

HERBICIDES FOR CRABGRASS AND GOOSEGRASS CONTROL IN TURF



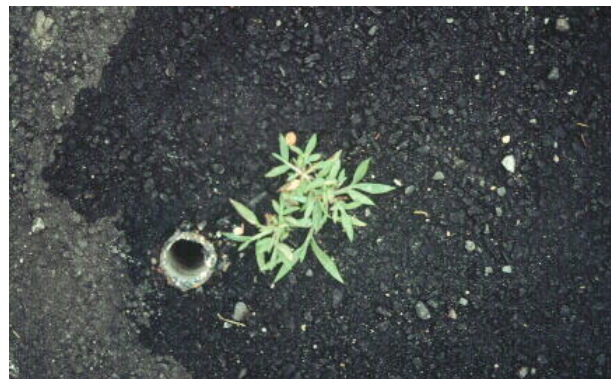
University of Maryland
Turfgrass Technical Update
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Dr. Peter H. Dernoeden, Turfgrass Specialist

University of Maryland Department of Plant Science & Landscape Architecture

Crabgrass (*Digitaria* spp.), goosegrass (*Eleusine indica*), and yellow foxtail (*Setaria glauca*) are among the most common and troublesome turf weeds in Maryland. These grasses germinate in the spring and summer, and are killed by frost in the autumn. As they mature, seedheads are produced which produce seeds that provide the next year's crop of seedlings.

Crabgrass and yellow foxtail seeds normally begin germinating after March 15 on the Eastern Shore and southern Maryland, after April 1 in the Baltimore-Washington D.C. corridor, and in late April or early May west of Hagerstown. Most crabgrass and yellow foxtail seeds germinate by early July, but some seedlings can emerge as late as September. Goosegrass generally begins to germinate after May 15 in central Maryland; large numbers often germinate throughout summer.



Crabgrass seeds germinate about the time that Forsythia bushes drop their blooms.

CULTURAL CONTROL

Growing a healthy, dense and vigorous turf is one of the best methods of excluding crabgrass, foxtail and goosegrass from turf. A vigorous, thick turf shades the soil surface and greatly reduces weed seed germination. In thin, weak turf, crabgrass is one of the first weeds to invade. Yellow foxtail is most commonly found in poorly nourished, droughty sites and where turf density is poor. Goosegrass is especially invasive in compacted soils and is most often found in athletic fields, golf courses, and adjacent to sidewalks. By far, crabgrass is the most common and invasive of these annual grassy weeds. Although it is not always easy to grow turf in Maryland, there are several management practices that, when followed, will help to reduce weed encroachment. The following five steps can lead to healthy, dense and vigorous turf that will resist weed invasion.

1. Plant high quality, certified seed of recommended cultivars. Do not use seed that is more than two years old. Avoid seeding perennial ryegrass in lawns. Refer to TT-77 for Maryland turfgrass cultivar recommendations.
2. Plant seed of cool-season grasses between late August and early October, and avoid spring or summer seedings. Zoysiagrass and bermudagrass are warm-season grasses, which are established in early summer.
3. Fertilize cool-season turfgrass in autumn with mostly slow release (>50%) nitrogen fertilizers. Bermudagrass and zoysiagrass are fertilized in the summer, but zoysiagrass requires much less nitrogen. Reduce soil acidity with lime as recommended by soil tests.
4. Mow lawns at the recommended height (2.5- 3.5 inches for Kentucky bluegrass and fescues). Zoysiagrass and Bermuda-grass can be mowed between 0.5 to 1.5 inches.
5. Irrigate when turf begins to wilt (i.e. turf develops a blue-gray color and "footprinting" occurs). Water deeply by wetting the soil to a 4 - 6 inch depth. Frequent, light watering greatly encourages weed seed germination and diseases, discourages deeper rooting, and lowers the environmental stress tolerance of turfgrasses.

KEY POINTS

Maintaining healthy turf through sound cultural practices is the best way to protect lawns from weed encroachment.

Crabgrass and goosegrass are most efficiently controlled with preemergence herbicides.

Read herbicide labels before application and handle these products carefully.

Crabgrass, yellow foxtail and goosegrass can be controlled with herbicides. There are two types of herbicide

applications. The first type, preemergence, prevents crabgrass, goosegrass, foxtail and many other seeds from emerging. The second type, postemergence, removes emerged and actively growing plants.

PREEMERGENCE HERBICIDES

Preemergence herbicides are generally more effective and easier to apply than postemergence herbicides, but most must be applied in the spring before annual grass weed seed germinate. Preemergence herbicides do not kill seeds in the soil. Germinating weed seeds absorb the herbicide, which prevents root and shoot development. Preemergence herbicides should first be applied in Maryland between mid-March and early April to be effective. Most preemergence herbicides should be applied twice on a 6 to 8 week interval for consistent, season-long control. The rates (in pounds of active ingredient to be applied per acre, or lb ai/A) of those herbicides that perform better when applied twice are given a designation such as 1.5 + 1.5 lb ai/acre. This means that the first application should be applied at 1.5 lb ai/acre in early April and the second (6 to 8 weeks later) at 1.5 lb ai/acre in mid-to-late May.

Except as otherwise noted, most of these herbicides provide good to excellent season-long annual grass weed control when used properly. Precautions that will help assure good control are as follows: Use the rate recommended on the label; no more, no less. Avoid skips and overdoses. Insure good, uniform coverage by applying half the recommended rate in two directions (at right angle to each other). Apply at least 1 to 2 weeks before weeds germinate, which is generally late March or early April for most regions in Maryland. Late April would be acceptable in Washington, Allegany and Garrett counties. To improve consistency and level of control, apply preemergence herbicides at the rates noted below in a split application 6 to 8 weeks apart. Water-in immediately and thoroughly after a preemergence herbicide is applied. Do not disturb the soil surface (by aerifying, spiking, or verticutting) after a preemergence herbicide has been applied until late summer or autumn.

None of the herbicides discussed below are 100% ai (active ingredient), except for corn gluten meal (Dynaweed). For instance, the herbicide Pre-M 60DG is actually only 60% pendimethalin in a dispersible granular (DG) formulation, the active ingredient in Pre-M 60DG. Herbicide labels usually include the ai rate as well as the product use rate, and many granular products also include spreader settings. Although you may never need to calculate product use rates from ai rates, it's easy. Just divide the pounds ai you want to apply by the percent ai in the product. In the case of Pre-M 60DG, you simply divide the 1.5 lbs. ai/A rate of pendimethalin by 0.60 (the mathematical equivalent of 60%) and you get 2.5 lbs/acre of product (Pre-M 60DG).

The descriptions of commercially available preemergence herbicides for annual grass control in turfgrass are noted below. Note that there are many granular herbicide-fertilizer combination products, and many products can either be sprayed (e.g., CS, DG, EC, EW, SC, WP formulations) or may be applied in a dry granular (G) form with a spreader. Note: The actual chemical name of each herbicide that must appear on the container is listed below. Take this publication with you when you shop and compare herbicide names to be sure you are buying the product you desire.

Benfin + Trifluralin Trade Name: Team-Pro 0.86G or in combination with fertilizers

Chemical Name: Benfin = N-butyl-M-ethyl-a, a-trifluoro-2,6-dinitro-p-toluidine + trifluralin = a,a,a-trifluoro-2,6-dinitro-N-N-dipropyl-P-toluidine. Team-Pro is safe to use on most cool-season grasses (such as Kentucky bluegrass, perennial ryegrass, and the fescues), but it should not be applied to bentgrass turf. Team-Pro has been reported to injure Kentucky bluegrass in some regions of the U.S. Team-Pro also may be safely applied to mature bermudagrass and zoysiagrass. Use Team-Pro on established turfs only, and do not apply to seedling turfgrasses. Reseeding should be delayed at least 6 weeks after application. Two applications of Team-Pro (1.5 + 1.5 lb ai/acre), 6 to 8 weeks apart, are recommended for season-long control of crabgrass, foxtail and goosegrass in Maryland.

Bensulide Trade Name: Bensumec or PreSan 4EC, and granular fertilizer combinations

Chemical Name: S-(0,0-diisopropyl phosphorodithioate) ester of N-(2-mercaptoethyl) benzenesulfonamide. Bensulide is safe to use on established creeping bentgrass, Kentucky bluegrass, fescues, perennial ryegrass, bermudagrass or zoysiagrass. Bensulide should not be used on newly seeded turf or on newly sprigged bermudagrass and zoysiagrass. Reseeding should be delayed at least 4 months after application of bensulide. One application per season (12-15 lb ai/A) provides erratic levels of crabgrass and foxtail control, and therefore it should be applied in a split application (7.5 + 7.5 lb ai/A, 6 to 8 weeks apart) for best results in Maryland. Bensulide generally provides poor goosegrass control.

Dithiopyr Trade Name: Dimension 2EW and 40WSP, and granular formulations with or without fertilizers

Chemical Name: 3,5-pyridinedicarbothioic acid, 2-(difluoromethyl)-4-(2-methylpropyl)-6-trifluoromethyl)-S,S-dimethyl ester

Dithiopyr is safe to apply to most turfgrasses including creeping bentgrass fairways mowed above 0.5 inches (spring, preemergence use only), Kentucky bluegrass, tall fescue, Chewings fescue, creeping red fescue, hard fescue, sheep fescue, perennial ryegrass, bermudagrass and zoysiagrass. Granular forms of dithiopyr effectively control crabgrass, goosegrass and foxtails preemergence with a single spring application of 0.38 lb ai/A. The sprayable dithiopyr formulation (40WSP) is best applied twice per season (0.25 + 0.25 lb ai/A), 6 to 8 weeks apart for consistently good crabgrass, foxtail and goosegrass control in Maryland. Dithiopyr also provides effective postemergence control of young crabgrass plants (see below for more information). Reseeding should be delayed for 3 months following use of dithiopyr.

Oxadiazon **Trade Name: Chipco Ronstar 2G and 50WP**

Chemical Name: 2-tert-butyl-4(2,4-dichloro-5-isopropoxyphenyl)-1²-1,3,4-oxadiazolin-5-one Oxadiazon 2G is safe to use on established Kentucky bluegrass, tall fescue, perennial ryegrass, bermudagrass and zoysiagrass. The wettable powder formulation (50WP) only may be used safely on bermudagrass and zoysiagrass. Oxadiazon should not be used on newly seeded turf or mature creeping red, Chewings, hard or sheep fescues. It can, however, be used safely over newly sprigged bermudagrass or zoysiagrass. Reseeding should be delayed at least 4 months after application of oxadiazon. Oxadiazon (3-4 lb ai/A) is one of the most effective preemergence herbicides available for control of goosegrass in turf, but it is erratic in controlling crabgrass. When targeting both goosegrass and crabgrass it is best to apply oxadiazon in a split (2.0 + 2.0 lb ai/A applied 6 to 8 weeks apart) application.

Pendimethalin **Trade Name: Pre-M 60DG; Pendulum 3.3EC or 3.8CS, and granular fertilizer combinations**

Chemical Name: N-(1-ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamine Pendimethalin is safe to use on established stands of Kentucky bluegrass, perennial ryegrass, tall fescue, fine-leaf fescue (i.e., creeping red, Chewings, hard, sheep), bermudagrass and zoysiagrass. Do not use on bentgrass mowed below 0.50 inches or where annual bluegrass is the desired species. On new seedings, wait until grass has been mowed at least 4 times and has filled-in. Reseeding should be delayed 16 weeks after application. Pendimethalin will provide some preemergence control of oxalis, spurge and other broadleaf weeds. Two applications of pendimethalin (1.5 + 1.5 lb ai/A), 6 to 8 weeks apart, are recommended for season-long control of crabgrass, foxtail and goosegrass in Maryland. For use on bentgrass fairways, however, the rate of pendimethalin should not exceed 2.0 lb ai/A.

Prodiamine **Trade Name: Barricade 65DG or 4L, and granular fertilizer combinations**

Chemical Name: N³,N³-di-n-propyl-2,4-dinitro-6-(trifluoromethyl)-M-phenylenediamine Prodiamine is safe to use on Kentucky bluegrass, perennial ryegrass, tall fescue, bermudagrass and zoysiagrass. Use on mature turf only and do not apply where annual bluegrass is considered desirable. Do not apply prodiamine to bentgrass mowed below 0.50 inches, and do not exceed 0.50 lb ai/A for bentgrass fairways. Prodiamine effectively controls crabgrass, goosegrass and foxtails with a split (0.50 + 0.25 lb ai/A) application 6 to 8 weeks apart using the 65WDG formulation. A single application of 0.65 lb ai/A is effective where crabgrass pressure is low to moderate. In general, higher rates (i.e., 0.75 lb ai/A) of prodiamine are suggested when using granular formulations. Finer grades of granular formulations are more effective than course grades. Reseeding should be delayed 16 weeks after application.

Siduron **Trade Name: Tupersan 50WP, and granular fertilizer combinations**

Chemical Name: 1-(2-methylcyclohexyl)-3-phenylurea Siduron is known to only effectively control crabgrass preemergence and early postemergence. Its activity on foxtails and goosegrass is unknown, but it is not likely to control goosegrass. Siduron is safe to use on established and newly seeded Kentucky bluegrass, tall and fine-leaf fescues, perennial ryegrass, bentgrass and some cultivars of zoysiagrass. Siduron should not be used on bermudagrass or on golf course putting greens. Following label recommendations, siduron can be safely used at the time of or immediately following seeding of tolerant grasses. Two or more applications of siduron, 3 to 5 weeks apart, are necessary if satisfactory crabgrass control is to be achieved in seedling turf. There is no apparent benefit from applying siduron after 15 July. See the label for proper use rates on seedling turf. Siduron, however, requires multiple applications at higher rates to provide effective season-long crabgrass control in Maryland.

Corn Gluten Meal **Trade Name: Dynaweed, only available in granular form**

Chemical Name: Protein fraction in corn meal. Corn gluten is a natural herbicide that contains 10% nitrogen. The nitrogen component may over stimulate turf growth. Apply 15 lb of product/1000ft² in early April and again in late May, for a total of 30 lb product/1000ft². Provides fair crabgrass control when weed pressure is low to moderately severe and may reduce the population of some broadleaf weeds. Corn gluten is ineffective in controlling crabgrass where weed pressure is severe.

POSTEMERGENCE HERBICIDES

Postemergence herbicides are used to control weeds after they germinate and emerge from the soil. Crabgrass, yellow foxtail and goosegrass are easiest to control with postemergence herbicides when plants are small, and in the 2- to 4-leaf stage of growth. This normally occurs between mid-June and early July in most areas of Maryland. The most common postemergence herbicides used for annual grass control in turf are the organic arsenicals, dithiopyr (early postemergence only), fenoxaprop-ethyl, mesotrione, and quinclorac. Only fenoxaprop-ethyl effectively controls goosegrass. Available postemergence annual grass weed herbicides are listed and discussed below.

Organic Arsenicals **Trade Names: MSMA, Methar 30, Weedone Crabgrass Killer, Ortho Crabgrass and Dandelion Killer, Super Methar, Daconate 6, DSMA and others.**

There are two compounds: DSMA = Disodium methanearsonate MSMA = Monosodium methanearsonate
These postemergence herbicides are most effective when applied to young crabgrass or foxtail plants. The organic arsenicals are not generally effective in controlling goosegrass, but they are the only herbicides that effectively control dallisgrass (a warm-season, perennial grass weed). Generally, two and sometimes three treatments are needed, and they should be made on 7 to 10 day intervals. Soil should be moist before treatments are made. Desirable turfgrasses may be temporarily discolored after treatment, especially if they are under stress from heat or drought. Applying these herbicides in 100 or more gallons of water per acre, however, greatly reduces potential turf injury problems. Follow directions on the container for rates to apply. Do not irrigate for 24 hours after they are applied and do not apply if rain is forecast within 24 hours of the day you intend to apply the herbicide.

Dithiopyr **Trade Names: Dimension 2EW and 40WSP, and granular formulations with or without fertilizer**

Use of dithiopyr and other relevant information about this chemical is outlined above in the section on preemergence herbicides. Dithiopyr only provides early (i.e. 1 to 4 leaf stage) postemergence control of crabgrass. Little information exists regarding its ability to postemergently control other annual grasses and therefore dithiopyr is currently labelled only for postemergence crabgrass control. For postemergence control, dithiopyr should be applied to 1 to 4 leaf stage crabgrass at 0.25 to 0.38 lb ai/acre for granular formulations and at 0.5 lb ai/acre for the sprayable formulation. Tillered crabgrass will not be effectively controlled, therefore dithiopyr (0.38 lb ai/acre) should be tank-mixed with either Acclaim Extra (0.09 lb ai/acre) or quinclorac (0.5 lb ai/acre) and applied prior to mid-June. Dithiopyr should **not** be used on creeping bentgrass as a postemergence herbicide, but it is safe to apply postemergently to most other turfgrass species. Dithiopyr use after mid-June is generally not recommended in Maryland, because its soil residual can interfere with over seeding operations and because it is ineffective after weeds have tillered.

Fenoxaprop-ethyl **Trade Name: Acclaim Extra 0.57EW; no granular formulations**

Chemical Name: (±)-ethyl 2-[4-[(6 chloro 2-benzoxaolyl) oxy]phenoxy]propanoate Controls crabgrass, goosegrass, foxtail and fall panicum. May stunt or discolor Kentucky bluegrass if applied prior to July. Safe to use on perennial ryegrass, tall fescue, fine-leaf fescues, and zoysiagrass. Acclaim may yellow low cut bentgrass turfs such as those grown on fairways and tees. Do not apply to bermudagrass, and refer to label regarding low rate usage on bentgrass. Acclaim is relatively safe (may cause yellowing) to apply to tall fescue and perennial ryegrass seedlings, but it may severely injure seedling Kentucky bluegrass and other turfgrass species less than one year old. Apply when crabgrass, foxtail and goosegrass are just above the turf canopy (usually early July), but prior to the time when weeds have developed 2 or 3 tillers. There must be good soil moisture and actively growing weeds for Acclaim to be effective in a single application. Due to antagonism within the weed (i.e., not the spray tank), Acclaim should not be tank-mixed with a broadleaf weed herbicide or be applied within 14 days following a broadleaf weed herbicide application. A broadleaf weed herbicide may be applied 24 hours after Acclaim without diminishing the ability of Acclaim to control annual grass weeds. Do not mow treated turf within 24 hours of application. Acclaim is more effective when applied through flat-fan nozzles. Effectiveness may be reduced by nozzles (i.e., flood jet nozzles) that produce large droplet sizes. The recommended rate of Acclaim Extra will vary (0.09 to 0.18 lb ai/acre) with weed size, vigor and other factors noted on the label. Multiple applications are generally needed for goosegrass control because this weed germinates throughout the summer and Acclaim Extra has no preemergence activity.

Quinclorac **Trade Name: Drive 75DF; no granular formulations**

Chemical Name: 3,7-dichloro-8-quinolinecarboxylic acid Quinclorac effectively controls crabgrass and barnyardgrass, but not goosegrass. Quinclorac must be tank-mixed with 1% v/v with either methylated seed oil or other approved adjuvant listed on the label to be effective. Quinclorac most effectively controls young crabgrass plants that have not tillered. It is best to begin applications about mid to late June, before crabgrass plants have tillered. Generally, two quinclorac applications (0.50 + 0.50 lb ai/acre applied on a two week interval) are required to control crabgrass, particularly where crabgrass levels are severe. Where crabgrass populations are low, a single application of 0.75 lb ai/acre in mid-to-late

June can be very effective. Quinclorac will “burn-down” tillered crabgrass later in the season, but many plants will recover. It is safe to apply to Kentucky bluegrass, perennial ryegrass, bermudagrass and zoysiagrass. It may cause yellowing in tall fescue, but can be extremely phytotoxic to fine-leaf fescues (creeping red, Chewings, hard, sheep) or cause an objectionable yellowing or mottling in creeping bentgrass maintained on fairways. The discoloration caused by quinclorac in fairway creeping bentgrass can persist from 2 to 10 weeks or longer. The discoloration can be masked by tank-mixing quinclorac with liquid chelated iron plus nitrogen products like Lesco’s 12-0-0 With Iron Plus Micronutrients, Ferremec and other similar products. It also effectively controls clovers, violets and some speedwells. It is weak or ineffective against foxtails, dandelion, plantains, oxalis and other broadleaf weeds.

Mesotrione Trade Name: Tenacity 4SC; no granular formulations

Chemical Name: 2-[4-(methysulfonyl)-2-nitrobenzoyl]-1,3-cyclohexanedione. Mesotrione is unique in that it controls a diverse group of weed species including crabgrass, creeping bentgrass, nimblewill, white clover (partial), yellow nutsedge and Kylinga species. Therefore, caution must be taken to assess the total weed population at a site. If high populations of susceptible weeds are present then large areas of bareground may result from use of this herbicide. Fortunately, bareground areas can be immediately re-seeded using the grass species noted below. Mesotrione should be tank-mixed with a non-ionic surfactant (0.25% v/v) to provide maximum control. Mesotrione may be used on fescues (expect some yellowing), perennial ryegrass and Kentucky bluegrass. It also is safe to apply mesotrione to the seedbed or overtop seedlings of tall fescue, perennial ryegrass or Kentucky bluegrass. Mesotrione may cause some short-lived (i.e, 7–10 days) bleaching of the turfgrass leaves and yellowing in tall fescue. The yellowing or chlorosis elicited by mesotrione in tall fescue may last 21 days, but can be masked by tank-mixing with a chelated iron product. Mesotrione effectively controls crabgrass postemergence, but it must be applied twice on a two week interval at a rate ranging from 0.187 to 0.250 lb ai/A (i.e., 6 – 8 fl. ounce of 4SC product per acre). Mesotrione effectively controls crabgrass when plants begin to tiller in early July and will work on more mature crabgrass in late July. Mesotrione will not effectively control tillered goosegrass and its effect on foxtails is unknown.

FINAL CONSIDERATIONS

A weed control program must be accompanied by a good turf management program. When weeds are removed, large bare areas should be sodded or re-seeded in the autumn as these open spaces will be invaded by new weeds. Proper fertilization, irrigation and mowing greatly reduce and often eliminate significant annual grass weed problems in turf. Herbicides can be harmful, but they may be used safely if you handle them with care. Use only the recommended rates. Follow directions and precautions on the label. Store all pesticides out of reach of children and animals and away from feed, seed and foodstuffs. References to trade names do not constitute an endorsement or warranty by the University of Maryland. No discrimination is intended against products not mentioned.

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