



IPM-0022

Commercial Turf and Lawns



Chemical Weed Control Recommendations for 2020

PREPLANT

Table 1. Herbicide Preplant Recommendations

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
PREPLANT				
glyphosate ROUNDUP PRO	4-6 T. of 4 lb./gal.	3-4 lb. (isopropyl-amine salt)	Annual and perennial grasses, broadleaf weeds and sedges, including nutsedge, bermudagrass, bahiagrass, torpedograss, etc.	Turfgrass Renovation. Apply to actively growing vegetation that is at least 4 to 5 inches tall. Mowing, tillage, or renovation techniques should be delayed for 7 to 14 days after application to allow proper translocation into underground plant parts. A second application may be necessary. Mid to late summer is the best time to treat for control of warm-season weeds. Desirable turfgrasses may be established as soon as acceptable control has been obtained on existing vegetation. See label for precautionary statements.
ROUNDUP PRO MAX	3 T. of 5.5 lb./gal.	3-4 lb. (potassium salt)		

PREEMERGENCE

Preemergence herbicide treatments should be applied to turfgrasses prior to emergence of the specific target weed. The recommended herbicide rates given below are for turfgrasses growing under optimum conditions of light, moisture, and nutrients. For sensitive grasses or for any grasses growing

under stress conditions (such as on golf greens, in shade, or in drought situations), apply the lowest effective rate in split applications. Make two applications, 10 to 14 days apart, with each application using half of the lowest effective rate.

Table 2. Herbicide Preemergence Recommendations

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
NEW PLANTINGS				
Preemergence				
oxadiazon RONSTAR 2G	2.25-3.3 lb.	2-3	Crabgrass, goosegrass	Make application to weed-free area immediately after sprigging bermudagrass or zoysiagrass. Irrigate immediately after application. DO NOT apply to newly seeded areas. DO NOT apply more than 4 pounds of active ingredient per acre per application. See label for additional precautions.

Table 2. Herbicide Preemergence Recommendations (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED WARM-SEASON—BERMUDAGRASS, CENTIPEDEGRASS, ST. AUGUSTINEGRASS, ZOYSIAGRASS ESTABLISHED COOL-SEASON—TALL FESCUE, KENTUCKY BLUEGRASS				
Preemergence				
atrazine AATREX 4L AATREX NINE-O	0.75-1.5 fl.oz. of 4 lb./gal. 0.4-0.8 oz. of 90 WDG	1-2 1-2	Annual bluegrass, henbit, spurweed, burclover, other annual broadleaf weeds	For use ONLY on warm-season turfgrasses listed on label. Apply after October 1 for control of winter weeds or during late winter but before April 15 for control of summer annual weeds. Use the low rate on newly sprigged turfgrass, on hybrid bermudagrass, or for the control of annual bluegrass. DO NOT make more than two applications per year. DO NOT use on alkaline soils or on golf greens. Read label carefully before using this product around trees and ornamentals. DO NOT overseed for 6 months after application. Atrazine is a RESTRICTED USE pesticide. DO NOT apply more than 2 pounds of atrazine a.i. per acre per year.
benefin BALAN	1.8-2.75 lb. of 2.5G	2-3	Crabgrass, goosegrass, annual bluegrass, others	Apply to well-established warm and cool-season turfgrasses. An additional treatment may be made 8 weeks after initial application for continued weed control. DO NOT apply to golf greens. Use high rate for annual bluegrass control on warm-season grasses when applied in late summer or early fall. Delay overseeding for 6 to 16 weeks after treatment, depending on rate used.
benefin + oryzalin XL 2G	2.5-3.5 lb. of 2G	2-3	Crabgrass, goosegrass, annual bluegrass, barnyardgrass, foxtail	Apply to established warm-season turfgrasses in February or early March for crabgrass control. For goosegrass control, use high rate. For annual bluegrass control, apply in late August or early September at high rate. Delay overseeding for 6 to 16 weeks after treatment, depending on rate used. Maximum number of applications per year is 2. Rainfall or irrigation of 0.5 inches or more is required to activate. Read label for additional directions and application instructions.
benefin + trifluralin TEAM 2G	2.4-3.37 lb. of 2G	2-3	Crabgrass, goosegrass, annual bluegrass, barnyard grass, and foxtail	Cool-season turf grass can be retreated 56 to 70 days after and warm-season turf grass can be retreated 70–84 days after initial treatment. Do Not apply to sod farms, turfgrasses grown for seed, or plants or plant materials intended for sale. Do not apply in spring if turf was planted in the previous fall. Only apply to well established turf. Reseeding should be delayed by 8 weeks after 75 to 100 lbs per acre has been applied. It should be delayed by 12 weeks if 100 to 150 per acre has been applied. Read label for additional directions and application instructions
bensulide BENSUMEC 4LF PRE-SAN 7G	5-9 fl.oz. of 4LF 2.4-4.1 lb of 7G	7.5-12.5 7.5-12.5	Crabgrass, goosegrass, annual bluegrass, other annual grasses, small-seeded broadleaf weeds	Apply to well-established bermudagrass, centipedegrass, St. Augustinegrass, zoysiagrass, Kentucky bluegrass, and tall fescue in March for summer weed control. For goosegrass control, apply about 4 to 6 weeks later. For crabgrass and goosegrass control within 50 miles of Gulf Coast, apply in late February. For winter weed control, apply in late August or early September. Must be water into the soil immediately after application. Irrigate with ½ to 1 inch of water following application to established lawns. Follow directions on label.

Table 2. Herbicide Preemergence Recommendations (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED WARM-SEASON AND COOL-SEASON GRASSES (cont.)				
Preemergence (cont.)				
bensulide + oxadiazon ANDERSON'S GOOSEGRASS/ CRABGRASS CONTROL	2.6 lb. of 6.5G	7.5	Crabgrass, goosegrass	For use on established bermudagrass, zoysiagrass, tall fescue, and perennial bluegrass. Apply prior to weed seed germination and while grass is dormant. Irrigate immediately after application. Delay overseeding for 5 months after application. May be used on bermudagrass and bentgrass putting greens only under conditions of heavy goosegrass infestations and where the herbicide side effects are tolerable. Yellowing and thinning for up to 4 weeks may be observed on such greens. Can be used to control annual bluegrass on established bentgrass greens. DO NOT use on bermudagrass putting greens to be overseeded. See label for other application instructions.
dimethenamid TOWER	0.5-0.75 fl.oz. of 6 lb./gal.	1-1.5	Crabgrass, annual bluegrass, kyllingas, broadleaves	Use the low rate on cool-season grasses. DO NOT apply more than 1.46 fluid ounces of Tower per 100 square feet per year. DO NOT seed or sprig treated areas for 8 weeks following application.
dimethenamid + pendimethalin FREEHAND 1.75G	2.3 to 4.6 lb. of 1.75G	1.75-3.5	Crabgrass, annual bluegrass, kyllingas, broadleaves	For use on established warm-season grasses only. DO NOT apply to putting greens. DO NOT apply to overseeded warm season turf. Use a maximum rate of 3.4 lb. per 100 square feet on residential turfgrass; sequential applications are allowed. Allow 3 months before overseeding or establishing new turf.
dithiopyr DIMENSION 1EC DIMENSION ULTRA	1.5 fl.oz. of 1 lb./gal. 0.46 oz. of 40 WP	0.5 0.5	Crabgrass, yellow foxtail, smutgrass, woodsorrel, annual bluegrass	Provides preemergence control of annual grasses and certain broadleaf weeds. Also controls small crabgrass (before tillering). Dimension does not provide consistent control of goosegrass at labeled rates. Apply as a spring or fall treatment. DO NOT apply more than 1.5 fluid ounces of 1EC or 0.46 ounce of 40 WP per 1000 square feet per application. DO NOT apply more than 4.5 fluid ounces of 1EC or 1.375 ounces of 40 WP per 1000 square feet per year. DO NOT overseed or sprig treated areas for 3 months after application. See label for tolerant hybrid bermudagrasses.
flumioxazin SUREGUARD	0.18-0.27 oz of 51WDG	0.25-0.38	Annual bluegrass, crabgrass, goosegrass, chickweed, henbit	APPLY ONLY TO DORMANT BERMUDAGRASS. DO NOT apply to putting greens. DO NOT apply to any turf overseeded with a cool-season grass. Allow 8 weeks before seeding or sodding new turf. DO NOT apply more than 12 oz. per acre per application. DO NOT apply more than 24 oz. per acre per year. DO NOT reapply within 30 days. DO NOT apply if rain is expected within an hour of application.
indazaflam SPECTICLE 20WP	2.1-3.75 oz. of 20WP	0.027-0.047	Crabgrass, goosegrass, annual bluegrass	Use on well-established warm-season turfgrasses. DO NOT use on cool-season turf. If uncertain of cultivar tolerance, treat a small area and observe turf tolerance. DO NOT apply more than 5 oz. per acre in a single application. DO NOT exceed 7.1 oz. per acre per 12-month period.

Table 2. Herbicide Preemergence Recommendations (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED WARM-SEASON AND COOL-SEASON GRASSES (cont.)				
Preemergence (cont.)				
isoxaben GALLERY 75DF	0.25-0.5 oz. of 75DF	0.5-1	Chickweed, clover, henbit, bittercress, spurge, plantains, and other broad- leaf weeds	Use on established warm- and cool-season grasses listed. For summer weed control, apply during early spring. For fall and winter control, apply during late summer to early fall. DO NOT apply to golf course putting greens. Apply 0.5 inch of water within 25 days after application. DO NOT reseed treated area within 60 days.
metolachlor PENNANT MAGNUM 7.62EC	1 fl.oz. of 7.62 lb./gal.	2.5	Yellow nutsedge, annual sedges, annual grasses	For established bermudagrass, centipedegrass, St. Augustinegrass, and zoysiagrass ONLY . Make application before yellow nutsedge emerges. If rainfall does not occur within 7 days, irrigate with 0.5 inch of water. DO NOT use on golf greens, tees, and aprons. DO NOT seed or overseed with desirable turfgrasses within 4 months before or 6 months after treatment.
oryzalin SURFLAN 4AS	1-1.5 fl.oz. of 4 lb./gal.	1.5-2	Crabgrass, goosegrass, annual bluegrass, barnyardgrass, foxtail	Apply to established warm-season turf in February or early March for crabgrass control. For goosegrass control, apply 4 to 6 weeks later at low rate, except in South Alabama. For annual bluegrass control, apply in late August or early September, using low rate. Some movement may occur if not "watered in." Read label for additional directions and application instructions. DO NOT use on putting greens or tees. Reseeding should be delayed for 120 days after treatment.
oxadiazon RONSTAR 2G RONSTAR 50WSP	2.25-4.5 lb. of 2G 1.5-2.2 oz. of 50WSP	2-4 2-3	Crabgrass, goosegrass, annual bluegrass	Ronstar G can be used on all warm- and cool-season grasses, except red fescue, centipedegrass, and bentgrass. DO NOT apply more than 3 pounds of the 2G formulation per 1000 square feet to St. Augustinegrass. Ronstar 50WSP can only be applied on <i>dormant established</i> bermudagrass, St. Augustinegrass, and zoysiagrass. Ronstar is not labeled for use on home lawns. Delay overseeding for 4 months after application. DO NOT apply more than 4 pounds of active ingredient per acre per application. See label for additional application instructions. DO NOT apply to wet turf. Do not apply to newly seeded areas.
pendimethalin PENDULUM 2G PENDULUM 3.3EC PENDULUM AQUACAP	1.7-3.4 lb. of 2G 1.8-2.6 fl.oz. of 3.3EC 1.12-2.3 fl.oz. of 3.8CS	1.5-3 1.5-3 1.5-3	Crabgrass, goosegrass, annual bluegrass, chickweed, henbit	Apply the high rate to all warm-season grasses and the low rate to all cool-season grasses. A late summer application at the low rate will control annual bluegrass and the other winter annuals. Apply prior to weed seed germination. DO NOT reseed, sprig, or sod with new grass or seed until 4 to 5 months after treatment.
prodiamine BARRICADE 65WDG BARRICADE 4FL STONEWALL 60WDG PROCLIPSE 65WDG	0.4 oz. of 65WDG 0.5 fl.oz. of 4FL 0.4 oz. of 65WDG 0.4 oz. of 65WDG	0.75 0.75 0.75 0.75	Crabgrass, annual bluegrass, chickweed, spurge, goosegrass	Provides preemergence control of annual grasses and certain broadleaf weeds in established turfgrasses. See label for maximum use rate per season. DO NOT make more than two applications per season. See overseeding restrictions on label (3-18 months).

Table 2. Herbicide Preemergence Recommendations (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED WARM-SEASON AND COOL-SEASON GRASSES (cont.)				
Preemergence (cont.)				
pronamide KERB SC T/O	1-2 T. of 3.3 lb./gal. (1.25-2.5 pt.)	0.5-1	Annual bluegrass, other cool-season grasses, and broadleaf weeds	For use on warm-season turfgrasses listed on label. Apply in October or November when annual bluegrass begins to germinate or is in the 1- to 2-leaf stage. CAUTION: Kerb moves with surface water. DO NOT use on golf putting greens or lawns and other turf areas to be overseeded. Excessive rate will cause injury. Irrigate after application. DO NOT overseed within 90 days of application. Kerb is a RESTRICTED USE pesticide.
sidiron TUPERSAN	See label.	See label.	Smooth crabgrass, large crabgrass; yellow, green and giant foxtail; downy brome and barnyard	Do not use on warm-season turfgrass species. Water is required to activate the herbicide following applications to the soil. Rainfall or irrigation must be greater than 0.5 inches within 3 days of application. Soils with high organic matter levels require higher dose rates than soils with low organic matter for equal performance. Review labels for at seeding application rates versus fall application rates as they vary.
simazine PRINCEP LIQUID SIMAZINE 90DF	0.75-1.5 fl.oz. of 4 lb./gal. 0.4-0.8 oz. of 90DF	1-2 1-2	Annual bluegrass, burclover, henbit, other annual grasses and broadleaf weeds	For use ONLY on warm-season turfgrasses listed on label. Apply after September 1 for control of winter weeds or during late winter but before germination for control of summer annual weeds. DO NOT apply after June 1. Use the low rate on newly sprigged turfgrass, on hybrid bermudagrass, or for the control of annual bluegrass. DO NOT make more than two applications per year. DO NOT use on alkaline soils or on golf greens. Read label carefully before using this product around trees and ornamentals. DO NOT overseed for 6 months after application.
sulfentrazone + prodiamine ECHELON 4SC	0.4-0.83 fl.oz. of 4 lb./gal.	0.56-1.12	Many annual grasses, some broadleaf weeds, annual sedges, yellow nutsedge	For use in established tall fescue, Kentucky bluegrass, centipede, bermudagrass, and zoysiagrass. High rate only for use on bermudagrass. DO NOT apply to newly laid sod. DO NOT add surfactant. DO NOT apply to putting greens. DO NOT exceed 36 oz./A per calendar year. Allow 7 days of separation between herbicide application and plant growth regulators to avoid discoloration.

SOD PRODUCTION ONLY

Preemergence				
simazine PRINCEP LIQUID SIMAZINE 90DF	0.75-1.5 fl.oz. of 4 lb./gal. 0.4-0.8 oz. of 90DF	1-2 1-2	Many annual grasses and broadleaf weeds	For use on centipedegrass and St. Augustinegrass. DO NOT apply to actively growing bermudagrass. Apply within 2 days after lifting sod or on new beds 7 to 10 days after sprigging or plugging. The soil should be well settled around sprigs and plugs before applying herbicide. Use low rate on sandy soils and/or on bermudagrass. Apply in fall for winter weed control and in spring for summer weed control. DO NOT apply within 30 days of harvesting sod. DO NOT apply to cool-season turfgrasses.

Table 2. Herbicide Preemergence Recommendations (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
Postemergence				
clethodim ENVOY PLUS	0.4-0.8 fl.oz. of 0.97 lb./gal.	0.125- 0.25	Common bermudagrass	For Sod Farms Only. Apply to centipedegrass in the spring at least 3 weeks after green-up to actively growing common bermudagrass. Two applications will be necessary for control. Make second application 3 to 4 weeks after first when there is 1 to 2 inches of bermudagrass regrowth. Use high rate on patches of well-established common bermudagrass. Avoid mowing sod for one week before or after application. Always add a non-ionic surfactant to spray mix at rate of 2 pints per 100 gallons. State Label. DO NOT apply if rain is expected within 1 hour of application.

POSTEMERGENCE

ESTABLISHED BERMUDAGRASS AND/OR ZOYSIAGRASS

Spray when weeds are actively growing, preferably when weeds are in the seedling stage. Postemergence herbicide applications should be made in 30 to 40 gallons of water per acre. Control may be greatly increased by using a non-ionic surfactant at 0.5 percent of spray solution (1 pint per 25 gallons).

Air temperature in the 80-degree range for MSMA and the 70-degree range for 2,4-D and dicamba is advisable. For sensitive grasses or for grasses growing under stress conditions (such as grasses growing in shady areas, on golf greens, or in drought situations), the lowest effective rate should be applied in split applications. Two applications should be made 10 to 14 days apart with each application using one-half of the lowest effective rate.

Table 3. Herbicide Postemergence Recommendations for Warm-Season Grasses

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED BERMUDAGRASS AND/OR ZOYSIAGRASS				
Postemergence				
2,4-D amine AMINE 4 WEEDAR 64 (Other trade names)	0.375-0.75 fl.oz. of 4 lb./gal. (1-2 pt./A)	0.5-1	Many broadleaf weeds, dandelion, dock, plantains, certain clovers	Apply when weeds are young and actively growing. Repeat applications may be necessary. Use low pressure—25 psi. Avoid spray drift to susceptible flowers and shrubs. Use lower rate on Tifgreen and Tifdwarf bermudagrass. DO NOT allow people (other than applicator) or pets to enter treatment areas until sprays have dried. DO NOT apply on newly seeded areas until grass is well established. Limited to 2 applications per year. Maximum of 3.16 pt. per acre per application. Maximum seasonal rate is 6.25 pt. per acre. Refer to label for instructions on adding a surfactant.
2,4-D amine AMINE 4 WEEDAR 64 (Other trade names)	1-1.5 fl.oz. of 4 lb./gal. (3-4 pt.)	1.5-2	Wild onion and garlic	Same as 2,4-D amine above. Apply in November or December and again in February or early March. Repeat applications on this cycle for 2 to 5 years. Use of ester formulations usually causes more problems when drift occurs. See label use rate.

Table 3. Herbicide Postemergence Recommendations for Warm-Season Grasses (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED BERMUDAGRASS AND/OR ZOYSIAGRASS (cont.)				
Postemergence (cont.)				
2,4-D + clopyralid + dicamba MILLENNIUM ULTRA 2	0.73-1.1 fl.oz. of 3.75 lb./gal. (2-3 pt./A)	0.75-1.12 + 0.09-0.14 + 0.09-0.14	Broad spectrum of broadleaf weeds	For use on common bermudagrass and zoysiagrass. When treating grass growing under stress conditions, use half rates. Slight turf yellowing will disappear after one week. To minimize turf injury, a second application should not be made for at least 4 weeks. DO NOT spray when air temperature exceeds 90°F. DO NOT reseed for 3 to 4 weeks after application. DO NOT use on residential lawn areas. DO NOT compost treated lawn clippings. Read label before use. Limit 2 applications per year.
2,4-D + dicamba + fluroxypyr ESCALADE 2	0.75-1.1 fl.oz. of 4 lb./gal. (2-3 pt./A)	0.8-1.2 + 0.1-0.15 + 0.1-0.15	Broad spectrum of broadleaf weeds	Apply to actively growing established bermudagrass and zoysiagrass. Use low rate on closely mowed turf or to turf under stress. Some turf yellowing can be expected. To minimize grass injury, retreatment should not occur until later than 4 weeks after initial treatment. Avoid broadcast application when air temperature exceeds 90 degrees. DO NOT apply more than twice a year. Maximum application rate of 3.75 pt./A and maximum rate of 7.5 pt./A year. See label for reduced rate and timings of use on sod farms.
2,4-D + mecoprop + 2,4-DP TRIAMINE	See label.	See label.	Broad spectrum of weeds	For use on zoysiagrass and common bermudagrass only. DO NOT spray when air temperatures exceed 85°F or when turfgrass is growing under stress conditions. Delay reseeding for 4 weeks after treatment. Avoid applications when turfgrass is emerging from winter dormancy. DO NOT make more than 2 applications a year with a minimum of 30 days between applications.
2,4-D + mecoprop + dicamba TRIMEC CLASSIC TRIPLET SF	Follow label directions on Trimec or equivalent.	0.8-1 lb. *See Special Instructions.	Broad spectrum of broadleaf weeds, including wild onion or garlic	*Special Instructions: DO NOT apply more than 0.8-1 pound of 2,4-D from any formulation. DO NOT apply when day temperature exceeds 85°F. DO NOT use within drip line of trees or shrubs. Observe precautions for each component part. Excellent herbicide for broad spectrum weed control. See label for instructions.
2,4-D + MCPP + dicamba + carfentrazone SPEEDZONE SOUTHERN	0.75-1.5 fl.oz. of 0.81 lb./gal. (2-4 pt./A)	0.13-0.26 + 0.05-0.1 + 0.012-0.025 + 0.01-0.02	Broadleaf weed control including dandelion, ragweed, wildclover, spurge, pigweed, lambsquarter, etc., goosegrass See label for more details.	Controls a number of broadleaf weeds, including spurge and ground ivy. Apply when day temperature is between 60 and 85°F. May be applied 4 weeks after sprigging or sodding turfgrass. Best applied to young and actively growing weeds. Do not apply to bentgrass greens, carpetgrass, dichondra, legumes, and lawns. Rainfast in 3 hours. Delay mowing 2 days before and after application. where desired clovers are present. DO NOT apply more than 2 broadcast treatments per season. Minimum of 30 days between applications.
2,4-D + MCPP + dicamba + sulfentrazone SURGE	1-1.2 fl.oz. of 2.18 lb./gal. (2.75-3.25 pt./A)	0.47-0.57 + 0.17-0.2 + 0.07-0.09 + 0.01-0.02	Broad spectrum of broadleaf weeds. See label for more details.	Apply to established turfgrass or to turfgrass that has been sprigged or sodded for at least 4 weeks. Sequential broadcast treatments can be made 2 to 6 weeks later depending on weed growth. Do not treat turfgrass during spring or fall transition. Fully dormant turfgrass can be treated for winter weeds. Rainfast in 6 hours. Delay mowing 2 days before and 2 days after application.

Table 3. Herbicide Postemergence Recommendations for Warm-Season Grasses (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED BERMUDAGRASS AND/OR ZOYSIAGRASS (cont.)				
Postemergence (cont.)				
2,4-D + dicamba + quinclorac QUINCEPT	2.6-2.9 fl.oz. of 1.875 lb./gal (7-8 pt./A).	1.6-1.8	Crabgrass, signalgrass	Apply to bermudagrass or zoysia to control a few seedling grasses and many broadleaf weeds. Use lower rate on these grasses. DO NOT apply when temperatures exceed 90°F or when turf is stressed. Temporary discoloration may be observed. DO NOT water or irrigate 24 hours after application. If rainfall does not occur in 2 to 7 days after application, irrigation of 0.5 inches is required.
amicarbazon XONERATE 70WDG	0.069-0.23 of 70WDG (3-10 oz./A)	0.13-0.44	Annual bluegrass, chickweed, henbit, spurge, speedwell	Apply to bermuda or zoysia grasses established a minimum of 6 months. When applying at rates of 3 to 5 ounces per acre, repeat application is recommended at a 14- to 21-day interval. DO NOT exceed the maximum total use rate of 10 ounces per acre per season. See label for possible tank-mix partners. Refer to label concerning the overseeding of cool-season grasses prior to use.
bentazon BASAGRAN T/O	0.75 fl.oz. of 4 lb./gal. (2 pt./A)	1	Yellow nutsedge, common purslane, ragweed, dayflower, wild mustard	Apply when yellow nutsedge is actively growing under good moisture conditions. Make additional applications at intervals of 10 to 14 days until nutsedge is eliminated. DO NOT make more than three applications in a single growing season. DO NOT apply more than 2 lb. active ingredient per acre per season. Avoid spraying adjacent trees, shrubs, and flowers. DO NOT mow 3 to 5 days before or after application. Purple nutsedge will not be controlled by this treatment. Add a crop oil concentrate to the spray mix at a rate of 2 pints per acre when making application to yellow nutsedge.
bromoxynil BUCTRIL 2EC	0.375-0.75 fl.oz. of 2 lb./gal. (1-2 pt./A)	0.25-0.5	Many seedling broadleaf weeds	For Non-Residential Turf and Sod Production Only. Apply to newly seeded, sprigged, or established bermudagrass and zoysiagrass to control seedling broadleaf weeds. Weeds must be small and actively growing. Good spray coverage is essential. Apply in 20 to 40 gallons of water per acre or in 2 to 4 gallons of water per 1000 square feet.
carfentrazone QUICKSILVER T&O	0.023-0.048 fl.oz. of 1.9 lb./gal. (1-2.1 oz./A)	0.015-0.03	Numerous seedling broadleaf weeds	To expand the weed spectrum, QuickSilver may be tank-mixed with 2,4-D, 2,4-DP, and/or dicamba. Add a non-ionic surfactant at the rate of 1 to 2 pints surfactant per 100 gallons of spray mix. DO NOT apply more than 6.7 oz. of product per acre per application. Minimum retreatment interval for sequential application is 2 weeks. See AIM herbicide label for use on sod farms. Rainfast in 1 hour.
carfentrazone + quinclorac SQUARE ONE 70WDG	0.28-0.41 of 70WDG (0.75-1.12 lb./A)	0.53-0.79	Wide spectrum of broadleaf weeds, some sedges and grasses	Use only on established bermudagrass and zoysiagrass not growing under stress. DO NOT water or irrigate for 24 hours after application. If rainfall does not occur in 7 days after application, irrigation of at least ½ inch is required. See label for surfactant and rate to use for sedge control.
chlorsulfuron CORSAIR 75 WDG	0.06-0.12 oz. of 75 WDG (0.16-0.32 lb./A)	0.13-0.25	Tall fescue, wild violet	Apply as a postemergence spot treatment to tall fescue plants in bermudagrass using a hand-held or boom sprayer. Spray ONLY to wet the tall fescue blades. Avoid overapplication. Repeat treatment may be needed in 60 days. DO NOT apply under desirable trees. Add a non-ionic surfactant to spray mix at rate of 1 quart per 100 gallons of spray mix.

Table 3. Herbicide Postemergence Recommendations for Warm-Season Grasses (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED BERMUDAGRASS AND/OR ZOYSIAGRASS (cont.)				
Postemergence (cont.)				
clopyralid LONTREL T&O	0.1-0.5 fl.oz. of 3 lb./gal. (0.25-1.33 pt./A)	0.09-0.5	Clovers, black medic, dandelions, vetch, other broadleaf weeds	See label for specific rate for target pest. Can cause injury to desirable legumes and composite species. DO NOT apply to residential lawn areas. DO NOT compost treated lawn clippings. DO NOT irrigate for at least 2 hours after application.
dicamba VANQUISH 4S	0.16-0.32 fl.oz. of 4 lb./gal. (0.5-1 pt./A)	0.25-0.5	Most broadleaf weeds, including wild onions	DO NOT use around shrubs or trees. Roots take up the chemical from the soil and some species are damaged. Good for use on golf tees, fairways, and roughs. DO NOT exceed a total of 1 pound a.i. per acre per year.
diclofop-methyl ILLOXAN 3EC	0.75-1 fl.oz. of 3 lb./gal. (1-1.4 qt./A)	0.75-1	Goosegrass	Use ONLY on bermudagrass on golf courses. A non-ionic surfactant can be added at the rate of 2 pints per 100 gallons of spray mix to improve control of goosegrass growing under adverse conditions. Use the low rate when treating goosegrass in the 1- to 3-leaf stage and the high rate when treating goosegrass in the 1-tiller stage. Make application using 20 to 40 gallons of water per acre at 30 to 60 psi using flat fan nozzle spray tips. Application should result in a uniform spray pattern with minimum overlap. Illoxan is most effective on closely mowed goosegrass (not less than 0.33 inch cutting height). DO NOT mow for 36 hours after application. DO NOT apply with any other pesticide or liquid fertilizer. DO NOT overseed treated area for 3 months after application. DO NOT apply more than 65 ounces of Illoxan per acre per year. Illoxan is a RESTRICTED USE pesticide.
diquat dibromide REWARD L&A	0.33-0.67 fl.oz. of 2 lb./gal. (1-2 pt./A)	0.25-0.5	Annual bluegrass, Carolina geranium, henbit, little barley	Apply To Dormant Bermudagrass Only. Apply to small, actively growing weeds in established turf. DO NOT apply during “green up” in spring. Add 1 to 2 pints of a non-ionic surfactant to every 100 gallons of spray mix.
ethofumesate PROGRASS 1.5 EC	2-2.2 fl.oz. of 1.5 lb./gal. (5.4-6 pt./A)	1-1.1	Annual bluegrass, common chickweed	Use ONLY on dormant bermudagrass overseeded with perennial ryegrass. Apply in fall after bermudagrass is dormant and 1 to 2 weeks after emergence of perennial ryegrass. One or two additional applications at 21- to 28-day intervals may be needed to maintain control during the winter. Provides postemergence and preemergence control of listed weeds. DO NOT apply after February 1. DO NOT use on golf greens. DO NOT apply more than 2 applications when treating nondormant bermudagrass.

Table 3. Herbicide Postemergence Recommendations for Warm-Season Grasses (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED BERMUDAGRASS AND/OR ZOYSIAGRASS (cont.)				
Postemergence (cont.)				
fenoxaprop ACCLAIM EXTRA	0.33-0.66 fl.oz. of 0.57 lb./gal. (14-28 oz./A)	0.06-0.125	Crabgrass, goosegrass, barnyardgrass, johnsongrass, and common bermudagrass	For Newly Plugged Or Established Zoysiagrass Only. Apply in late spring or early summer to actively growing weedy grasses in the 3-leaf (low rate) to 5-tiller (high rate) growth stage. Apply using 30 to 60 gallons of water per acre at 30 to 60 psi. Add a non-ionic surfactant (1 quart per 100 gallons) if using a spray pressure less than 30 psi or when spray volumes are larger than 60 gallons per acre. Make no more than three applications per season at spray intervals greater than 14 days. DO NOT apply more than 2.75 fl./oz./1,000 sq. ft. per year. Tank-mixing Acclaim with phenoxy or related herbicides will reduce grass control on larger (tillered) grasses. Acclaim will not control annual bluegrass. Avoid application when grass is under drought stress.
fluroxypyr SPOTLIGHT	0.25-0.5 fl. oz. of 1.5 lb./gal. (0.67-1.33 pt./A)	0.125-0.25	Bedstraw, chickweed, Virginia buttonweed, clover, woodsorrel, ground ivy	Apply postemergence to established bermudagrass and zoysiagrass to control a number of annual and perennial broadleaf weeds. Use the low rate on bermudagrass. Repeat treatment can be made 4 weeks after previous treatment. Rainfast in 1 hours. DO NOT apply more than 2.5 pints per acre per year. See label concerning need for addition of non-ionic surfactant.
fluzifop FUSILADE II T/O	0.07-0.11 fl.oz. of 2 lb./gal. (3-6 oz./A)	0.05-0.10	Common and hybrid bermudagrass	Apply to zoysia in late spring (around June 1) and repeat every 30 days. Higher rate can be used during hot summer applications, and lower rates can be used in fall before dormancy. Add 1 quart of non-ionic surfactant to every 100 gallons of spray mix. Higher use rates may cause temporary zoysia discoloration. For use on zoysia turf except commercial sod farms. For established turf, DO NOT reseed desirable grasses to treated areas for 14 days following the application. For bare ground areas that have been treated, wait 30 days to reseed. DO NOT apply if rainfall is expected within an hour of application.
foramsulfuron REVOLVER	0.2-0.6 fl.oz. of 0.19 lb./gal. (8.8-26.2 oz./A)	0.013-0.04	Annual bluegrass, ryegrass, fescue (tall), rough bluegrass (<i>Poa trivialis</i>), goosegrass	May be applied to established bermudagrass to (a) remove ryegrass and annual bluegrass during spring transition; (b) control annual bluegrass before overseeding bermudagrass with perennial ryegrass or <i>Poa trivialis</i> ; or (c) control annual bluegrass, tall fescue, ryegrass, and other cool-season grasses in non-overseeded bermudagrass. Apply during transition when bermudagrass has resumed active growth. Rate and temperature will influence speed of weed removal. Apply 14 days prior to overseeding to control annual bluegrass. See label for directions for use on bermudagrass greens, tees, and collars. Use high rate for goosegrass control and centipedegrass suppression. Rainfast in 2 hours. DO NOT exceed a maximum of 1.25 ounces of product per 1,000 sq. ft. per season.

Table 3. Herbicide Postemergence Recommendations for Warm-Season Grasses (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED BERMUDAGRASS AND/OR ZOYSIAGRASS (cont.)				
Postemergence (cont.)				
glufosinate FINALE 1.0	2.2-4.4 fl.oz. of 1 lb./gal. (3-6 qt./A)	0.75-1.5	Annual bluegrass, ryegrass, wild onion, woodsorrel	Dormant Established Bermudagrass. Controls numerous winter annual broadleaf weeds and annual bluegrass. Treat when weeds are small and actively growing. Do not apply to spring green up. Rainfast in 4 hours.
halosulfuron SEEDGEHAMMER 75DF	0.015-0.03 oz. of 75DF (0.67-1.33 oz./A)	0.031- 0.062	Yellow nutsedge, purple nutsedge See label for more broadleaf weed controlled or suppressed.	Apply to established bermudagrass and zoysiagrass. Apply after nutsedge has reached 3- to 8-leaf stage. Apply 2 quarts of non-ionic surfactant per 100 gallons of spray mix, but DO NOT exceed 2 pints of surfactant per acre. A second application can be made 6 to 10 weeks later when nutsedge has three to eight leaves. DO NOT make more than two applications or apply more than 0.125 pound a.i. per acre. DO NOT apply to golf course putting greens. Rainfast in 4 hours.
imazaquin IMAGE 70DG	0.2-0.26 oz. of 70DG (8.6-11.4 oz./A)	0.375-0.5	Wild garlic, wild onion, nutsedge, sandbur, henbit, chickweed	Apply to well-established, actively growing turf when weeds are small. Add non-ionic surfactant to the spray solution at the rate of 2 pints per 100 gallons. A repeat treatment may be needed in 6 to 8 weeks for season-long control. DO NOT apply when turfgrass is emerging from dormancy. Image will severely damage fescue and ryegrass. DO NOT graze or feed clippings.
MCPA + MCPP + 2,4-DP TRIAMINE II	See label.	See label.	Broad spectrum of broadleaf weeds	For zoysiagrass ONLY . Refer to label for use rate. DO NOT use when air temperature is above 90°F. Delay reseeding for 4 weeks after treatment. DO NOT make more than 2 applications a year with a minimum of 30 days between applications.
MCPA + MCPP + dicamba TRI-POWER	See label.	See label.	Broad spectrum of broadleaf weeds	Refer to label for use rate. DO NOT apply during green-up growth stage. DO NOT apply when air temperature exceeds 85°F. Delay reseeding for 3 to 4 weeks after treatment.
MCPA + MCPP + dicamba + carfentrazone POWER ZONE	0.75-1.5 fl.oz. of 2.91 lb./gal. (2-4 pt./A)	0.55-1.1 + 0.11-0.22 + 0.055-0.11 + 0.01-0.02	Broad spectrum of broadleaf weeds including pigweeds, ragweed, dandelion, spurge, lambquarters, etc.	Controls a number of broadleaf weeds including spurge and ground ivy. Apply when day temperatures are between 45 and 75°F. May be applied 4 weeks after sprigging or sodding turfgrass.

*NOTE: Effective December 31, 2009, the Environmental Protection Agency (EPA) announced the cancellation for sale for many of the labeled uses of MSMA (monosodium methanarsonate), which included residential turfgrass. Existing quantities of labeled MSMA products could be used in residential turf (as labeled) until supply was exhausted. No use of MSMA in residential turf was permitted after December 31, 2010. After this date, the few remaining uses were greatly modified and limited to golf courses and sod farms through December 31, 2013. On March 27, 2013 the EPA permitted the continued use of MSMA on golf courses and sod farms until the review of data is completed by the National Academy of Science in 2015. Final EPA action can be expected after this review. Golf courses will be allowed to make one broadcast application of MSMA on newly constructed courses. Existing courses will be limited to spot treatment (100 square feet per spot) but not to exceed 25 percent of the total course in one year. Sod farms will be permitted to make two broadcast applications if a 25-foot buffer strip is maintained adjacent to water bodies.

Table 3. Herbicide Postemergence Recommendations for Warm-Season Grasses (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED BERMUDAGRASS AND/OR ZOYSIAGRASS (cont.)				
Postemergence (cont.)				
MCPA + triclopyr + clopyralid (amine) BATTLESHIP	1.1-1.5 oz.	0.13-3	Many broadleaf species.	Do not treat warm-season turfgrass when mowing height is less than 0.5 inches. Herbicide may discolor or stunt turf that is not well established or stressed due to unfavorable climate conditions. Apply only to healthy, well-established turf. Maximum use rate is 3 pints per acre per season. When hard to control species are prevalent, when applications are made in late summer, when weeds are mature or during drought conditions, use higher application rates.
MCPA + triclopyr + dicamba COOL POWER	0.91-1.29 fl.oz. of 3.6 lb./gal. (2.5-3.5 pt./A)	0.94-1.31 + 0.09-0.13 + 0.09-0.13	Broad spectrum of broadleaf weeds	Read the label. When treating dormant turf, use higher rate. When treating actively growing turf, use low rate. Turf injury will occur if application is made when turf is under stress. DO NOT reseed sooner than 3 to 4 weeks after application. DO NOT spray when air temperature is above 85°F. Cool Power contains the ester formulations primarily for use during the cool winter months.
HORSEPOWER	0.73-1.1 fl.oz. of 4.4 lb./gal. (2-3 pt./A)	0.95-1.4 + 0.09-0.14 + 0.09-0.14		
MSMA* DREXEL MSMA PLUS Other labeled products	1 fl.oz. of 6 lb./gal. (2.7 pt.)	1.8	Crabgrass, dallisgrass, bahiagrass, goosegrass (seedling), nutsedge	Mow turfgrass to a height of 1 to 1.5 inches before application. Repeat applications at 7- to 10-day intervals are necessary. For dallisgrass and bahiagrass control, repeat applications on a 5-day interval (sod farms). Adequate soil moisture gives best results. DO NOT water for 24 hours after application. Use on new plantings after several mowings. Zoysiagrass cultivars vary in tolerance to MSMA. "Meyer" is more tolerant than "Emerald" or Matrella." DO NOT use on carpetgrass, centipede grass, or St. Augustine grass.
metribuzin SENCOR 75TURF	See label for rate to use.	0.25-0.5	Goosegrass	For use on established bermudagrass on golf course fairways, grounds, and lawns. Make application when turf is actively growing and not under stress conditions for postemergence control of goosegrass. Temporary discoloration of turf may result. See label for directions and rates for use on dormant bermudagrass. An application to dormant turf can provide postemergence control of henbit, common chickweed, and spurweed.
metsulfuron methyl MANOR 60WDG (other products)	0.005-0.02 oz. of 60 WDG (0.25-1 oz./A)	0.009-0.0375	Bahiagrass, clover, chickweed, dandelion, spurge, wild garlic	Apply as a postemergence treatment on established bermudagrass to control target weeds. Add a non-ionic surfactant to spray mix at the rate of 1 quart per 100 gallons of spray mix. Use the low to medium rate to control many broadleaf weeds, but use the higher rate to control bahiagrass. Wait 8 weeks after application to overseed. DO NOT apply to turf less than a year old. DO NOT apply in temperatures above 85 degrees.

Table 3. Herbicide Postemergence Recommendations for Warm-Season Grasses (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED BERMUDAGRASS AND/OR ZOYSIAGRASS (cont.)				
Postemergence (cont.)				
pinoxaden MANUSCRIPT	0.22 oz (2 applications) 0.44 oz (1 application)	0.063	Tropical signal grass, large crabgrass, smooth crabgrass, bahiagrass, daligrass, torpedograss	DO NOT apply more than 19.2 fl/oz per acre per year. Two applications can be made but must be made 14-21 days apart. MUST BE applied at a minimum water volume of 20 gallons per acre. Spray in early to mid-summer when weeds are actively growing and not under stress. Requires spray adjuvants. DO NOT apply on any other turfgrass than what is listed on the label or severe injury may occur.
quinclorac DRIVE 75DF	0.367 oz. of 75DF (1 lb./A)	0.75	Barnyardgrass, crabgrass, dandelion, foxtails, dollarweed, signalgrass, Torpedograss suppression	Apply at a minimum of 20 gallons per acre. DO NOT water or irrigate within 24 hours of application. DO NOT apply more than 1.5 pounds a.i. per acre per year. Must be applied with a methylated seed oil at a rate of 1.5 pints per acre to spray mix. DO NOT apply within root zone of ornamentals.
DRIVE XLR8	1.45 fl.oz. of 1.5 lb./gal. (4 pt./A)	0.75		
quinclorac + MCPP + dicamba ONETIME	1.45 fl.oz. of 2.45 lb./gal. (4 pt./A)	0.75 + 0.35 + 0.10	Crabgrass, signalgrass, dandelions, clover, others	Apply to bermudagrass or zoysia to control few grasses and many broadleaf weeds. DO NOT apply more than two times per year. DO NOT apply when temperature is above 90°F.
quinclorac + sulfentrazone + 2,4-D + dicamba Q4 PLUS	1.8-2.6 fl. oz. of 1.8 lb./gal.	1.12-1.8	Crabgrass, foxtail, signalgrass, nutsedge and other bradleaves	DO NOT apply to putting greens or collars. For use on established bermudagrass and zoysiagrass. Expect some temporary discoloration. Do not use on centipedegrass or St. Augustinegrass. For best results, do not apply if rain is expected within 24 hours. If rainfall does not occur in 2 to 7 days after application, irrigation of at least ½ inch is required.
rimsulfuron TRANXIT GTA	1.3 g of 25DF (2 oz./A)	0.031	Annual bluegrass, perennial ryegrass, rough bluegrass (<i>Poa trivialis</i>)	Use on established bermudagrass ONLY . DO NOT apply to residential lawns. To control annual bluegrass in non-overseeded bermudagrass, apply 2 ounces per acre in November/December and again in February/March. If annual bluegrass population is heavy and plants are large, a single application of 4 ounces per acre can be made. Add a non-ionic surfactant with each application at the rate of 1 quart per 100 gallons of spray mix. To control perennial ryegrass and rough bluegrass overseeded in bermudagrass, apply Tranxit at a rate of 2 ounces per acre in the spring three to four weeks before the desired date for overseed removal. Add a non-ionic surfactant to the spray mix at a rate of 1 quart per 100 gallons. Repeat treatment in 3 weeks, if needed. See label for use on putting greens. See label for use on zoysia.
sulfentrazone DISMISS 4SC	0.18-0.275 fl.oz. of 4 lb./gal. (0.5-0.75 pt./A)	0.25-0.375	Nutsedges, annual sedges, wide spectrum of broadleaf weeds	Apply to established turfgrass or sodded or seeded turfgrasses after the second mowing. DO NOT apply if turf is experiencing heat or drought stress. See label for maximum application amounts. DO NOT apply with surfactants. See label for instructions on sedge control. Spartan is labeled for use ONLY on sod farms.

Table 3. Herbicide Postemergence Recommendations for Warm-Season Grasses (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED BERMUDAGRASS AND/OR ZOYSIAGRASS (cont.)				
Postemergence (cont.)				
SPARTAN 4F	0.18-0.275 fl.oz. of 4 lb./gal. (0.5-0.75 pt./A)	0.25-0.375	Nutsedges, annual sedges, wide spectrum of broadleaf weeds	May be applied to established turf only. See label for rates. Reseeding, overseeding, or spigging may be done 2 to 4 weeks after application.
sulfentrazone + metsulfuron BLINDSIDE 66WDG	0.15-0.23 oz. of 66WDG (6.5-10 oz./A)	0.27-0.41	Wide spectrum of broadleaf weeds, some sedges and grasses	Use only on established bermudagrass and zoysiagrass not growing under stress. DO NOT water or irrigate for 24 hours after application. If rainfall does not occur in 7 days after application, irrigation of at least ½ inch is required. See label for surfactant and rate to use for sedge control.
sulfentrazone + quinclorac SOLITAIRE 75WDG	0.37-0.74 oz. of 75WDG (1-2 lb./A)	0.75-1.5	Wide spectrum of broadleaf weeds, some sedges and grasses	Use only on established bermudagrass and zoysiagrass not growing under stress. See label for surfactant and rate to use for sedge control.
sulfosulfuron CERTAINTY	0.017-0.029 oz. of 75DF (0.75-1.25 oz./A)	0.035-0.059	Yellow nutsedge, purple nutsedge, annual sedges, tall fescue	Apply postemergence to established bermudagrass and zoysiagrass to control listed weeds and other broadleaf weeds. A second application can be made 4 to 10 weeks after the initial treatment if needed. Add a non-ionic surfactant to spray mix at rate of 1 quart per 100 gallons of spray mix. Some turf yellowing can be expected. Certainty can be applied to dormant or actively growing bermudagrass (not overseeded) to control annual bluegrass. Use higher rate if annual bluegrass is heavy or dense. See label for fall application or for bermudagrass application prior to overseeding.
triclopyr + clopyralid CONFRONT	0.37-0.75 fl.oz. of 3 lb./gal. (1-2 pt./A)	0.375-0.75	Broad spectrum of broadleaf weeds	Apply to established bermudagrass and zoysiagrass mowed to a height taller than 0.5 inch. DO NOT apply in areas of shallow-rooted trees and shrubs. DO NOT apply more than 1.5 pounds a.i. (4 pints) per acre per year. Repeat treatments to control wild violets and woodsorrel. Some discoloration may be seen on hybrid bermudagrass. DO NOT reseed for 3 weeks after application. DO NOT apply to residential lawn areas. DO NOT compost treated lawn clippings.
thiencarbazone + dicamba + iodoflurofen CELSIUS WG	0.57-0.113 oz. of 68% WDG [2.5-4.9 oz./A]	0.106-0.208	Crabgrass, Virginia buttonweed, dallisgrass, many other broadleaf and grassy weeds	For use on warm-season turf, except seashore paspalum and bahiagrass. Celsius controls weedy bahiagrass. Use lower rates on centipedegrass and St. Augustinegrass. DO NOT apply more than 0.17 oz. per 100 square feet per year. See label for specific rates needed to control specific weeds. DO NOT apply to putting greens or collars.

Table 3. Herbicide Postemergence Recommendations for Warm-Season Grasses (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED BERMUDAGRASS AND/OR ZOYSIAGRASS (cont.)				
Postemergence (cont.)				
thiencarbazon + foramsulfuron + halosulfuron TRIBUTE TOTAL	0.023-0.073 oz. of 60.5% WDG [1-3.2 oz./A]	0.038-0.121	Many problem weeds and grasses, including dallisgrass, sedges, goosegrass, crabgrass, Virginia buttonweed, doveweed	For the specific weeds listed, the use rate is 3.2 ounces per acre with repeat treatment needed at scheduled intervals. DO NOT exceed a total of 6.4 ounces of Tribute Total per acre per season. Apply with the addition of a non-ionic surfactant or methylated seed oil (MSO) and ammonium sulfate (AMS) to the spray mix. See label for weeds controlled, the use rate and specific additives needed, and timing of application. DO NOT apply when turfgrass is stressed by drought or high temperatures.
trifloxysulfuron-sodium MONUMENT 75WG	0.007-0.013 oz. of 75WG (0.35-0.53 oz./A)	0.015-0.026	Annual bluegrass, ryegrass, nutsedge, tall fescue, signalgrass, spurge, green kyllinga, clover	May be used in established bermudagrass and zoysiagrass. DO NOT apply to residential lawns. Add a non-ionic surfactant at the rate of 1 to 2 quarts per 100 gallons of spray mix. Control may not occur for up to 4 weeks after treatment. Repeat treatment may be necessary on difficult weeds in 4 to 6 weeks. At reduced rates (see label), Monument may be used to remove overseeded perennial ryegrass and <i>Poa trivialis</i> from bermudagrass during spring transition.
bispyribac-sodium VELOCITY SG	0.14 oz. of 17.6 SG (6 oz./A)	0.066	Annual bluegrass, dandelion, clover, yellow nutsedge, chickweed	Apply to established bermudagrass overseeded with perennial ryegrass on golf course fairways. Apply between February 1 and March 15 to bermudagrass overseeded the previous fall with perennial ryegrass for annual bluegrass control and seedhead suppression. Earlier or later application may decrease efficacy or increase risk of ryegrass injury. The first application should be made just as soon as annual bluegrass seedheads begin to emerge. Make a second application at the same rate 14 to 21 days after the first application. DO NOT apply if air temperature is less than 50°F or if maximum temperature is expected to be less than 50°F for the first 3 days after treatment. Not recommended for applications above 80°F or when air temperature is expected to exceed 80°F for the first 3 days after treatment. DO NOT apply to golf course greens, non-overseeded bermudagrass, or to ryegrass mowed less than 0.38 inch.

ESTABLISHED CENTIPEDEGRASS AND/OR ST. AUGUSTINEGRASS

Spray when weeds are actively growing, preferably when they are in seedling stage. Postemergence herbicides should be applied in 30 to 40 gallons of water per acre. A non-ionic surfactant at 0.5 percent of the spray solution (1 pint per 25 gallons) greatly increases control. Air temperatures in the 70-degree range are advisable. Application during dormancy will minimize turf damage. For the sensitive grasses or for grasses growing under stress conditions (such as those growing in shade or in drought situations), use the lowest effective rate in split applications. Make two applications 10 to 14 days apart with each application using one-half of the lowest effective rate.

Table 3. Herbicide Postemergence Recommendations for Warm-Season Grasses (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED CENTIPEDEGRASS AND/OR ST. AUGUSTINEGRASS				
Postemergence				
2,4-D + mecoprop + 2,4-DP TRIAMINE	See label.	See label.	Broad spectrum of weeds	DO NOT spray centipedegrass when air temperature exceeds 90°F and DO NOT spray St Augustinegrass when air temperature exceeds 80°F. Turfgrass should not be sprayed when growing under stress or drought conditions. Delay reseeding for 4 weeks after treatment. Avoid application when turfgrass is emerging from winter dormancy. DO NOT make more than 2 applications a year with a minimum of 30 days between applications.
2,4-D + mecoprop + dicamba TRIMEC BROADLEAF HERBICIDE BENTGRASS FORMULA	2-3 T. of 0.5 + 1.5 + 0.2 lb./gal. (3-4 pt./A)	0.17 + 0.55 + 0.07	Broad spectrum of broadleaf weeds	DO NOT overdose or apply during hot summer months. Repeat after 3 weeks if necessary. Spraying while grass is dormant reduces possibility of injury. Temperature should be above 70°F, but below 85°F. Read label for more instructions.
2,4-D + MCPA + dicamba + carfentrazone SPEEDZONE SOUTHERN	See label.	See label.	Chickweed, clover, dollarweed, henbit, ground ivy, oxalis, spurge, red sorrel	Apply only to centipedegrass and common St. Augustinegrass. Controls a number of broadleaf weeds. May be applied as a single broadcast treatment or as sequential treatments with a 2- to 6-week time interval. DO NOT apply when day temperatures are below 50°F or above 85°F. DO NOT apply when the temperature is 85 degrees or higher as this chemical will cause injury. May be applied to newly seeded areas after the second mowing or 4 weeks after sodding, sprigging, or plugging. DO NOT apply this product to Floratam, Bitterblue, or other improved varieties of St. Augustinegrass. Rainfast in 3 hours.
amicarbazon XONERATE 70WDG	0.069-0.23 of 70WDG (3-10 oz./A)	0.13-0.44	Annual bluegrass, chickweed, henbit, spurge, speedwell	Apply to centipede or St. Augustine grasses established a minimum of 6 months. DO NOT use Xonerate on St. Augustinegrass in the summer months when air temperature is greater than 90°F. When applying at rates of 3 to 5 ounces per acre, repeat application is recommended at a 14- to 21-day interval. DO NOT exceed the maximum total use rate of 10 ounces per acre per season. See label for possible tank-mix partners.
bentazon BASAGRAN T/O	1.5 T. of 4 lb./gal. (2 pt./A)	1	Yellow nutsedge, common purslane, ragweed, dayflower, wild mustard	Apply when yellow nutsedge is actively growing under good moisture conditions. Make additional applications at intervals of 10 to 14 days until nutsedge is eliminated. DO NOT make more than three applications in a single growing season. Avoid spraying adjacent trees, shrubs, and flowers. DO NOT mow 3 to 5 days before or after application. Purple nutsedge will not be controlled by this treatment. Add a crop oil concentrate to spray mix at a rate of 2 pints per acre when making application to yellow nutsedge.

Table 3. Herbicide Postemergence Recommendations for Warm-Season Grasses (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED CENTIPEDEGRASS AND/OR ST. AUGUSTINEGRASS (cont.)				
Postemergence (cont.)				
bromoxynil BUCTRIL 2E	0.375-0.75 fl.oz. of 2 lb./gal. (1-2 pt./A)	0.25-0.5	Many seedling broadleaf weeds	For Non-Residential Turf and Sod Production Only. Apply to established St. Augustinegrass to control seedling broadleaf weeds. Weeds must be actively growing, and good spray coverage is essential. Apply in 20 to 40 gallons of water per acre or in 0.5 to 1 gallon of water per 1000 square feet.
carfentrazone QUICKSILVER T&O	0.023-0.048 fl.oz. of 1.9 lb./gal. (1-2.1 oz./A)	0.015-0.03	Numerous seedling broadleaf weeds	To expand the weed spectrum, QuickSilver may be tank-mixed with 2,4-D, 2,4-DP, and/or dicamba. Add a non-ionic surfactant at the rate of 1 to 2 pints surfactant per 100 gallons of spray mix. DO NOT apply more than 6.7 fl oz per acre per application or more than 0.4 lb. ai. per acre per season.
carfentrazone + quinclorac SQUARE ONE 70WDG	0.28-0.41 of 70WDG (0.75-1.12 lb./A)	0.53-0.79	Wide spectrum of broadleaf weeds, some sedges and grasses	Use only on established centipede grass not growing under stress. See label for surfactant and rate to use for sedge control. Best weed control results if no rainfall or irrigation occurs 24 hours after application. If no rainfall in 7 days, apply 0.5 inches of irrigation. DO NOT exceed 2.27 lbs or product per year. DO NOT apply to golf courses.
clethodim ENVOY PLUS	0.4-0.8 fl.oz. of 0.97 lb./gal. (17-34 oz./A)	0.125- 0.25	Common bermudagrass, barnyardgrass, crabgrass, foxtail, goosegrass, etc.	Use only on centipede grass grown on sod farms. Add a non-ionic surfactant at rate of 1 quart per 100 gallons of spray mix. Two applications will be necessary for control. Make second application 3 to 4 weeks after the initial treatment when new growth (regrowth) is 1 to 2 inches tall. Use the high rate when treating established bermudagrass. Avoid mowing sod for one week before and after applications. DO NOT apply until 3 weeks after 100-percent green-up of centipede grass in spring. STATE LABEL.
clopyralid LONTREL T&O	0.1-0.5 fl.oz. of 3 lb./gal. (0.25-1.33 pt.)	0.09-0.5	Clovers, black medic, dandelions, vetch, other broadleaf weeds	See label for specific rates for target pests. Can cause injury to desirable legumes and composite species. DO NOT irrigate for at least 2 hours after application. DO NOT apply to residential lawn areas. DO NOT compost treated lawn clippings.
dicamba VANQUISH 4S	0.16-0.33 fl.oz. of 4 lb./gal. (0.5-1 pt.)	0.25-0.5	Many broadleaf weeds	Apply to established centipede grass only. DO NOT use within drip line of trees or shrubs. Follow label directions. Make only one application per year.
fluroxypyr SPOTLIGHT	0.25-0.5 fl. oz. of 1.5 lb./gal. (0.67-1.33 pt./A)	0.125-0.25	Bedstraw, chickweed, Virginia buttonweed, clover, woodsorrel, ground ivy	Apply postemergence to established centipede grass and St. Augustine grass to control a number of annual and perennial broadleaf weeds. Use low rate on St. Augustine grass if injury can be tolerated. Repeat treatment can be made 4 weeks after previous treatment. DO NOT apply more than 2.5 pints per acre per year. See label concerning need for addition of non-ionic surfactant.

Table 3. Herbicide Postemergence Recommendations for Warm-Season Grasses (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED CENTIPEDEGRASS AND/OR ST. AUGUSTINEGRASS (cont.)				
Postemergence (cont.)				
halosulfuron SEdgeHAMMER 75DF	0.015-0.03 oz. of 75DF (0.67-1.33 oz./A)	0.031-0.062	Yellow nutsedge, purple nutsedge See label for more broadleaf weed controlled or suppressed.	Apply to established centipedegrass and St. Augustinegrass. Apply after nutsedge has reached 3- to 8-leaf stage. Apply 2 quarts of non-ionic surfactant per 100 gallons of spray mix, but DO NOT exceed 2 pints of surfactant per acre. A second application can be made 6 to 10 weeks after the first one when nutsedge has three to eight leaves. DO NOT make more than two applications or apply more than 0.125 pound a.i. per acre per year. Rainfast in 4 hours.
imazaquin IMAGE 70DG	0.2-0.26 oz. of 70DG (8.6-11.4 oz./A)	0.375-0.5	Wild garlic, wild onion, nutsedge, sandbur, henbit, chickweed	Apply to well-established, actively growing turf when weeds are small. Add non-ionic surfactant to the spray solution at the rate of 2 pints per 100 gallons. A repeat treatment may be needed for season-long control. St. Augustinegrass should not be mowed until 48 hours after application. DO NOT use on St. Augustinegrass for winter weed control. DO NOT graze or feed clippings.
metsulfuron methyl MANOR 60WDG (other products)	0.005-0.02 oz. of 60WDG (0.25-1 oz./A)	0.009- 0.0375	Bahiagrass, clover, chickweed, dandelion, spurge, wild garlic	Apply as a postemergence treatment to control target weeds. DO NOT apply more than 0.01 ounce of Manor per 1000 square feet to centipedegrass. Some yellowing and stunting may be observed. Add a non-ionic surfactant to spray mix at the rate of 1 quart per 100 gallons of spray mix. Use the low to medium rate (0.01 ounce per 1000 square feet) to control most broadleaf weeds and bahiagrass. Repeat treatment may be necessary in 4 to 6 weeks. DO NOT apply on turf less than a year old. DO NOT apply in temperatures above 85 degrees.
pinoxaden MANUSCRIPT	0.22 oz. (2 applications) 0.44 oz. (1 application)	0.063	Tropical signal grass, large crabgrass, smooth crabgrass, bahiagrass, daligrass, torpedograss	ST AUGUSTINE GRASS SOD PRODUCTION ONLY. DO NOT apply more than 19.2 fl/oz per acre per year. Two applications can be made but must be made 14-21 days apart. MUST BE applied at a minimum water volume of 20 gallons per acre. Spray in early to mid-summer when weeds are actively growing and not under stress. Requires spray adjuvants. DO NOT apply on any other turfgrass than what is listed on the label or severe injury may occur. Must be sprayed with Adigor spray surfactant.
sethoxydim SEGMENT 1EC	0.55-0.77 fl.oz. of 1EC (1.5-2.25 pt./A)	0.18-0.28	Crabgrass, barnyardgrass, foxtail, goosegrass, and other annual or perennial grass weeds	Apply to seedling and established centipedegrass only, but no sooner than 3 weeks after spring green-up. Apply low rate to seedling centipede and high rate to established centipede. Make application before crabgrass is well established. DO NOT mow turf area for 7 days before or after application. DO NOT make more than two applications per season. DO NOT add additional additives.
sulfentrazone DISMISS 4SC	0.18-0.275 fl.oz. of 4 lb./gal. (0.5-0.75 pt./A)	0.25-0.375	Nutsedges, annual sedges, wide spectrum of broadleaf weeds	Apply to established centipede and St. Augustine grasses. St. Augustinegrass may exhibit temporary discoloration. See label for instructions on sedge control. DO NOT apply if turf is experiencing heat or drought stress. See label for maximum application amounts. DO NOT apply with surfactants

Table 3. Herbicide Postemergence Recommendations for Warm-Season Grasses (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED CENTIPEDEGRASS AND/OR ST. AUGUSTINEGRASS (cont.)				
Postemergence (cont.)				
sulfentrazone + metsulfuron BLINDSIDE 66WDG	0.15-0.23 oz. of 66WDG (6.5-10 oz./A)	0.27-0.41	Wide spectrum of broadleaf weeds, some sedges and grasses	Use only on established centipedegrass and St. Augustinegrass not growing under stress. See label for surfactant and rate to use for sedge control.
sulfentrazone + quinclorac SOLITAIRE 75WDG	0.37-0.74 oz. of 75WDG (1-2 lb./A)	0.75-1.5	Wide spectrum of broadleaf weeds, some sedges and grasses	Use only on established centipedegrass not growing under stress. See label for surfactant and rate to use for sedge control.
sulfosulfuron CERTAINTY	0.017-0.029 oz. of 75DF (0.75-1.25 oz./A)	0.035-0.059	Yellow nutsedge, purple nutsedge, annual sedges	Apply postemergence to established centipedegrass and St. Augustinegrass to control listed sedges and broadleaf weeds. A second application can be made 4 to 10 weeks after the initial treatment if needed. Add a non-ionic surfactant to spray mix at rate of 1 quart per 100 gallons of spray mix. Some turf yellowing or stunting can be expected. DO NOT exceed 2.66 ounces per acre per year.
triclopyr + clopyralid CONFRONT	0.37-0.75 fl.oz. of 3 lb./gal. (1-2 pt./A)	0.375-0.75	Broad spectrum of broadleaf weeds	Apply to established centipedegrass only. DO NOT apply in areas of shallow-rooted trees and shrubs. DO NOT apply more than 1.5 pounds a.i. per year. Repeat treatments to control wild violets and woodsorrel. DO NOT use on residential lawn areas. DO NOT compost treated lawn clippings. DO NOT apply when air temperatures exceed 85°F.
thiencarbazon + dicamba + iodosulfuron CELSIUS WG	0.057-0.113 oz. of 68%WDG [2.5-4.9 oz./A]	0.106-0.208	Crabgrass, Virginia buttonweed, dallisgrass, many other broadleaf and grassy weeds	For use on warm-season turf, except seashore paspalum and bahiagrass. Celsius controls weedy bahiagrass. Use lower rates on centipedegrass and St. Augustinegrass. DO NOT apply more than 0.17 oz. per 100 square feet per year. See label for specific rates needed to control specific weeds. DO NOT apply to putting greens or collars.

ESTABLISHED KENTUCKY BLUEGRASS, FESCUES, AND RYEGRASS**Table 4. Herbicide Postemergence Recommendations for Cool-Season Grasses**

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED KENTUCKY BLUEGRASS, FESCUES, AND RYEGRASS				
Postemergence				
2,4-D + clopyralid + dicamba MILLENNIUM ULTRA 2	0.73-1.1 fl.oz. of 3.75 lb./gal. (2-3 pt./A)	0.75-1.12 + 0.09-0.14 + 0.09-0.14	Broad spectrum of broadleaf weeds	Read the label. When treating grass growing under stress conditions, use half rates. Slight yellowing of turf will disappear after one week. To minimize turf injury, a second application should not be made for at least 4 weeks. DO NOT spray when air temperatures exceed 90°F. DO NOT reseed for 3 to 4 weeks after application. DO NOT apply to residential lawn areas. DO NOT compost treated lawn clippings. Limit to 2 applications a season.

Table 4. Herbicide Postemergence Recommendations for Cool-Season Grasses (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED KENTUCKY BLUEGRASS, FESCUES, AND RYEGRASS (cont.)				
Postemergence (cont.)				
2,4-D + dicamba + fluroxypyr ESCALADE 2	0.75-1.1 fl.oz. of 4.4 lb/gal. (2-3 pt./A)	0.8-1.2 + 0.1-0.15 + 0.2-0.3	Broad spectrum of broadleaf weeds	Apply to actively growing established fescue and Kentucky bluegrass. Use low rate on closely mowed turf or turf under stress. Some turf yellowing can be expected. To minimize grass injury, retreatment should not occur until later than 4 weeks after initial treatment. Avoid broadcast application when air temperature exceeds 90 degrees. DO NOT apply more than twice a year. Maximum application rate of 3.75 pt./A and maximum rate of 7.5 pt./A year. See label for reduced rate and timings of use on sod farms.
2,4-D + MCPP + dicamba TRIMEC CLASSIC (Other trade names)	Follow label directions on Trimec or equivalent.	*See Special Instructions.	Broad spectrum of broadleaf weeds including wild garlic and onion	*DO NOT apply more than 1 pound of 2,4-D per acre per application. DO NOT use within the dripline of trees or shrubs. Avoid spraying during long periods of dry or hot weather. Reseeding can occur 4 weeks after treatment. Make no more than two applications per year.
2,4-D + MCPP + dicamba + sulfentrazone SURGE	1.2-1.5 fl.oz. of 2.18 lb./gal. (3.25-4 pt./A)	0.57-0.7 + 0.2-0.25 + 0.09-0.11 + 0.02-0.03	Broad spectrum of broadleaf weeds	Apply to established cool season perennial turfgrasses. Sequential broadcast treatment can be made 2 to 6 weeks later depending on weed growth. Make only two applications per year. DO NOT apply if air temperature exceeds 90°F. Rainfast in 6 hours. Delay mowing 2 days before and 2 days after.
2,4-D + quinclorac + dicamba QUINCEPT	2.6-2.9 fl.oz. of 1.875 lb./gal. (7-8 pt./A)	0.875-1 + 0.66-0.75 + 0.11-0.125	Crabgrass, signalgrass, oxalis, clover, others	Apply to cool-season established turfgrass for control of seedling broadleaf weeds and suppression or control of few grasses. DO NOT apply when temperatures exceed 90°F or when turf is stressed. DO NOT water or irrigate 24 hours after application. If rainfall does not occur in 2 to 7 days after application, irrigation of 0.5 inches is required.
2,4-D + triclopyr (amine) TEFLON II AMINE CHASER 2 AMINE	1-1.3 oz.	1.07-2.78	Many broadleaf species.	Do not apply more than 2 broadcast applications per year per treatment site. Maximum seasonal rate is 3 lb. ae 2,4-D per acre, excluding spot treatments. Applications should be spaced at least 4 weeks apart. Do not apply to exposed roots of shallow-rooted trees or shrubs.
amicarbazone XONERATE 70WDG	0.046-0.092 oz. of 70WDG (2-4 oz./A)	0.09-0.18	Annual bluegrass, chickweed, henbit, spurge, speedwell	Apply when air temperature ranges from 50 to 85°F. Applications made in summer or fall when day temperature is greater than 85°F will result in unacceptable injury. Apply to fescue or perennial ryegrass established a minimum of 6 months. Kentucky bluegrass must be established at least 12 months prior to treatment. For annual bluegrass control in fescue or ryegrass, apply Xonerate twice at 2 to 4 ounces per acre at a 14- to 21-day interval. For annual bluegrass control in Kentucky bluegrass, apply Xonerate twice at 2 ounces per acre at a 14- to 21-day interval. See label for possible tank-mix partners for broader spectrum of weeds controlled.

Table 4. Herbicide Postemergence Recommendations for Cool-Season Grasses (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED KENTUCKY BLUEGRASS, FESCUES, AND RYEGRASS (cont.)				
Postemergence (cont.)				
bentazon BASAGRAN T/O	0.75 fl.oz. of 4 lb./gal. (2 pt./A)	1	Yellow nutsedge, common purslane, ragweed, dayflower, wild mustard	Apply when yellow nutsedge is actively growing under good moisture conditions. Make additional applications at intervals of 10 to 14 days until nutsedge is eliminated. DO NOT make more than three applications in a single growing season. Avoid spraying adjacent trees, shrubs, and flowers. DO NOT mow 3 to 5 days before or after application. Purple nutsedge will not be controlled by this treatment. Add a crop oil concentrate to the spray mix at a rate of 2 pints per acre when making application to yellow nutsedge.
carfentrazone QUICKSILVER T&O	0.023-0.048 fl.oz. of 1.9 lb./gal. (1-2.1 oz./A)	0.015-0.03	Numerous seedling broadleaf weeds	To expand the weed spectrum, QuickSilver may be tank-mixed with 2,4-D, 2,4-DP, and dicamba. Add a non-ionic surfactant at the rate of 1 to 2 pints surfactant per 100 gallons of spray mix. DO NOT apply more than 0.4 lb. ai per acre per season. Minimum retreatment interval is 2 weeks. Rainfast in 1 hour.
chlorsulfuron CORSAIR 75WDG	0.06-0.12 oz. of 75WDG	0.13-0.25	Tall fescue, wild onion, wild violet	Apply as a postemergence spot treatment to established Kentucky bluegrass or fine fescue turf. Spray ONLY to wet the tall fescue blades. Avoid over-application. Repeat treatment may be needed in 60 days. DO NOT apply under desirable trees. Add a non-ionic surfactant to spray mix at rate of 1 quart per 100 gallons of spray mix.
clopyralid LONTREL T&O	0.1-0.5 fl.oz. of 3 lb./gal. (0.25-1.33 pt.)	0.09-0.5	Black medic, clovers, dandelions, vetch, other broadleaf weeds	See label for specific rate for target pest. Can cause injury to desirable legumes and composite species. DO NOT irrigate for at least 2 hours after application. DO NOT apply to residential lawn areas. DO NOT compost treated lawn clippings.
ethofumesate PROGRASS 1.5E	2-4 fl.oz. of 1.5 lb./gal. (2.6-5.2 qt.)	1-2	Annual bluegrass, common chickweed	Use ONLY on established perennial ryegrass. Apply in early fall (September) about the time of annual bluegrass germination. One to two additional applications at 21- to 28-day intervals may be needed to maintain control. Provides postemergence and preemergence control of listed weeds. May be used during the establishment of perennial ryegrass. See label for additional instructions.
fenoxaprop ACCLAIM EXTRA	0.33-0.83 fl.oz. of 0.57 lb./gal. (13-39 fl.oz./A)	0.06-0.17	Crabgrass, goosegrass, barnyardgrass, johnsongrass, common bermudagrass	Apply Acclaim in late spring or early summer to actively growing weedy grasses in the 3-leaf (low rate) to 5-tiller (high rate) growth stage. Apply with 30 to 60 gallons of water per acre at 30 to 60 psi. Add a non-ionic surfactant (1 quart per 100 gallons) if application is made using a spray pressure less than 30 psi or when spray volumes are larger than 60 gallons per acre. Spray intervals should be greater than 14 days. DO NOT apply more than 120 ounces per acre per year. Tank-mixing Acclaim with phenoxy or related herbicides will reduce grass control on larger (tillered) grasses. Acclaim will not control annual bluegrass.

Table 4. Herbicide Postemergence Recommendations for Cool-Season Grasses (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED KENTUCKY BLUEGRASS, FESCUES, AND RYEGRASS (cont.)				
Postemergence (cont.)				
halosulfuron SEdgeHAMMER 75DF	0.015-0.03 oz. of 75DF (0.67-1.33 oz./A)	0.031-0.062	Yellow nutsedge, purple nutsedge See label for more broadleaf weed controlled or suppressed.	Apply to established tall fescue, Kentucky bluegrass, and perennial ryegrass. Apply after nutsedge has reached 3- to 8-leaf stage. Apply 2 quarts of non-toxic surfactant per 100 gallons of spray mix, but DO NOT exceed 2 pints of surfactant per acre. A second application can be made 6 to 10 weeks after the first one when nutsedge has three to eight leaves. DO NOT make more than two applications or apply more than 0.125 pound a.i. per acre.
MCPA + MCPP + dicamba TRI-POWER	See label.	See label.	Broad spectrum of broadleaf weeds	For tall fescue and Kentucky bluegrass. Refer to appropriate label for use rates. DO NOT use when air temperature is above 85°F. Delay reseeding for 3 to 4 weeks after treatment.
MCPA + triclopyr + dicamba COOL POWER HORSEPOWER	0.91-1.29 fl.oz. of 3.6 lb./gal. (2.5-3.5 pt./A) 0.73-1.10 fl.oz. of 4.4 lb./gal. (2-3 pt./A)	0.94-1.31 + 0.09-0.13 + 0.09-0.13 0.95-1.4 + 0.09-0.14 + 0.09-0.14	Broad spectrum of broadleaf weeds	Read the label. Turf injury will occur if application is made when turf is under stress. DO NOT reseed sooner than 3 to 4 weeks after application. DO NOT spray when air temperature is above 85°F. Cool Power contains the ester formulations primarily for use during the cool winter months.
mesotrione TENACITY	0.11-0.18 fl.oz. of 4 lb./gal. (5-8 fl.oz.)	0.16-0.25	Controls a few grasses and a number of broadleaf weeds. Aids with preemergence control of some weeds by other herbicides.	Apply to established cool-season turfgrasses. See label for application instructions for use during seeding. See label for reduced use rate for perennial ryegrass and fine fescues. Retreatment after 2 to 3 weeks may be required for adequate control. Apply with a non-ionic surfactant. If rainfall (0.15 inches) has not occurred within 10 days after a preemergence application, activate with 0.15 inches of irrigation. DO NOT apply more than 16 oz. per acre per year. DO NOT apply an organophosphate or carbamate insecticide within 7 days of a Tenacity application as turf injury may occur.
metsulfuron methyl MANOR 60WDG	0.005-0.01 oz. of 60WDG (0.25-0.5 oz./A)	0.009-0.018	Bahiagrass, clover, chickweed, dandelion, spurge, wild garlic	Apply as a postemergence treatment to control target weeds in fine fescues and Kentucky bluegrass. DO NOT apply to tall fescue or ryegrass turf. Some yellowing and stunting may be observed in fine fescues and Kentucky bluegrass. Add a non-ionic surfactant to spray mix at the rate of 1 quart per 100 gallons of spray mix. Repeat treatments may be necessary in 4 to 6 weeks. DO NOT apply on turf less than a year old. DO NOT apply in temperatures above 85 degrees.

Table 4. Herbicide Postemergence Recommendations for Cool-Season Grasses (cont.)

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
ESTABLISHED KENTUCKY BLUEGRASS, FESCUES, AND RYEGRASS (cont.)				
Postemergence (cont.)				
quinclorac DRIVE 75 DF	0.367 oz. of 75DF (1 lb./A)	0.75	Torpedograss suppression	Requires two applications each year. DO NOT apply more than 1.5 pound a.i. per acre in one year. Must be applied with a methylated seed oil at rate of 1.5 pints per acre to spray mix. DO NOT apply within root zone of ornamentals. DO NOT apply 2 days before or after mowing. DO NOT water or irrigate within 24 hours of application.
DRIVE XLR8	1.45 fl.oz. of 1.5 lb./gal. (4 pt./A)	0.75		
quinclorac + MCPP + dicamba ONETIME	1.45 fl.oz. of 2.45 lb./gal. (4 pt./A)	0.75 + 0.35 + 0.10	Crabgrass, signal-grass, dandelions, clover, others	Apply to tall fescue and Kentucky bluegrass to control few grasses and many broadleaf weeds. DO NOT apply more than two times per year. DO NOT apply when temperature is above 90°F. DO NOT irrigate or water within 24 hours of application.
quinclorac + sulfentrazone + 2,4-D + dicamba Q4 PLUS TURF HERBICIDE	2.6-3 fl.oz. of 1.54 lb./gal. (7-8 pt./A)	0.44-0.5 + 0.05-0.06 + 0.77-0.88 + 0.09-0.10	Broadleaf weeds, few grasses; suppression of yellow nutsedge	Apply to established cool season perennial grasses. Sequential treatment can be made 14 to 21 days after initial application. Make only two applications per year. DO NOT apply if air temperature exceeds 90°F. DO NOT apply to diseased or drought-stressed turfgrass.
sulfentrazone DISMISS 4SC	0.092-0.18 fl.oz. of 4 lb./gal. (0.25-0.5 pt./A)	0.125-0.25	Nutsedges, annual sedges, wide spectrum of broadleaf weeds	Apply to established tall fescue and Kentucky bluegrass turfgrasses. See label for instructions on nutsedge control. DO NOT apply if turf is experiencing heat or drought stress. See label for maximum application amounts. DO NOT apply with surfactants.
triclopyr TURFLON ESTER	0.375-0.75 oz.	0.25-0.5	Controls most broadleaves especially clover and oxalis. Suppresses bermudagrass.	DO NOT follow application with irrigation within 4 hours. To minimize injury, do not treat turf during heat or drought stress. Herbicide may be reapplied at 4-week intervals. Mow newly seeded turf 2 or 3 times before application. DO NOT reseed for 3 weeks after application.
triclopyr + clopyralid CONFRONT	0.37-0.75 fl.oz. of 3 lb./gal. (1-2 pt./A)	0.375-0.75	Broad spectrum of broadleaf weeds	Apply to tall fescue, Kentucky bluegrass, and perennial ryegrass. Repeat treatments will be necessary to control wild violets and woodsorrel. Mow newly seeded turf two to three times before treatment. DO NOT water for 24 hours after applying. DO NOT apply to exposed roots of shallow-rooted trees and shrubs. DO NOT reseed for 3 weeks after application. DO NOT apply to residential lawn areas. DO NOT compost treated lawn clippings. DO NOT apply when air temperature exceeds 85°F.

Table 5. Herbicide Postemergence Recommendations for Special Problems

Herbicide	Herbicide Rate		Weeds Controlled	Time of Application and Special Instructions
	Formulation per 1000 Square Feet	Lb. Active Ingredient per Acre		
glufosinate FINALE	2.2-4.4 fl.oz. of 1 lb./gal. (3-6 qt./A)	0.75-1.5	Most annual broadleaf weeds and grasses	Non-selective weed control around buildings, fencerows, parking lots, ditchbanks, and other public areas. Rainfast in 4 hours.
glyphosate ROUNDUP PRO ROUNDUP ORIGINAL Generics	2-3 fl.oz. of 4 lb./gal. (3-4 qt./A)	3-4 (isopropyl-amine salt)	Most annual and perennial broadleaf and grass weeds such as bermudagrass, bahiagrass, johnsongrass, honeysuckle, kudzu, nutsedge, etc.	Non-selective weed control around buildings, fencerows, airports, parking areas, schools, parks, golf courses, and other public areas. Avoid drift to non-target plants. DO NOT use galvanized (zinc-coated) spray equipment. Weeds MUST be actively growing. Best results are obtained in mid to late summer. Control is slow. No residual activity. Refer to label for need and rate of surfactant.
paraquat GRAMOXONE INTEON 2.0	0.75-1.5 fl.oz. of 2 lb./gal. (2-4 pt./A)	0.5-1	Most annual broadleaf and grass weeds; top-kill of perennials	Non-selective weed control around buildings, fencerows, power plants, and other similar noncrop areas. This is a RESTRICTED USE pesticide. Avoid contact with foliage of ornamentals or other desirable plants. Add a non-ionic surfactant to spray mix at rate of 1 quart per 100 gallons of spray mix.

Table 6. Estimated Control from Preemergence Herbicides ^{1,2}

WEEDS	HERBICIDES							
	atrazine	benefin	bensulide	benefin + oryzalin	benefin + trifluralin	dithiopyr	isoxaben	metolachlor
Annual bluegrass	G	G	G	G	G	E	N	F
Chickweed	E	N	F	F	G	—	E	—
Clovers	G	N	N	N	—	—	G	—
Crabgrass	F	G	E	E	G	E	N	G
Dandelion	—	N	N	N	N	—	G	N
Florida betony	E	N	N	N	N	N	—	N
Goosegrass	F	F	F	F	G	G	—	F
Ground ivy	G	N	N	N	N	N	—	N
Henbit	E	N	N	N	—	—	G	—
Lawn burweed	G	N	N	N	N	N	—	—
Lespedeza	G	N	N	N	N	N	—	—
Pennywort	E	N	N	N	N	N	G	N
Plantain	—	N	N	N	N	N	G	—
Prostrate spurge	—	N	N	N	N	—	F	N
Woodsorrel	G	N	N	N	N	N	G	—

¹ E = Excellent; G = Good; F = Fair; N = No control; — = Data not available.

² Adapted from information contained in Turf Weed Control Guidelines for Mississippi, Mississippi State University Extension Service and Mississippi Agricultural and Forestry Experiment Station, Mississippi State, MS 39762.

Table 6. Estimated Control from Preemergence Herbicides^{1,2} (cont.)

WEEDS	HERBICIDES						
	oryzalin	oxadiazon	oxadiazon + prodiamine	pendimethalin	prodiamine	pronamide	simazine
Annual bluegrass	E	G	G	E	E	E	E
Chickweed	G	F	F	G	—	F	E
Clovers	N	N	—	N	—	—	F
Crabgrass	E	G	E	E	E	N	F
Dandelion	N	N	N	N	N	N	F
Florida betony	N	N	N	N	N	N	—
Goosegrass	G	E	E	G	E	—	N
Ground ivy	N	N	N	N	N	N	G
Henbit	N	G	—	N	—	—	E
Lawn burweed	N	F	N	N	—	—	E
Lespedeza	N	—	N	N	N	—	F
Pennywort	N	N	N	N	N	N	N
Plantain	N	N	N	N	N	N	F
Prostrate spurge	N	G	F	F	—	—	G
Woodsorrel	F	G	F	F	F	—	G

¹ E = Excellent; G = Good; F = Fair; N = No control; — = Data not available.

² Adapted from information contained in Turf Weed Control Guidelines for Mississippi, Mississippi State University Extension Service and Mississippi Agricultural and Forestry Experiment Station, Mississippi State, MS 39762.

Table 7. Estimated Control from Postemergence Herbicides^{1,2}

WEEDS	HERBICIDES						
	2,4-D	2,4-D + dicamba	2,4-D + dicamba + fluroxypy	2,4-D + mecoprop	2,4-D + mecoprop + dicamba	amicarbazone	atrazine
Annual bluegrass	N	N	N	N	N	G	E
Bahiagrass	N	N	N	N	N	N	N
Chickweed	F	G	E	G	E	G	E
Clovers	N	E	E	G	E	F	G
Crabgrass	N	N	N	N	N	F	F
Dallisgrass	N	N	N	N	N	N	N
Dandelion	E	E	E	E	E	N	F
Florida betony	N	G	G	F	G	F	F
Goosegrass	N	N	N	N	N	N	N
Ground ivy	G	—	G	—	G	N	G
Henbit	F	G	E	G	E	G	E
Lawn burweed	F	G	G	F	G	F	E
Lespedeza	F	G	G	G	G	—	F
Nutsedge, purple	N	N	N	N	N	N	N
Nutsedge, yellow	N	N	N	N	N	N	N
Pennywort	F	G	F	G	G	N	F
Plantain	E	G	G	G	G	N	F
Prostrate spurge	N	G	G	F	G	—	G
Virginia buttonweed	N	G	F	F	G	N	N
Wild garlic	F	F	—	F	F	N	N
Woodsorrel	N	F	G	N	F	—	G

¹ E = Excellent; G = Good; F = Fair; N = No control; — = Data not available.

² Adapted from information contained in Turf Weed Control Guidelines for Mississippi, Mississippi State University Extension Service and Mississippi Agricultural and Forestry Experiment Station, Mississippi State, MS 39762.

Table 7. Estimated Control from Postemergence Herbicides ¹ (cont.)

WEEDS	HERBICIDES						
	bentazon	bispyribac	carfentrazone	clethodim	clopyralid	clopyralid + triclopyr	diclofop
Annual bluegrass	N	G	N	F	N	N	—
Bahiagrass	N	N	N	—	N	N	N
Chickweed	N	E	G	N	—	E	N
Clovers	N	E	G	N	E	E	N
Crabgrass	N	N	N	G	N	N	—
Dallisgrass	N	N	N	N	N	N	N
Dandelion	—	F	G	N	F	E	N
Florida betony	—	N	—	N	—	—	N
Goosegrass	N	N	N	F	N	N	E
Ground ivy	—	—	G	N	—	G	N
Henbit	—	E	G	N	—	E	N
Lawn burweed	—	G	—	N	—	—	N
Lespedeza	N	—	—	N	—	—	N
Nutsedge, purple	N	N	N	N	N	N	N
Nutsedge, yellow	E	—	N	N	N	N	N
Pennywort	—	N	—	N	—	—	N
Plantain	—	G	—	N	G	F	N
Prostrate spurge	—	—	E	N	N	E	N
Virginia buttonweed	N	N	N	N	—	F	N
Wild garlic	—	N	—	N	N	F	N
Woodsorrel	—	F	—	N	—	—	N

¹ E = Excellent; G = Good; F = Fair; N = No control; — = Data not available.**Table 7. Estimated Control from Postemergence Herbicides ¹ (cont.)**

WEEDS	HERBICIDES						
	dicamba	fenoxaprop	fluroxypyr	halosulfuron	imazaquin	mecoprop	mesotrione
Annual bluegrass	N	—	—	N	N	N	N
Bahiagrass	N	N	—	N	—	N	N
Chickweed	E	N	E	—	G	G	G
Clovers	E	N	E	—	—	E	G
Crabgrass	N	E	—	N	—	N	F-G
Dallisgrass	N	N	—	N	N	N	N
Dandelion	G	N	F	N	F	F	G
Florida betony	G	N	F	N	—	N	G
Goosegrass	N	G	—	N	N	N	F-G
Ground ivy	—	N	G	—	—	N	F
Henbit	E	N	F	N	F	F	G
Lawn burweed	G	N	—	—	—	N	G
Lespedeza	E	N	—	N	—	G	—
Nutsedge, purple	N	N	—	E	E	N	N
Nutsedge, yellow	N	N	—	E	E	N	G
Pennywort	G	N	—	N	—	N	G
Plantain	F	N	F	N	—	F	N
Prostrate spurge	F	N	—	N	—	N	—
Virginia buttonweed	F	N	G	N	—	N	N
Wild garlic	F	N	—	—	E	N	N
Woodsorrel	G	N	E	N	F	F	G

¹ E = Excellent; G = Good; F = Fair; N = No control; — = Data not available.

Table 7. Estimated Control from Postemergence Herbicides ¹ (cont.)

WEEDS	HERBICIDES						
	metribuzin	metsulfuron	MSMA	rimsulfuron	sethoxydim	sulfentrazone	sulfosulfuron
Annual bluegrass	G	N	N	E	F	N	G
Bahiagrass	—	E	F	—	F	N	N
Chickweed	G	G	N	—	N	G	G
Clovers	N	G	N	—	N	G	E
Crabgrass	N	N	E	—	G	—	N
Dallisgrass	N	N	E	—	N	N	N
Dandelion	N	G	N	—	N	G	—
Florida betony	N	G	N	—	N	N	—
Goosegrass	N	N	F	—	F	G	N
Ground ivy	G	G	N	E	N	F	—
Henbit	G	G	N	—	N	G	G
Lawn burweed	G	—	N	G	N	G	—
Lespedeza	N	G	N	—	N	G	F
Nutsedge, purple	N	N	F	—	N	F-G	G
Nutsedge, yellow	N	N	F	—	N	G	G
Pennywort	N	N	F	—	N	—	—
Plantain	N	G	N	—	N	F	—
Prostrate spurge	N	G	N	—	N	G	—
Virginia buttonweed	N	—	N	—	N	N	N
Wild garlic	N	N	N	—	N	G	N
Woodsorrel	N	G	N	—	N	G	—

¹ E = Excellent; G = Good; F = Fair; N = No control; — = Data not available.

Table 8. Tolerance of Established Turfgrasses to Herbicides ¹

ESTABLISHED TURF	HERBICIDES							
	atrazine (PRE)	bensulide (PRE)	dithiopyr (PRE)	isoxaben (PRE)	oxadiazon (PRE)	prodiamine (PRE)	simazine (PRE)	pronamide (PRE, POST)
WARM SEASON								
Bahiagrass	I-S	T	—	T	—	T	I-S	—
Bermudagrass	I-D	T	T	T	T	T	I-D	T
Centipedegrass	T	T	T	T	T	T	T	I
St. Augustinegrass	T	T	T	T	T	T	T	I
Zoysiagrass	I	T	T	T	—	T	I	I
COOL SEASON								
Kentucky Bluegrass	S	T	T	T	—	T	S	S
Red Fescue	S	T	—	T	—	T	S	S
Tall Fescue	S	T	T	T	—	T	S	S

continued

¹ Ratings are based on observations of research plots and field use of herbicides under average weather conditions for several year sby weed control workers in Alabama. Control may vary depending on factors such as time and method of application, weather conditions, size of weeds, etc.

KEY TO RATINGS AND ABBREVIATIONS

T = Tolerant.

I = Intermediately tolerant; use herbicide with care.

S = Sensitive; do not use this herbicide.

D = Dormant grasses tolerant to this herbicide; will kill growing plants.

— = Information not available.

PRE = Preemergence

NOTE: Some of the above combinations show a tolerance rating although such usage is not currently labeled.

Table 8. Tolerance of Established Turfgrasses to Herbicides ¹ (cont.)

ESTABLISHED TURF	HERBICIDES							
	2,4-D (POST)	2,4-D + dicamba + fluoxypyr (POST)	amicarb-azone (POST)	bentazon (POST)	bispyribac (POST)	carfentrazone (POST)	clethodim (POST)	clopyralid (POST)
WARM SEASON								
Bahiagrass	T	I-S	S	T	T	I	S	T
Bermudagrass	T	T	T	T	T	T	S	T
Centipedegrass	I	S	T	T	I	S	T	T
St. Augustinegrass	I	S	T	T	I	S	S	T
Zoysiagrass	T	T	T	T	T	S	S	T
COOL SEASON								
Kentucky Bluegrass	I	T	I	T	T	S	S	T
Red Fescue	I	I	T	T	T	S	S	T
Tall Fescue	T	T	T	T	T	S	S	T

continued

¹ Ratings are based on observations of research plots and field use of herbicides under average weather conditions for several years by weed control workers in Alabama. Control may vary depending on factors such as time and method of application, weather conditions, size of weeds, etc.

KEY TO RATINGS AND ABBREVIATIONS

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- = Information not available.
- PRE = Preemergence
- POST = Postemergence

NOTE: Some of the above combinations show a tolerance rating although such usage is not currently labeled.

Table 8. Tolerance of Established Turfgrasses to Herbicides ¹ (cont.)

ESTABLISHED TURF	HERBICIDES						
	dicamba (POST)	fluroxypyr (POST)	glyphosate (POST)	halosulfuron (POST)	imazaquin (POST)	mecoprop (POST)	metribuzin (POST)
WARM SEASON							
Bahiagrass	T	S	S	T	I	T	I
Bermudagrass	T	I	S	T	T	T	T
Centipedegrass	I	T	S	T	T	I	S
St. Augustinegrass	S	I	S	T	T	I	S
Zoysiagrass	T	T	S	T	T	T	S
COOL SEASON							
Kentucky Bluegrass	I	T	S	T	S	T	S
Red Fescue	I	I	S	T	S	T	S
Tall Fescue	T	T	S	T	S	T	S

continued

¹ Ratings are based on observations of research plots and field use of herbicides under average weather conditions for several years by weed control workers in Alabama. Control may vary depending on factors such as time and method of application, weather conditions, size of weeds, etc.

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NOTE: Some of the above combinations show a tolerance rating although such usage is not currently labeled.

Table 8. Tolerance of Established Turfgrasses to Herbicides ¹ (cont.)

ESTABLISHED TURF	HERBICIDES						
	mesotrione (POST)	metsulfuron (POST)	MSMA (POST)	rimsulfuron (POST)	sethoxydim (POST)	sulfentrazone (POST)	sulfosulfuran (POST)
WARM SEASON							
Bahiagrass	—	T	I-S	I	S	T	S
Bermudagrass	S	T	T	T	S	T	S
Centipedegrass	T	T	S	T	T	T	T
St. Augustinegrass	T	T	S	T	S	T	S
Zoysiagrass	S	T	T	T	S	T	S
COOL SEASON							
Kentucky Bluegrass	T	T	T	S	S	T	S
Red Fescue	T	T	I	S	S	T	S
Tall Fescue	T	T	T	S	S	T	S

¹ Ratings are based on observations of research plots and field use of herbicides under average weather conditions for several years by weed control workers in Alabama. Control may vary depending on factors such as time and method of application, weather conditions, size of weeds, etc.

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Commercial Turf and Lawns: Chemical Weed Control Recommendations prepared by Steve Li, Extension Specialist, Assistant Professor, Department of Crop, Soil and Environmental Sciences, Auburn University.

FOR MORE INFORMATION on pesticides, pesticide safety, or submitting samples for analysis, see the following publications in the IPM series:

IPM 1293, "Safety." Safety contact information; worker protection standards; the safe use, handling, and storage of pesticides

IPM 1294, "Submitting Samples." Procedures for submitting samples for diagnosis, analysis, and identification

IPM 1295, "General Pesticide Information." Federal and state restricted use pesticide lists; pesticides and water quality

IPM 1317, "Appendix." Pesticide guidelines for agronomic crops, including preharvest intervals; rain-free requirements; grazing restrictions; crop rotation guidelines; and the names, classifications, and toxicities of pesticides.



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Use pesticides **only** according to the directions on the label. Follow all directions, precautions, and restrictions that are listed. Do not use pesticides on plants that are not listed on the label

The pesticide rates in this publication are recommended **only** if they are registered with the Environmental Protection Agency or the Alabama Department of Agriculture and Industries. If a registration is changed or canceled, the rate listed here is no longer recommended. Before you apply **any** pesticide, check with your county Extension agent for the latest information.

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