicon	7 + 11	0.47 fl oz	Section 2(ee)
	<i>isofetamid</i> Kabuto	7	Program A: Single preventative application of 3.2 fl oz Program B: First application 0.5–2 fl oz; second application 0.5–1.2 fl oz at 14–28-day intervals	When soil temperatures have declined to 65° F. Use 2 gal of water and water immediately with 1/8" irrigation. Do not apply more than 3.2 fl oz per year.

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>isofetamid + tebuconazole</i> Tekken	7 + 3	3.0 fl oz	
	<i>mefentrifluconazole</i> Maxtima	3	0.6–0.8 fl oz at 28-day intervals	
	<i>mefentrifluconazole + pyraclostrobin</i> Navicon	3 + 11	0.85 fl oz at 28-day intervals	
	<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>PCNB + tebuconazole</i> Oreon Premion	14 + 3	6–8 fl oz at 28-day intervals	
	<i>penthiopyrad</i> Velistar	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.
	<i>prothioconazole</i> Densicor	3	0.196 fl oz at 14–21-day intervals	Lightly water-in to move the fungicide into crown area and root zone.
	<i>pydiflumetofen</i> Posterity	7	0.16–0.32 fl oz	Make two applications on a 28-day intervals. Golf courses only.
	<i>pydiflumetofen + azoxystrobin + propiconazole</i> Posterity XT	7 + 11 + 3	3.0 fl oz at 28-day intervals	Make two applications in the fall one month prior to bermudagrass dormancy and second application 28 days later. Apply ¼ to ½ of irrigation directly after applications.
	<i>pydiflumetofen + azoxystrobin + propiconazole</i> Posterity Forte	7 + 11 + 3	0.63–0.84 fl oz Make one or two applications 14 or 28 days after first application, depending on disease pressure, with the final application approx. one month before bermudagrass dormancy.	¼ to ½ inch of irrigation directly after application is recommended.
	<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 intervals	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		

■ TURF DISEASE CONTROL

TURF

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)	azoxystrobin Heritage 50 WG, G Strobe 50 WG, Strobe 2L	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.
	ArmorTech Zoxy Artavia			
	azoxystrobin + acibenzolar- <i>S</i> -methyl Heritage Action	11 + P	0.2–0.4 oz at 28-day intervals	
	azoxystrobin + difenconazole 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.
	azoxystrobin + propiconazole Headway	11 + 3	3 oz at 14–28-day intervals	
	azoxystrobin + tebuconazole ZoxyT	11 + 3	1.5 oz at 14–28-day intervals	
	cyazofamid + azoxystrobin Union	21 + 11	5.75 fl oz at 28-day intervals	
	fluindapyr + flutriafol Kalida	7 + 3	0.25–0.4 fl oz at 14–21-day intervals	
	fluopyram+ prothioconazole + propamocarb Resilia	7 + 3 + 28	4.0 fl oz at 14–28 day intervals	Apply Resilia preventatively when conditions are favorable for target pest activity. Do not exceed 4.0 fl oz per 1000 sq ft per application. Do not exceed 16 oz per 1000 sq ft per year.
	fluoxastrobin 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, and 0.25–0.5" of direct irrigation is recommended after application.
	fluoxastrobin + chlorothalonil Disarm C, Fame + C	11 + M5	5.9 oz at 28-day intervals	
	fluoxastrobin + myclobutanil Disarm M	11 + 3	0.5–1 fl oz at 28-day intervals	
	fluoxastrobin + tebuconazole Fame + T	11 + 3	0.45–0.9 oz at 21–28-day intervals	
	fluxapyroxad + pyraclostrobin Lexicon	7 + 11	0.47 fl oz at 28-day intervals	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. DO NOT exceed 3 applications in a 12-month period.
	hydrogen dioxide TerraCyte Pro, Zeritol	NC	6–12 oz at 7-day intervals	Curative control may require 2–3 consecutive applications. Use on 3–5 gal/1000 sq ft.
	isofetamid + tebuconazole Tekken	7 + 3	3.0 fl oz	
	mandestrobin Pinpoint	11	0.31 at 14–21-day intervals	For Take All Patch.
	mefentrifluconazole Maxtima	3	0.8 fl oz at 28-day intervals	
	mefentrifluconazole + pyraclostrobin Navicon	3 + 11	0.7– 0.85 fl oz at 14–28-day intervals	
	myclobutanil Eagle 40WSP	3	1.2–2.4 oz at 28-day intervals (spring and fall)	
Phosphorous acid (potassium phosphite) Appear II	33	6.0 fl oz at 14-day intervals	Apply as a preventative treatment prior to the expression of disease symptoms.	

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) (continued)	<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>prothioconazole</i> Densicor	3	0.196 fl oz at 14–21-day intervals	Lightly water-in to move the fungicide into crown area and root zone.
	PCNB + <i>tebuconazole</i> Oreon, Premion	14 + 3	6–8 fl oz at 14–28-day intervals	
	<i>pydiflumetofen</i> + <i>azoxystrobin</i> + <i>propiconazole</i> Posterity XT	7 + 11 + 3	1.5–3.0 fl oz at 14–28-day intervals	Irrigate immediately after application with ¼ to ½ inch of water.
	<i>pyraclastrobin</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>pyraclastrobin</i> + <i>boscalid</i> Honor Honor Intrinsic	11 + 7	Bermudagrass Decline 1.1 oz Take All Patch: 1.1 oz at 28-day intervals	Bermudagrass Decline: 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>pyraclastrobin</i> + <i>triticonazole</i> Pillar	11 + 3	3 lb at 28-day intervals	DO NOT 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 intervals	Bermudagrass Decline: Irrigate the area with sufficient water to move fungicide into crown and root zone of the turf. Take All Patch: 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</i> + <i>triadimefon</i> Tartan	11 + 3	For Take All Patch: 1.5–2 oz at 28-day intervals		

■ TURF DISEASE CONTROL

TURF

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) (continued)	<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	Preventative: 2 oz Start sprays 2–4 weeks before symptoms reappear. Re-apply every 3–4 weeks Curative: 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, Contend B	<i>fluoxastrobin + tebuconazole</i>	Fame + T
<i>azoxystrobin + acibenzolar-S-methyl</i>	Heritage Action	<i>fluoxastrobin + miclobutanil</i>	Disarm M
<i>azoxystrobin + chlorothalonil</i>	Renown	<i>iprodione + thiophanate methyl</i>	26/36 Fungicide, ArmorTech TMI 2020, Dovetail, Lescos twosome, TM + IP SPC
<i>azoxystrobin + difenconazole</i>	Briskway	<i>iprodione + trifloxystrobin</i>	Interface
<i>azoxystrobin + tebuconazole</i>	ZoxyT, Strobe T	<i>myclobutanil + mancozeb</i>	MANhandle
<i>benzovindiflupyr + difenoconazole</i>	Ascernity, Contend A	<i>PCNB + tebuconazole</i>	Oreon, Premion
<i>copper hydroxyde + mancozeb</i>	Junction	<i>pydiflumetofen + azoxystrobin + propiconazole</i>	Posterity XT, Posterity Forte
<i>chlorothalonil + boscalid</i>	Encartis	<i>pyraclostrobin + boscalid</i>	Honor, Honor Intrinsic
<i>chlorothalonil + propiconazole</i>	Concert, Concert II	<i>pyraclostrobin + triticonazole</i>	Pillar
<i>chlorothalonil + propiconazole + PCNB</i>	FF III fungicide	<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, Versagard	<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>fluazinam + acibenzolar-S-methyl</i>	Secure Action	<i>triadimefon + trifloxystrobin</i>	Armada 50WGD, Armada 50WP, Tartan
<i>fluazinam + tebuconazole</i>	Traction	<i>tebuconazole + isofetamid</i>	Reserve
<i>fluidapyr + flutriafol</i>	Kalida	<i>tebuconazole + isofetamid</i>	Tekken
<i>fluopyram + trifloxystrobin</i>	Exeris	<i>mefentrifluconazole + pyraclostrobin</i>	Navicon
<i>fluoxastrobin + chlorothalonil</i>	Disarm C, Fame + C	<i>fluopyram + prothioconazole + propamocarb</i>	Resilia

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	Protectant Fungicide MOA: Interferes with mitosis
	<i>etridiazol</i>	Koban 30WP, Terrazole	
	PCNB	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, Oreon, FF III	
Antibiotic	<i>polyoxind</i>	Affirm, Endorse	Localized penetrant fungicide MOA: 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 MOA: Fungicide binds tubulin subunits that results in mitotic arrest
Carboximides (SDHI)	<i>benzovindiflupyr</i>	Part of Ascernity, part of Contend A	Acropetal penetrant fungicide Basidiomycete control MOA: Blocks activity of certain respiratory enzymes
	<i>boscalid</i>	Emerald	
	<i>fluopyram</i>	Part of Exteris	
	<i>flutalonil</i>	Prostar	
	<i>fluxapyroxad</i>	Xzemplar	
	<i>penthiopyrad</i>	Velista	
	<i>isofetamid</i>	Kabuto Fungicide SC, Tekken	
	<i>pydiflumetofen</i>	Posterity	

CHEMICAL FAMILY	COMMON NAME	TRADE NAME	TYPE/MODE OF ACTION
Demethylation Inhibitors (DMI's)	<i>flutriafol</i>	Rayora	Broad spectrum acropetal penetrant fungicide MOA: Sterol inhibitor (ergosterol). Inhibits cell membrane synthesis
	<i>mefentrifluconazole</i>	Maxtima	
	<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>prothioconazole</i>	Densicor	
	<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, Tekken	
Dicarboximides	<i>iprodione</i>	ArmorTech IP233, Chipco 26GT, Chipco 26019, Eclipse ETQ, Lesco 18 plus, Iprodione Pro 2SE, Iprodione SPC, Ipro2SE	Localized Penetrant MOA: 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 MOA: Enzyme inactivation
	<i>propamocarb hydrochloride</i>	Banol, Lesco Banol, Proplant	Localized penetrant MOA: 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 MOA: Toxic to cell membrane



MAJOR CHEMICAL GROUPS OF TURFGRASS FUNGICIDES

TURF

CHEMICAL FAMILY	COMMON NAME	TRADE NAME	TYPE/MODE OF ACTION
Phenylamides	<i>mefenoxam</i>	Anderson's Pythium Control 1.2G, Apron XL LS, Mefanoxam 2AQ, Quell, Ridomil Gold EC, Subdue GR, Subdue Maxx, Subdue WSP, Tri-Power Selective	Acropetal penetrant fungicide MOA: Inhibits RNA synthesis
Phenylpyrrole	<i>fludioxonil</i>	Medallion	Protectant Fungicide MOA: Cell membrane toxicity, amino acids uptake inhibition
Phenylpyridinamine	<i>fluazinam</i>	Secure, Rotator, Secure Action	Protectant Fungicide MOA: Inhibits respiration
Phosphonates	<i>fosetyl-a1</i>	ArmorTech ALT70, Aliette 80WP, Aliette WDG, Chipco Signature, Prodigy Signature, Fosetyl-Al 80WGD, Lesco Prodigy Signature 80DG, Terra Aliette T/O, 80WDG	Systemic fungicide MOA: General fungitoxic effect
	<i>potassium phosphonate, phosphite</i>	Alude, Appear, Appear II, 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	MOA: ATP inhibition
	<i>mandestrobin</i>	Pinpoint	Broad spectrum, systemic
Tetrazolyloximes	<i>picarbutrazox</i>		Unknown

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
Zio	<i>Pseudomonas chlororaphis</i> strain AFS009	1.8-6.0 oz	SePro
ChitoPro-f	<i>Quillaja extract</i> + <i>Chitosan</i>	0.34-0.64-32 fl oz	Organisan

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-AI) 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.

ADDITIONAL NOTES ON TURFGRASS FUNGICIDES

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 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
- Labeling changes:
 - Xzemplar and Lexicon Intrinsic can now be applied for a total of 4 applications per year, (4 Lexicon at 0.47 fl oz or 85 fl oz/A per year; 4 Xzemplar at 0.26 fl oz or 47 fl oz per acre per year).
 - Kabuto has a 2 (ee) section for SDS Program A and Program B. Check label for instructions.

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.

Alfredo Martinez-Espinoza, Extension Plant Pathologist
 Clint Waltz, Turfgrass Specialist

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.

DISEASE	NEMATOCIDE	RATES	REMARKS
Nematodes	<i>abamectin</i> Divanem	3.125–6.25 fl oz/1000 sq ft	Restricted Use. Special Local Needs Label for Georgia (24c). For golf greens, tees, and fairways. Apply as an early curative treatment (after appropriate nematode extraction, identification, and counts). Apply in the early morning while grass is wet with dew or irrigate prior to application with 0.1 inches of water. Within one hour following application, irrigate with 0.1 to 0.25 inches of water to move the treatments through the thatch. Do not over irrigate. Apply 3–4 consecutive applications at 14–21 day intervals. Apply in 2 gallons of water / 1000 ft ² (approximately 100 gpa) with a non-ionic surfactant (0.25% v/v) included. Including Heritage (azoxystrobin) with applications has demonstrated healthier turf.
	<i>azadirachtin</i> AzaGuard	15 fl oz/A	Apply in sufficient amount of water to penetrate in the soil to a depth of 12 inches. 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 aeration 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.

NEMATODE CONTROL IN TURFGRASS

DISEASE	NEMATICIDE	RATES	REMARKS
Nematodes (continued)	<i>fluopyram</i> Indemnify	0.195–0.39 fl oz/1000 sq ft	Irrigate to root zone. For golf courses, sod farms, sport fields, residential, institutional, commercial, and other turfgrass areas.
	<i>fluopyram</i> + <i>prothioconazole</i> + <i>propamocarb</i> Resilia	4.0 fl oz at 14–28 day intervals	Apply Resilia preventatively when conditions are favorable for target pest activity. Do not exceed 4.0 fl oz per 1000 sq ft per application. Do not exceed 16 oz per 1000 sq ft per year.
	<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 inch) 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	Restricted Use. 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 inch 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>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	Restricted Use. 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

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

TURF

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
PREEMERGENCE HERBICIDES						
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	centipedegrass, St. Augustinegrass, dormant bermudagrass, zoysiagrass	<i>Atrazine</i> 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, <i>atrazine</i> 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 or residential turfgrass. <i>Atrazine</i> is a Restricted Use Herbicide. Refer to <i>atrazine</i> —Postemergence.
<i>benefin</i> Balan 2.5G Other trade names	3	80–120 lb	2–3	12 H	Ky. bluegrass, bermudagrass, centipedegrass, tall fescue, St. Augustine, zoysiagrass	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, bahia grass, bermudagrass, centipede, tall fescue, St. Augustine, seashore paspalum, zoysiagrass	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</i> 0.75% + <i>pendimethalin</i> 1% Freehand 1.75G	15 + 3	100–200 lb	1.75–3.5	12 H	bermudagrass, centipedegrass, 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 <i>dithiopyr</i>) 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, zoysiagrass, St. Augustinegrass, 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)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
PREEMERGENCE HERBICIDES (continued)						
<i>flumioxazin</i> Sureguard 51WDG Sureguard 4SC	14	8–12 oz 8–12 fl 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. <i>Flumioxazin</i> also provides early-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 non-ionic 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. <i>Indaziflam</i> 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, centipedegrass, 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 <i>atrazine</i> or <i>simazine</i> for use on St. Augustine or centipede use only 4 fl oz of Tenacity and 0.5 lb ai/A of either <i>atrazine</i> or <i>simazine</i> . 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, centipedegrass, zoysiagrass, 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, centipedegrass, tall fescue, zoysiagrass, St. Augustinegrass	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.

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
PREEMERGENCE HERBICIDES (continued)						
<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, zoysiagrass, St. Augustinegrass	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. Ronstar 2G may be used immediately prior or immediately after sprigging 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. <i>Oxadiazon</i> 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, centipedegrass, tall fescue, zoysiagrass, St. Augustinegrass	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	0.75 0.75	See Label	Ky. bluegrass, bermudagrass, buffalograss, centipedegrass, St. Augustinegrass, seashore paspalum, zoysiagrass, 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.
<i>prodiamine</i> + <i>imazaquin</i> + <i>simazine</i> Coastal 1.68 + 0.73 + 2.59 lb/gal	3 + 2 + 5	48 to 64 oz/acre	0.63 to 0.84 0.27 to 0.37 0.97 to 1.3	12 H	Bermudagrass, centipedegrass, St. Augustinegrass, zoysiagrass	Provides control of annual grasses and broadleaf weeds. Apply this product anytime from Sept 15 through May 31 with the exception of just prior to and during spring transition. Do not apply if spring transition is imminent or expected within 3–4 weeks unless delayed green up and/or temporary yellowing can be tolerated. For fall and winter applications—64 fl.oz. per acre is recommended. For spring applications—48 fl.oz. per acre is recommended if spring transition is expected within a month. Higher labelled rates may be used if spring transition is at least 4–6 weeks away or has already occurred. Do not exceed the maximum of 113 fl oz/acre per year. Do not apply if spring transition is imminent or expected within 3–4 weeks as delayed greenup and temporary yellowing may occur. Do not use after May 31st.
<i>pronamide</i> Kerb T/O 50WSP Kerb 3.3SC	3	1–2 lb 1.25 to 3.5 pt	0.5–1 0.5 to 1.44	24 H	bermudagrass, centipedegrass, St. Augustinegrass, seashore paspalum, zoysiagrass	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			
PREEMERGENCE HERBICIDES (continued)						
<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, centipedegrass, St. Augustinegrass, zoysiagrass	Apply <i>simazine</i> 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. See label for potential application rate restrictions on sites with and without irrigation.
<i>benefin</i> + <i>oryzalin</i> XL 2G	3 + 3	100–150 lb	1–1.5 <i>benefin</i> + 1–1.5 <i>oryzalin</i>	24 H	bermudagrass, centipedegrass, tall fescue, zoysiagrass, St. Augustinegrass	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 <i>benefin</i> + 0.75–1.5 <i>trifluralin</i> 1.3–2 <i>benefin</i> + 0.7–1 <i>trifluralin</i>	See Label	Ky. bluegrass, bermudagrass, centipedegrass, tall fescue, zoysiagrass, St. Augustinegrass	Team Pro is a dry fertilizer based product that contains 0.43% <i>benefin</i> and 0.43% <i>trifluralin</i> . 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 <i>bensulide</i> + 1.5 <i>oxadiazon</i>	See Label	Ky. bluegrass, bermudagrass, tall fescue, zoysigrassa	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.
<i>oxadiazon</i> 1% + <i>proflam</i> 0.2% Regalstar II Regalstar G	14 + 3	200 lb	2 <i>oxadiazon</i> + 0.4 <i>proflam</i>	See Label	Ky. bluegrass, bermudagrass, centipedegrass, St. Augustinegrass, tall fescue, zoysiagrass	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>proflam</i> Echelon 4SC	14 + 3	18–36 fl oz	0.56–1.125	12 H	Ky. bluegrass, bermudagrass, buffalograss, carpetgrass, centipedegrass, seashore paspalum, tall fescue, zoysiagrass	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.

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
POSTEMERGENCE HERBICIDES						
<i>amicarbazone</i> Xonerate 70WDG Xonerate 2SC	5	1–10 oz 3–14 fl oz	04–0.18 0.04–0.2 lb	12 H 24 H	bahiagrass, bermudagrass, buffalograss, centipedegrass, creeping bentgrass, fine fescue, Ky. bluegrass, kikuyugrass, perennial ryegrass, seashore paspalum	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. Do not apply to desirable roughstalk bluegrass turf. Do not exceed 10 oz/A/year of the WDG or 29 fl oz/A of the 2SC formulation.
<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	centipedegrass, St. Augustine, dormant bermudagrass, zoysiagrass	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 or to residential turf. 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, zoysiagrass, 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. <i>Bentazon</i> is not recommended for use on putting greens.
<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	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 non-ionic surfactant at 0.125–0.25% v/v to the spray mix.

TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
POSTEMERGENCE HERBICIDES (continued)						
<i>carfentrazone</i> 0.04 lb/gal + 2,4-D 0.52 lb gal + MCP P 0.2 lb/gal + <i>dicamba</i> 0.05 lb/gal SpeedZone-Southern	14 + 4	2–5 pt	—	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) + <i>dicamba</i> 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 + <i>dicamba</i> 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, centipedegrass, St. Augustine, zoysiagrass	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 non-ionic 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.
<i>clopyralid</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, zoysiagrass	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 <i>triclopyr</i> as Confront. <i>Clopyralid</i> is not labeled for use on residential turfgrasses.
2,4-D Weedar 64 3.8 lb/gal Other trade names	4	See Label	0.5–2	See Label	Ky. bluegrass, bermudagrass, centipede, tall fescue, zoysiagrass	<i>Amine</i> 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.

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
POSTEMERGENCE HERBICIDES (continued)						
2,4-D + MCP + dicamba Three-way Trex-San Triplet Other trade names	4	See Label	0.75 + 0.4 + 0.08	See Label	Ky. bluegrass, bermudagrass, tall fescue, zoysiagrass	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.
2,4-D + MCP + 2,4-DP 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.
2,4-D + clop + dicamba 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.
2,4-D + fluroxypyr + dicamba 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.
2,4-D + triclop 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 + triclop + sulfentrazone + dicamba T Zone 1.75 + 0.5 + 0.06 + 0.2 lb/gal	4 + 14	2-4 pt	0.44 + 0.125 + 0.15 + 05-0.88 + 0.25 + 0.3 + 0.1	24 H	Ky. bluegrass, bahiagrass (DORMANT) bermudagrass (DORMANT) ryegrass, tall fescue, zoysiagrass (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.

TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
POSTEMERGENCE HERBICIDES (continued)						
2,4-D + <i>halauxifen</i> + <i>fluroxypyr</i> GameOn 1.95 + 0.02 + 0.27 lb/gal	4	3 to 4 pt	0.73 to 0.97 + 0.008 to 0.01 + 0.1 to 0.13	48 H	Ky. bluegrass, bermudagrass, ryegrass, tall fescue, zoysiagrass	GameOn provides postemergence control of annual and perennial broadleaf weeds in established turfgrass and ornamental grasses in golf courses, industrial sites, cemeteries, commercial sod farms, and unimproved turfgrass areas. Not for use on residential turf. Do not retreat for 21 days after initial treatment. The use of this herbicide in the spring when bermudagrass is breaking dormancy may delay green up of the turfgrass. Grass clippings from mowing within 2 weeks after application must be left onsite or discarded. Do not treat to bentgrass or bermudagrass with GameOn when the mowing height is less than ½ inch. Hybrid bermudagrass can be more sensitive to injury than common bermudagrass. Do not apply more than 3 pints of GameOn per acre to these grasses unless temporary turfgrass injury can be tolerated. Do not apply more than 4 pints per acre per application and more than a total of 8 pints per year.
<i>dicamba</i> Vanquish 4 lb/gal	4	0.5–1 pt	0.25–0.5	24 H	Ky. bluegrass, bermudagrass, centipedegrass, tall fescue, zoysiagrass	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.
XtendiMax 2.9 lb/gal		4.1–44 fl oz	0.1–1 lb			Xtendimax is labeled for sod farms for the control of annual and perennial broadleaf weeds. Do not broadcast-apply more than 44 fl oz/A/growing season. Applying more than 16 fl oz/A to buffalograss or St. Augustinegrass may result in excessive stunting or discoloration. Do not make re-treat applications in these areas for 30 days until previous applications have been activated in the soil by rain or irrigation. Do not use on residential sites.
<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 non-ionic 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	dormant bermudagrass, 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.

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
POSTEMERGENCE HERBICIDES (continued)						
<i>ethofumesate</i> Prograss 1.5EC + <i>atrazine</i> numerous formulations	8 + 5	2 gal + 2 lb ai/A	3 + 2	12 H See Label	St. Augustinegrass	Prograss + <i>atrazine</i> 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, zoysiagrass	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 <i>phenoxy</i> 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, seashore paspalum Zoysiagrass	<i>Flazasulfuron</i> (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. <i>Flazasulfuron</i> 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, Ky. 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 non-ionic surfactant when <i>florasulam</i> 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 non-ionic 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 non-ionic 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			
POSTEMERGENCE HERBICIDES (continued)						
<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. <i>Flumioxazin</i> 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 non-ionic 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	0.13–0.4	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 Prosedge 75DF	2	0.67–1.33 oz	0.031–0.062	12 H	Ky. bluegrass, bermudagrass, centipedegrass, St. Augustine, tall fescue, zoysiagrass, 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 non-ionic 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.

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
POSTEMERGENCE HERBICIDES (continued)						
<i>imazaquin</i> Image 70DG	2	8.6–11.4 oz	0.37–0.5	12 H	bermudagrass, centipedegrass, zoysiagrass, St. Augustine	Controls nutsedges, wild garlic and selected broadleaf weeds. Add a non-ionic surfactant at 1 qt/100 gal. The addition of <i>MSMA</i> (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 ryegrass. DO NOT apply to newly planted or sprigged lawns or golf greens.
<i>imazosulfuron</i> Celero 75 WDG	2	8–14 oz	0.38–0.66 lb	12 H	bentgrass, fescue, Ky. bluegrass, ryegrass, bermudagrass, centipedegrass, St. Augustinegrass, zoysiagrass	Provides postemergence control of annual and perennial sedges, kyllinga, and broadleaf weeds. Celero is labeled for residential and non-residential turfgrass including golf courses, sod farms, sports fields, parks, and lawns. Apply with a non-ionic surfactant at 0.25% v/v. Make second treatments no sooner than 21 D after the initial treatment. Do not apply more than 14 oz/A/application. Do not apply to golf greens.
<i>MCPA</i> (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, centipedegrass, 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 “Floratum,” “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, centipedegrass, St. Augustinegrass, zoysiagrass	Refer to individual labels for recommended amount of formulated product. Controls a broader spectrum of weeds than <i>2,4-D</i> 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 <i>2,4-D</i> alone. Cool Power is an ester formulation of <i>MCPA</i> + <i>triclopyr</i> + <i>dicamba</i> primarily for use during the cool winter months. HorsePower contains <i>amine</i> 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 <i>2,4-D</i> 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, centipedegrass, tall fescue, zoysiagrass, St. Augustinegrass	Controls a broader spectrum of weeds than <i>2,4-D</i> 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			
POSTEMERGENCE HERBICIDES (continued)						
<i>methiozolin</i> PoaCure SC 2.3 lb/gal	Not classified	0.2 to 0.4 gal	0.46 to 0.92	See Label	bentgrass bermudagrass, fescue, Kentucky bluegrass, Ryegrass, Seashore paspalum, Zoysiagrass	PoaCure is a pre- and postemergence herbicide that will selectively control annual bluegrass and roughstalk bluegrass in various established golf course turf including creeping bentgrass putting greens and fairways and other turf areas consisting of various cool and warm season turfgrasses. Provides preemergence control of crabgrass and goosegrass, and certain broadleaf weeds. Apply between 0.2 to 0.4 gal/acre when the average daily temperature is between 50° and 80° F, when both Poa weeds and turfgrasses are actively growing. Do not apply when summer air temperatures are consistently above 85° F or immediately following stressful summer weather. Not for use on turf being grown for sale or other commercial use as sod or seed production. Do not exceed 1 gal/acre per year. See label for recommendations regarding application regimens.
<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 + MSMA 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, centipedegrass, St. Augustinegrass, zoysiagrass	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 non-ionic 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 postemergence 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.

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
POSTEMERGENCE HERBICIDES (continued)						
<p><i>MSMA</i> Bueno 6 6 lb/gal Daconate 6 6 lb/gal Other trade names</p> <p><i>DSMA</i> DSMA Liquid 3.6 lb/gal Weed-E-Rad 360 3.6 lb/gal Other trade names</p> <p><i>penoxsulam + sulfentrazone + 2,4-D + dicamba</i> Avenue South</p>	17	2.7 pt 2.7 pt	2 2	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 ½ rate after 3 mowings. Add a surfactant according to label directions. Zoysiagrass cultivars vary in tolerance to <i>MSMA</i> . “Meyer” is more tolerant than “Emerald” or “Matrella”. DO NOT apply to centipede or St. Augustine.
<p><i>pinoxaden</i> Manuscript 0.42EC</p>	1	9.6 to 19.2 fl oz	0.0315 to 0.63	48 H	bermudagrass, St. Augustinegrass, zoysiagrass	Provides postemergence control of grassy weeds including crabgrass, dallisgrass, torpedograss, and tropical signalgrass. Make two applications 14 to 21 days apart. Do not apply more than 19.2 fl oz/acre per calendar year. Spot treatments may be applied by mixing 9.6 fl oz of Manuscript in 20 gallons of water per acre for treating an area up to 10,000 sq ft. Apply in combination with Adigor spray adjuvant or methylated seed oil at 0.5% v/v. Applications to St. Augustinegrass are restricted to sod production and only if temporary injury can be tolerated. Manuscript may be used on bermudagrass and zoysiagrass.
<p><i>prodiamine + imazaquin + simazine</i> Coastal 1.68 + 0.73 + 2.59 lb/gal</p>	3 + 2 + 5	48 to 64 oz/acre	0.63 to 0.84 0.27 to 0.37 0.97 to 1.3	12 H	Bermudagrass, centipede, St. Augustinegrass, zoysiagrass	Provides control of annual grasses and broadleaf weeds. Apply this product anytime from Sept 15 through May 31 with the exception of just prior to and during spring transition. Do not apply if spring transition is imminent or expected within 3–4 weeks unless delayed green up and/or temporary yellowing can be tolerated. For fall and winter applications—64 fl.oz. per acre is recommended. For spring applications—48 fl.oz. per acre is recommended if spring transition is expected within a month. Higher labeled rates may be used if spring transition is at least 4–6 weeks away or has already occurred. Do not exceed the maximum of 113 fl oz/acre per year. Do not apply if spring transition is imminent or expected within 3–4 weeks as delayed greenup and temporary yellowing may occur. Do not use after May 31st.
<p><i>pronamide</i> Kerb T/O 50WSP Kerb 3.3SC</p>	3	1.5–3 lb	0.75–1.5	24 H	bermudagrass, centipede, St. Augustine, zoysiagrass	<i>Pronamide</i> will control emerged annual bluegrass, corn speedwell, and common chickweed. Increase rate as annual bluegrass approaches maturity. <i>Pronamide</i> 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.

TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
POSTEMERGENCE HERBICIDES (continued)						
<p><i>pyrimisulfan</i> Vexis 0.025%</p> <p>Arkon 0.103 lb/gal</p>	2	174 lb 3.4–4.7 pt	0.04 0.04–0.06	12 H	bahiagrass, bentgrass, bermudagrass, buffalograss, centipedegrass, Ky. bluegrass, ryegrass, seashore paspalum, St. Augustinegrass, tall fescue, zoysiagrass	<p>Apply for postemergence control of sedges, kyllinga, rushes, and broadleaf weeds. Labeled for use in residential lawns, ornamental turf sites, non-crop areas, and sod farms. Moisture on leaf surface is not required. Temperatures below 50 F will reduce weed control activity. For best results, water-in granuals within 48 hours after treatment. Apply in early fall for control of winter annual weeds including henbit, chickweed, and false dandelion. Do not exceed 360 lb/acre per year.</p> <p>Do not exceed 7 pt/acre of Arkon per year.</p>
<p><i>quinclorac</i> Drive 75DF</p> <p>Drive XLR8 1.5 SL</p>	4	1 lb 64 fl oz	0.75 0.75	12 H	Ky. bluegrass, bermudagrass, seashore paspalum, tall fescue, zoysiagrass	<p>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 centipedegrass. DO NOT apply to exposed feeder roots of ornamental trees and shrubs.</p>
<p><i>quinclorac</i> 0.75 lb/gal + 2,4-D 1 lb/gal + <i>dicamba</i> 0.125 lb/gal Qunicept</p>	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	<p>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.</p>
<p><i>rimsulfuron</i> Tran Xit GTA 25DF</p>	2	1–2 oz	0.016–0.032	See Label	bermudagrass, centipedegrass, zoysiagrass	<p>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 non-ionic 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.</p>

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
POSTEMERGENCE HERBICIDES (continued)						
<i>sethoxydim</i> Segment 1 lb/gal Segment II 1.5 lb/gal	1	1.5–2.25 pt 1–1.5 pt	0.19–0.28 0.19–0.28	12 H	centipede, fine fescue	Apply <i>sethoxydim</i> only to centipede and fine fescues (creeping red, Chewings, hard fescue). Other turfgrasses, including tall fescue, will be severely injured by <i>sethoxydim</i> . 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 + MCP 0.5 lb/gal + <i>dicamba</i> 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.
<i>sulfentrazone</i> + <i>carfentrazone</i> Dismiss NXT 3.5 lb/gal	14	5.1–15.3 fl oz	0.14–0.4	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 2–4 weeks after application if slight injury to ryegrass can be tolerated. Dismiss NXT is not labeled for use on golf course putting greens, collar, or tees.

TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
POSTEMERGENCE HERBICIDES (continued)						
<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 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 warm- and cool-season turfgrasses for broadleaf weed control and suppression or control of grassy weeds. DO NOT apply to bentgrasses or greens. 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>thiencarbazone</i> + <i>iodosulfuron</i> + <i>dicamba</i> Celsius 68WG	2 + 4	2.5–4.9 oz	See Label	24 H	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>thiencarbazone</i> 4.29% + <i>iodosulfuron</i> 0.93% + <i>halosulfuron</i> 10% Celsius XTRA WG	2	5–10 oz	0.05–0.1	12 H	bermudagrass, centipedegrass, St. Augustinegrass, zoysiagrass	Apply for postemergence weed control in residential lawns, non-crop areas, sod farms, and commercial turf including golf courses, athletic fields, and non-residential lawns. Controls numerous grasses, broadleaf weeds, and sedges in tolerant turfgrasses. Do not apply more than 15 oz/acre per year. Do not apply more than 10 oz/acre per treatment.
<i>thiencarbazone-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.

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
POSTEMERGENCE HERBICIDES (continued)						
<i>topramezone</i> Pylex 2.8 lb/gal	27	1–2 fl oz/A	0.023–0.046 lb ai	12 H	centipedegrass, fine fescue, Ky. bluegrass, perennial ryegrass, tall fescue	Apply for postemergence control of crabgrass, goosegrass, foxtails, clovers, and other broadleaf weeds. Repeat applications with <i>triclopyr</i> 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.
<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, centipedegrass, 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 non-ionic 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.
TURF RENOVATION						
<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.

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
PREEMERGENCE HERBICIDES—GOLF COURSE PUTTING GREENS						
<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.
<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. <i>Siduron</i> 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>bensulide</i> + <i>oxadiazon</i> Goosegrass/Crabgrass Control 5.25% + 1.31% G	8 + 14	115 lb	6 <i>bensulide</i> + 1.5 <i>oxadiazon</i>	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.

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
POSTEMERGENCE HERBICIDES—GOLF COURSE PUTTING GREENS						
<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 non-ionic 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>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> MCPP-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 non-ionic 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.

■ TURFGRASS WEED CONTROL FOR PROFESSIONAL MANAGERS

TURF

HERBICIDE	MOA	BROADCAST RATE/ACRE		REI (Hours)	TURFGRASSES	REMARKS AND PRECAUTIONS
		AMOUNT OF FORMULATION	LBS. ACTIVE INGREDIENT			
POSTEMERGENCE HERBICIDES—GOLF COURSE PUTTING GREENS (continued)						
<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.
<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 non-ionic 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	<i>Sulfosulfuron</i> controls nutsedges, annual sedges, kyllinga species, tall fescue, and certain broadleaf weeds in warm-season turfgrasses. Add a non-ionic 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. <i>Sulfosulfuron</i> 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 grass, 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. DO NOT mow 2 days prior to or after application. Remove clippings prior to application. The addition of a non-ionic surfactant (0.25% v/v) may enhance suppression; however, temporary discoloration may increase. DO NOT 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. DO NOT apply to turf less than 3 years old and delay reseeding for 3 days. DO NOT add a surfactant. <i>Maleic hydrazide</i> 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. DO NOT 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 to 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. <i>Trinexapac-ethyl</i> is foliage-absorbed and is rainfast within one hour of application. <i>Trinexapac-ethyl</i> does not require the addition of a surfactant. <i>Trinexapac-ethyl</i> may cause temporary yellowing (about one week). <i>Trinexapac-ethyl</i> 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, <i>trinexapac-ethyl</i> 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. <i>Trinexapac-ethyl</i> may also be used for growth regulation of grasses around monuments and structural materials. At normal dilution rates, <i>trinexapac-ethyl</i> does not stain brass, bronze, concrete, marble, granite, and other types of stone.
<i>trinexapac-ethyl</i> 0.11 lb/gal + flurprimidol 0.44 lb/gal + paclobutrazol 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, bermudagrass, seashore paspalum, zoysiagrass	<i>Flurprimidol</i> + <i>trinexapac-ethyl</i> (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. DO NOT 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 enhancement (see Label).
<i>prohexadione-Ca</i> (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	PRODIAMINE
PREEMERGENCE														
PERENNIAL WEEDS														
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
GRASSES														
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		
BROADLEAF WEEDS														
carpetweed	E			G-E				G-E	E	G-E	G-E	G-E		G-E
chamberbitter (niruri)	G			G-E	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

	ATRAZINE	BENEFIN	BENSULIDE	DITHIOPYR	DIMETHENAMID	ETHOFUMESATE	INDAZIFLAM	ISOXABEN	MESOTRIONE	ORYZALIN	OXADIAZON	PENDIMETHALIN	FLUMIOXAZIN	PRODIAMINE
PREEMERGENCE														
BROADLEAF WEEDS (continued)														
knotweed	E		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							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	G-E	
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

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	<i>PRONAMIDE</i>	<i>SIMAZINE</i>	<i>ATRAZINE</i>	<i>BENTAZON</i>	<i>BROMOXYNIL</i>	<i>2,4-D</i>	<i>2,4-D + 2,4-DP</i>	<i>2,4-D + MCPP + DICAMBA</i>	<i>TRICLOPYR</i>
	PREEMERGENCE		POSTEMERGENCE						
PERENNIAL WEEDS									
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
ANNUAL GRASSES									
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
BROADLEAF WEEDS									
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

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■ TURFGRASS WEED RESPONSE TO HERBICIDES

TURF

	<i>PRONAMIDE</i>	<i>SIMAZINE</i>	<i>ATRAZINE</i>	<i>BENTAZON</i>	<i>BROMOXYNIL</i>	<i>2,4-D</i>	<i>2,4-D + 2,4-DP</i>	<i>2,4-D + MCPP + DICAMBA</i>	<i>TRICLOPYR</i>
	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

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	DICAMBA	FENOXAPROP	GLYPHOSATE	IMAZAQUIN	MCPP	MSMA DSMA	METRIBUZIN	PRONAMIDE	SETHOXYDIM	SIMAZINE	THIENCARBAZONE + FORAMSULFURON + HALOSULFURON	THIENCARBAZON + IODOSULFURON + DICAMBA
POSTEMERGENCE												
PERENNIAL WEEDS												
bahiagrass	P	G	G	P	P	F	P	P	F	P	G	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	G	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		G
ANNUAL GRASSES												
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		
BROADLEAF WEEDS												
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-G
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

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TURF

	DICAMBA	FENOXAPROP	GLYPHOSATE	IMAZAQUIN	MCPP	MSMA DSMA	METRIBUZIN	PRONAMIDE	SETHOXYDIM	SIMAZINE	THIENCARBAZONE + FORAMSULFURON + HALOSULFURON	THIENCARBAZON + IODOSULFURON + DICAMBA
POSTEMERGENCE												
BROADLEAF WEEDS (continued)												
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			G
spurweed (burweed)	E	P	E	E	F	P	G	P	P	E		G
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		

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	<i>ISOXABEN</i>	<i>METSULFURON</i>	<i>CLOPYRALID</i>	<i>FLUROXYPYR</i>	<i>TRICLOPYR + CLOPYRALID</i>	<i>AMICARBAZONE</i>	<i>TOPRAMEZONE</i>	<i>FLUMIOXAZIN</i>
TIME OF APPLICATION	PRE	POSTEMERGENCE						
PERENNIAL WEEDS								
bahiagrass	P	G-E	P	P	P	P	P	
bermudagrass	P	P	P	P	P	P	F	P
dallisgrass	P	P	P	P	P	P	P	P
nutsedge, purple	P	P	P	P	P	P		P
nutsedge, yellow	P	P	P	P	P	P		P
tall fescue	P	P	P	P	P	P	P	P
wild garlic/onion	P	E	P					P
ANNUAL GRASSES								
annual bluegrass	P	P	P	P	P	P	P	G
crabgrass	P	P	P	P	P	P	G-E	
crowfootgrass		P	P	P	P			
goosegrass	P	P	P	P	P	P	G-E	
sandbur	P	P	P	P	P			
BROADLEAF WEEDS								
carpetweed	G-E	P			P			
chamberbitter (niruri)	G-E	G	P					
common chick weed	E	E	P	G	E	G		G-E
corn speedwell	G	E			P	G	G-E	G-E
cudweed	F	E	E		G-E		G-E	F
dandelion	P	E	F	F-G	E		P	P-F
dichondra	P	P			E			
docks	P	E	G		E			
doveweed		P	P		P	P		
Florida betony		G-E	P		G			
ground ivy	P			G	G-E			
henbit	E	G		F-G	E	E		G-E

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TURF

	ISOXABEN	METSULFURON	CLOPYRALID	FLUROXYPYR	TRICLOPYR + CLOPYRALID	AMICARBAZONE	TOPRAMEZONE	FLUMIOXAZIN
TIME OF APPLICATION	PRE	POSTEMERGENCE						
BROADLEAF WEEDS (continued)								
hop clovers		P-F	E	G	E	G-E		G
knotweed	G	E		G				
lespedeza		E	P		E		P	
mallow, bristly	P	G						
mock strawberry	P							
mouseear chickweed	G	E	P	G	E	G		G
mugwort	P		G					
mustards		F	P					
parsley piert	E		P			G-E		F-G
pennywort		G			E			
plantains		G		F-G	E		P	P
purslane, common	E	F-G						
spurges	E	E			F-G	G-E		
spurweed (burweed)	G	E	E		E			
star-of-Bethlehem	P	P	P		P			
VA buttonweed	P	F		F	F			
violets	P	G-E			F-G			
white clover	P	E	E	G-E	E		P-F	P
yellow woodsorrel	G	G		G	F-G			P

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	FORAMSULFURON	FLAZASULFURON	TRIFLOXYSULFURON SODIUM	CARFENTRAZONE	RIMSULFURON	HALOSULFURON	SULFENTRAZONE	SULFOSULFURON
POSTEMERGENCE								
PERENNIAL WEEDS								
bahiagrass	P		F	P	P	P	P	P
bermudagrass	P	P	P	P	P	P	P	P
dallisgrass	F ¹	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
ANNUAL GRASSES								
annual bluegrass	E	G-E	E	P	E	P	P	P-F
crabgrass	P	P-F	P-F	P	P	P	P	P
crowfootgrass	P		P	P		P	P	P
goosegrass	G	P	P	P	P	P	P	P
sandbur	P		P	P			P	
BROADLEAF WEEDS								
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		P	P	P
Florida betony	E		E	P-F				
ground ivy			F-G	G			F	

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	FORAMSULFURON	FLAZASULFURON	TRIFLOXYSULFURON SODIUM	CARFENTRAZONE	RIMSULFURON	HALOSULFURON	SULFENTRAZONE	SULFOSULFURON
POSTEMERGENCE								
BROADLEAF WEEDS (continued)								
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.