

SECTION D.

GRASS SEED CROPS

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Revised March 2022

Note: Weed control in established perennial grass seed fields depends on effective management of crop residues. If grass seed fields cannot be burned after harvest, the recommended preemergence herbicide treatments may be less effective in controlling weeds. In unburned fields, remove crop residues by baling straw, or spread straw as evenly as possible by mechanical means if a full straw load is desired. Unburned grasses with considerable top regrowth may be damaged by some fall-applied treatments made before approximately October 15.

Seedbed Preparation

carfentrazone (Aim EC)

Rate Up to 0.031 lb ai/A (0.5 to 2 fl oz/A Aim EC)

Time Before planting or up to 24 hr after planting. Apply to actively growing weeds up to 4 inches tall and to rosettes less than 3 inches across.

Remarks See label for specific tank-mixes and adjuvant recommendations. Good spray coverage is essential for control.

Caution Do not exceed 0.093 lb ai/A of Aim EC per growing season.

Site of action Group 14: protoporphyrinogen oxidase (PPO) inhibitor

Chemical family Triazinone

glyphosate (several trade names)

Rate 0.5 to 3.75 lb ae/A

Time Apply to actively growing weeds.

Remarks Use higher application rates if weeds are over 6 inches tall. Apply 1.5 to 3.75 lb ae/A for perennial weed control. Delay tillage 3 days after treating annual weeds, at least 7 days after treating perennials. Refer to specific product label for direction on adding surfactants and for plant-back restrictions for grass seed crops.

Caution Do not graze or use feed from treated areas for 8 weeks after application.

Site of action Group 9: inhibits EPSP synthase

Chemical family None generally accepted

paraquat (several trade names)

Rate 0.5 to 1 lb ai/A

Time Apply from late November to December, in preparation for planting grasses in the spring. Seed between February 15 and March 15 on non-irrigated land.

Remarks Use 1 to 2 pints of nonionic surfactant or 1 gallon of crop oil concentrate per 100 gal spray mixture. If weather prevents treating in December, applications may be made into January (two applications may be needed for large weeds). If more weeds germinate after December treatments, paraquat may be applied up to the time the crop emerges if seed is well covered by soil. Apply to weeds in the three- to five-leaf stage.

Caution **A restricted-use herbicide.** Treatment controls only seedling weeds. Cultivate fields up to October 15 to mechanically control established weeds. Do not graze treated areas for livestock feed. Do not use straw from treated areas for animal bedding or feed. Use 2,4-D, dicamba, or bromoxynil for weed control later in the crop year.

Site of action Group 22: photosystem I electron diversion

Chemical family Bipyridilium

pyraflufen (several trade names)

Rate 0.001 to 0.006 lb ai/A

Time Apply to seedling weeds that are less than 4 inches tall or less than 3 inches in diameter if in the rosette stage 30 days before planting grass seed crops. The higher rate will be needed for difficult-to-control species such as kochia or field bindweed.

Remarks May be tank mixed with synthetic auxin herbicides and glyphosate to broaden the weed control spectrum. Always apply with a crop oil concentrate or nonionic surfactant for optimum activity.

Caution Do not exceed three applications of product during the preplant burndown period. Separate applications by 30 days. Do not graze treated areas.

Site of action Group 14: protoporphyrinogen oxidase (PPO) inhibitor

Chemical family Phenylpyrazole

saflufenacil (Sharpen)

Rate 0.022 to 0.045 lb ai/A (1 to 2 fl oz/A Sharpen)

Time Apply preplant, preplant incorporated, or preemergence for burndown and residual broadleaf weed control while establishing cool-season grasses in the fall or spring.

Remarks A methylated seed oil plus ammonium sulfate or urea ammonium nitrate is required for burndown activity. See label for more information on adjuvants and tank-mixes.

Caution Do not exceed 6 fl oz/A per year. Sharpen may cause transitory injury to cool-season grasses under certain conditions.

Site of action Group 14: protoporphyrinogen oxidase (PPO) inhibitor

Chemical family Pyrimidinedione

Activated Carbon Band Planting System

activated carbon

Oregon and Washington only

Rate 25 lb/A in a 1-inch band (equal to a 300 lb/A broadcast application)

Time At planting.

Remarks Apply to smooth, crop residue-free seedbeds. A spray unit on a 12-inch drill applying a slurry band 1 inch wide directly over the seeded row works well. Use proper agitation to keep the carbon in suspension. Mix activated carbon with water at 0.5 lb/gal. Follow carbon application with herbicide application (see entries immediately below).

diuron (several trade names)

Oregon and Washington only

Rate 2 to 2.4 lb ai/A (2.5 to 3 lb/A of an 80DF formulation)

Time Apply after planting but before rain or irrigation.

Remarks Oregon and Washington registrations. Not registered in Idaho. Broadcast immediately after planting and banding with activated carbon. Use lower rate in sandy soils. At least 1 inch of moisture is required within 2 weeks after applying diuron to activate herbicide and move it into the soil profile. Diuron is not strongly photodegraded, but losses can be significant if diuron remains on the soil surface for several weeks without significant moisture during hot and dry planting conditions.

Caution Do not use this system in grass seed rotations that will be replanted to any crop within 2 years because these rotational crops may be injured. Diuron will not control volunteer winter cereals, wild oat, or downy brome.

Site of action Group 7: photosystem II inhibitor

Chemical family Substituted urea

pronamide (Kerb SC)

Oregon only

Rate 0.125 to 0.25 lb ai/A (5.0 to 10.0 oz/A Kerb SC)

Time Apply in a tank-mix with a reduced rate of diuron after the carbon band seeding operation. Application must be made before the seeded crop emerges, and before rain dissipates the carbon band.

Remarks Apply only to fields with well-prepared, firmly packed seedbeds. An adequate carbon band that will absorb the applied herbicide must be present at time of treatment.

Caution **A restricted-use herbicide.** Do not apply pronamide to sandy or gravelly areas in the field. Grower assumes all risks of crop injury or stand loss under unforeseen, adverse environmental conditions, if seedbeds are poorly prepared, or if carbon bands are inadequate at treatment. Do not graze treated fields within 180 days of application; see label for other restrictions and precautions.

Site of action Group 3: microtubule assembly inhibitor

Chemical family Benzamide

rimsulfuron (Matrix SG)

Oregon and Washington only

Rate 0.047 lb ai/A (3.0 oz/A of Matrix SG)

Time Apply after planting but before rain or irrigation.

Remarks Oregon and Washington registrations. Not registered in Idaho. Broadcast immediately (within 5 days) after planting and banding with activated carbon.

Caution See Matrix SG for use precautions and use restrictions. Do not apply to established grass seed stands or unacceptable crop injury will result.

Site of action Group 2: acetolactate synthase (ALS) inhibitor

Chemical family Sulfonylurea

indaziflam (Alion Herbicide)

Rate 0.0125 lb ai/A (1.0 oz/A of Alion)

Time Apply after planting but before rain or irrigation.

Remarks Broadcast immediately after planting and banding with activated carbon. Apply only to a well-prepared and firmly packed seedbed.

Caution See Alion label for use precautions and use restrictions. Use Alion only once (either at carbon-planting or once in an established stand) to minimize risk of herbicide carryover to subsequent rotational crops.

Site of action Group 29: inhibition of cellulose biosynthesis

Chemical family Fluoroalkyltriazine

EPTC (Eptam 7 EC Selective Herbicide)

Rate 3.01 to 4.38 lb ai/A (3.5 to 5.0 pints/A of Eptam)

Time There are two ways to utilize Eptam in a carbon-seeding system. Apply after planting but immediately before rain or irrigation OR apply broadcast preplant 3 to 4 weeks prior to carbon-seeding of grasses. Broadcast preplant application may be mechanically incorporated to reduce losses from volatilization.

Remarks Rainfall or irrigation in the amount of 0.25 to 0.5 inches within 7 days of application is needed to activate the herbicide. Apply only to a well-prepared and firmly packed seedbed when applying immediately following carbon-seeding.

Caution See Eptam label for use precautions and use restrictions. Use Eptam only once during the growing season.

Site of action Group 8: inhibitor of lipid synthesis; not ACCase inhibition

Chemical family Thiocarbamate

pyoxasulfone + flumioxazin (Fierce EZ Herbicide)

Rate 0.032 lb ai/A of flumioxazin + 0.040 lb ai/A of pyoxasulfone (3.0 oz/A of Fierce EZ)

Time Broadcast immediately after planting and banding with activated carbon. Apply only to a well-prepared and firmly packed seedbed.

Remarks Rainfall or irrigation in the amount of 0.5 inches within 7 to 14 days of application is needed to activate the herbicide. Apply only to a well-prepared and firmly packed seedbed.

Caution See Fierce EZ label for use precautions and use restrictions. Use Fierce EZ only once during the growing season.

Site of action (flumioxazin) Group 14: protoporphyrinogen oxidase (PPO) inhibitor, (pyoxasulfone) Group 15: inhibits very long chain fatty acid synthesis

Chemical family (flumioxazin) Dicarboximide; (pyoxasulfone) Isoxazoline

New and Established Crops

Broadleaf Weed Control

2,4-D amine, 2,4-D ester, 2,4-D choline (several trade names)

Rate 0.36 to 0.75 lb ae/A. Follow individual labels.

Time Eastern Oregon: apply after new grass has established five leaves in non-irrigated grass or two leaves in irrigated grass but before boot stage. Western Oregon: apply 2,4-D at 0.5 lb ae/A to fall-seeded stands after the two-leaf stage of grass growth. Established stands: apply spring or fall before boot stage. Idaho and Washington seedling grasses: apply 0.36 to 0.47 lb ae/A of most esters or amines after the five-leaf stage.

Remarks For use on newly established grass seed and established stands. Formulations vary widely in concentration and volatility. Amine and ester formulations are the traditional options, where ester formulations are slightly more active but have considerably higher volatility and risk for off-target vapor movement than amine formulations. Newer choline formulations have little to no volatility and risk for off-target vapor movement. Use choline or amine formulations near sensitive crops and during warmer temperatures. All formulations are susceptible to droplet drift, so use coarse droplets and other good spraying practices to prevent drift with all formulations.

Caution See individual labels for grazing restrictions. Do not allow drift. Do not use an oil carrier. If used with nitrogen fertilizer solutions, foliage may be damaged temporarily. Bentgrass seedlings should be well established before application. Grass seedling root development may be inhibited when 2,4-D is applied to early growth stages, so frequent irrigation when possible is important to help grasses establish.

Site of action Group 4: synthetic auxin

Chemical family Phenoxy acetic acid

carfentrazone (Aim EC)

Rate 0.008 to 0.031 lb ai/A (0.5 to 2 fl oz/A Aim EC)

Time Apply to emerged and actively growing weeds when weeds are small. May be applied before seeding and up to jointing stage of crop.

Remarks See label for specific tank-mixes and adjuvants to control problem weed species. Apply in at least 10 gal/A of spray solution. Good spray coverage is essential for control. Proper adjuvant use is critical for good activity, and addition of nitrogen to spray solution highly recommended where label permits.

Caution Do not exceed 0.093 lb ai/A of Aim EC per growing season.

Site of action Group 14: protoporphyrinogen oxidase (PPO) inhibitor

Chemical family Triazinone

clopyralid (Stinger, several trade names)

Rate 0.094 to 0.25 lb ae/A (0.25 to 0.66 pint/A Stinger)

Time Apply in spring before boot stage and/or as a postharvest fall treatment. To control late-emerging Canada thistle, treat preharvest after grass seed is fully developed; apply to Canada thistle after most basal leaves emerge but before bud stage.

Remarks Re-treat as necessary, but do not exceed 0.66 pint/A Stinger per calendar year.

Caution Do not use on bentgrass unless injury can be tolerated. See label for rotation guidelines if land is taken out of grass seed production. Do not apply by air during an air temperature inversion. Some grass-seed straw export markets will not accept straw from grasses treated with clopyralid containing products.

Site of action Group 4: synthetic auxin

Chemical family Pyridine

clopyralid + 2,4-D (Curtail)

Rate 0.095 to 0.19 lb ae/A clopyralid + 0.5 to 1 lb ae/A 2,4-D (2 to 4 pints/A Curtail)

Time Apply in spring before boot stage and/or as a postharvest fall treatment. To control late-emerging Canada thistle, treat preharvest after grass seed is fully developed; apply to Canada thistle after most basal leaves emerge but before bud stage.

Remarks Curtail contains 2,4-D amine, which may injure some grasses grown for seed. Injury potential varies greatly with geographic location and crop species and is influenced by application rate and timing. Consider your experience with 2,4-D to evaluate the risk of injury versus the benefits of weed control.

Caution For established grasses only. Risk of crop injury increases with increasing rate and later application. Do not use on bentgrass unless injury can be tolerated. Carefully follow label instructions on crop rotation if land is to be taken out of grass seed production. Do not apply by air during an air temperature inversion. Some grass-seed straw export markets will not accept straw from grasses treated with clopyralid containing products.

Site of action (both) Group 4: synthetic auxin

Chemical family (clopyralid) Pyridine; (2,4-D) Phenoxy acetic acid

clopyralid + MCPA (Curtail M)

Rate 0.092 to 0.184 lb ae/A clopyralid + 0.5 to 1 lb ae/A MCPA (1.75 to 3.5 pints/A Curtail M)

Time Apply in spring before boot stage and/or as a postharvest fall treatment. To control late-emerging Canada thistle, treat preharvest after grass seed is fully developed; apply to Canada thistle after most basal leaves emerge but before bud stage.

Remarks Curtail M contains MCPA ester, which may injure some grasses grown for seed. Injury potential varies greatly with geographic location and crop species and is influenced by application rate and timing. Consider your experience with MCPA to evaluate the risk of injury versus the benefits of weed control.

Caution For established grasses only. Potential for crop injury increases with increasing rate and later stages of application. Do not use on bentgrass unless injury can be tolerated. Carefully follow label instructions on crop rotation if land is to be taken out of grass seed production. Do not apply by air during an air temperature inversion. Some grass-seed straw export markets will not accept straw from grasses treated with clopyralid containing products.

Site of action (both) Group 4: synthetic auxin

Chemical family (clopyralid) Pyridine; (MCPA) Phenoxy acetic acid

dicamba (several trade names) + 2,4-D or MCPA or tribenuron methyl (several trade names)

Rate 0.25 to 1 lb ae/A dicamba + 0.5 to 1.5 lb ae/A 2,4-D or MCPA or 0.008 to 0.016 lb ai/A tribenuron

Time New seedlings: apply to new grass after it reaches three-leaf stage but before jointing. Do not exceed 0.5 lb ae/A dicamba. Established stands: apply before jointing stage. Apply when temperatures are 55°F to 75°F. Fall applications give better control of perennial, biennial, and winter annual broadleaf weeds after considerable foliage has developed. Do not exceed 1 lb ae/A dicamba.

Remarks Refer to individual product labels for specific rate, timing, and application directions. See specific remarks for tribenuron below.

Caution Use precautions to prevent drift. Some perennial ryegrass varieties are sensitive to tribenuron and may be injured. On newly established grass seed stands, combinations of dicamba + MCPA result in greater crop safety than dicamba + 2,4-D tank-mixes. See individual labels for grazing restrictions, but in general for 2,4-D, 7 days; for MCPA, 14 days (see labels); for dicamba, 7 days for up to 0.5 lb ae/A and 21 days if over 0.5 lb ae/A for lactating dairy cows (see labels). Do not apply after grass seed crop reaches jointing stage. Do not use more than 0.5 lb ae/A dicamba on bentgrass unless injury can be tolerated.

Site of action (dicamba, 2,4-D, and MCPA) Group 4: synthetic auxin; (tribenuron methyl) Group 2: acetolactate synthase (ALS) inhibitor

Chemical family (dicamba) Benzoic acid; (2,4-D and MCPA) Phenoxy acetic acid; (tribenuron methyl) Sulfonylurea

halosulfuron (Sanda, Motif)

Rate 0.031 to 0.062 lb ai/A (0.67 to 1.33 oz/A Sandea)

Time Apply in spring for postemergence control of yellow nutsedge and broadleaf weeds in established creeping bentgrass, Kentucky bluegrass, fine fescues, tall fescue and perennial ryegrass.

Remarks A sequential treatment may be necessary to control yellow nutsedge 6 to 10 weeks after the initial application. Always apply with a NIS at 0.5% v/v.

Site of action Group 2: acetolactate synthase (ALS) inhibitor

Chemical family Pyrazole

MCPA amine, MCPA ester, + bromoxynil (Bronate Advanced, several trade names)

Rate 0.5 to 1 lb ae/A MCPA; 0.25 to 0.5 lb ai/A bromoxynil

Time Eastern Oregon: after new grass reaches three- to five-leaf stage. Western Oregon: apply MCPA at 0.5 lb ae/A on fall-seeded stands after two-leaf stage. Established stands: apply in fall or spring but before boot stage. Washington and Idaho seedling grasses: apply MCPA after grass tillers.

Remarks For newly established grass seed in eastern and western Oregon and established stands. Bromoxynil can be applied any time after grass emerges and before weeds are larger than listed on label (generally, four to six leaves).

Caution A 7-day waiting period is required after MCPA application before grazing. MCPA may injure bentgrass at higher application rates. Grass seedling root development may be inhibited when MCPA is applied to early growth stages; therefore, frequent irrigation is important to help grasses establish. Do not apply bromoxynil to cool-season grasses if air temperature is above 80°F, because crop injury may be unacceptable. Do not graze or feed straw from fields treated with bromoxynil.

Site of action (MCPA) Group 4: synthetic auxin; (bromoxynil) Group 6: photosystem II inhibitor

Chemical family (MCPA) Phenoxy acetic acid; (bromoxynil) Nitrile

saflufenacil (Sharpen)

Rate 0.022 to 0.045 lb ai/A (1 to 2 fl oz/A Sharpen)

Time Cool-season grasses: Apply to new grass seedlings after the first tiller is fully established in the fall or spring. Apply anytime to established grasses in fall or spring after greenup until boot stage.

Remarks A methylated seed oil is required for optimum efficacy. Where allowed, addition of a nitrogen fertilizer such as ammonium sulfate also improves activity. See label for more information on adjuvants and tank-mixes.

Caution Do not exceed 4 or 6 fl oz/A per year on seedling or established grass seed stands, respectively. Sequential applications must be separated by at least 14 days; do not apply more than 2.0 fl oz/A per application. Sharpen may cause transitory injury to cool-season grasses under certain conditions, but new growth is normal and vigor is not reduced. The preharvest interval for seed is 50 days after application. There are no feeding or grazing restrictions.

Site of action Group 14: protoporphyrinogen oxidase (PPO) inhibitor

Chemical family Pyrimidinedione

tribenuron methyl (several trade names)

Rate 0.008 to 0.016 lb ai/A

Time Fall or spring, when broadleaf weeds are actively growing.

Remarks May be used on seedling or established stands of perennial ryegrass, tall fescue, annual ryegrass, bluegrass, bentgrass, fine fescue, and orchardgrass. Use only the 0.008 lb ai/A rate on tall fescue and perennial ryegrass. Spring applications on tall fescue must be before stems start elongating. Use the 0.016 lb ai/A rate on established annual ryegrass, bluegrass, bentgrass, fine fescue, and orchardgrass. Always use a nonionic surfactant at 1 quart/100 gal. Adding 2,4-D at 0.25 to 0.5 lb ae/A plus liquid nitrogen fertilizer at 4 gal/100 gal aids weed control and crop safety.

Caution Some perennial ryegrass varieties are sensitive to tribenuron and may be injured. Do not apply to grass that is under stress. Do not feed or graze treated grass seed for 60 days after applying.

Site of action Group 2: acetolactate synthase (ALS) inhibitor

Chemical family Sulfonylurea

Bedstraw and Canada Thistle Management

carfentrazone (Aim EC)

Rate 0.008 to 0.031 lb ai/A (0.5 to 2 fl oz/A Aim EC)

Time Apply to actively growing weeds when they are small. May be applied before seeding and up to jointing stage of crop.

Remarks See label for specific tank-mixes and adjuvant recommendations. Apply in at least 10 gal/A of spray solution. Good spray coverage is essential for control.

Caution Do not exceed 0.093 lb ai/A of Aim per growing season.

Site of action Group 14: protoporphyrinogen oxidase (PPO) inhibitor

Chemical family Triazinone

fluroxypyr (Starane Ultra)

Rate 0.11 to 0.14 lb ai/A fluroxypyr (0.3 to 0.4 pints/A Starane Ultra)

Time For best performance, apply to emerged and actively growing broadleaf weeds less than 4 to 8 inches in height. Only weeds that have emerged at time of application will be controlled. Apply to two-leaf seedling grasses up to early boot stage, or to established grasses before early boot stage.

Remarks Do not exceed 0.7 pints/A per growing season or 2 applications per season, and separate applications by 14 days.

Caution There are no grazing restrictions after applying Starane Ultra. Do not harvest grass for hay or silage from treated area within 7 days of application. Withdraw meat animals from treated forage at least 2 days before slaughter.

Site of action Group 4: synthetic auxin

Chemical family Pyridine

fluroxypyr + bromoxynil (Starane NXT)

Rate 0.063 to 0.125 lb ai/A fluroxypyr + 0.26 to 0.5 lb ai/A bromoxynil (14 to 27.4 oz/A Starane NXT)

Time For best performance, apply to emerged and actively growing broadleaf weeds less than 2 inches high or 1 inch wide. Apply to two-leaf seedling grasses up to early boot stage or to established grasses before early boot stage. Reduced weed control may occur when applied in cold conditions. See label for recommended environmental conditions for timing of application.

Remarks Seedling grasses tolerant to Starane NXT include Kentucky bluegrass, fescue, orchardgrass, and perennial ryegrass. Established grasses tolerant to Starane NXT include bluegrass, fescue, perennial ryegrass, and bermudagrass.

Caution Do not plant any nonlabeled rotation crop within 120 days of application. Do not feed treated grasses to livestock or allow treated area to be grazed.

Site of action (fluroxypyr) Group 4: synthetic auxin; (bromoxynil) Group 6: photosystem II inhibitor

Chemical family (fluroxypyr) Pyridine; (bromoxynil) Nitrile

fluroxypyr + clopyralid (WideMatch)

Rate 0.094 to 0.125 lb ai/A fluroxypyr + 0.094 to 0.125 lb ai/A clopyralid (1 to 1.33 pints/A WideMatch)

Time For best performance, apply to emerged and actively growing broadleaf weeds less than 4 inches tall or before vining. Apply to two-leaf seedling grasses up to early boot stage or to established grasses before early boot stage. Weed control may be reduced when applied in cold conditions. See label for recommended environmental conditions at application.

Remarks Controls broadleaf weeds including kochia, wild buckwheat, Canada thistle, volunteer potato, and prickly lettuce. Tank-mix compatible with MCPA, dicamba, bromoxynil, or 2,4-D. Tank-mixes help to broaden annual-weed control spectrum but may reduce efficacy on perennial weeds such as Canada thistle. Do not tank mix with 2,4-D, MCPA, or dicamba unless the risk of crop injury is acceptable.

Caution Do not apply to bentgrass unless crop injury can be tolerated. See label for rotation restrictions on other crops. Do not harvest grass for hay or silage from treated area within 7 days of application. Withdraw meat animals from treated forage at least 2 days before slaughter. Some grass-seed straw export markets will not accept straw from grasses treated with products containing clopyralid.

Site of action (both) Group 4: synthetic auxin

Chemical family (both) Pyridine

Field Bindweed Management

quinclorac (Facet)

Rate 0.25-0.375 lb ai/A (22 to 32 fl oz/A Facet L)

Time Apply in fall after harvest but before a killing frost. Field bindweed should be actively growing and at least 4 inches long.

Remarks May be used on Kentucky bluegrass, annual and perennial ryegrass, and fine and tall fescue seed fields. Adequate soil moisture and/or light rain after application is required for root uptake. Repeat applications are necessary to maintain adequate control. Adding methylated seed oil or crop oil concentrate is required for consistent control. Nitrogen solutions or ammonium sulfate can be added to enhance control but should not replace the MSO or COC.

Caution Do not graze treated fields. Do not feed treated grasses, forage, hay, silage, straw, seed, or seed screenings to livestock. Do not apply by air west of the Cascades or in Spokane County, Washington.

Site of action Group 4: synthetic auxin

Chemical family Quinoline carboxylic acid

Annual Bluegrass Management

glufosinate-ammonium (several trade names)

Oregon only, grass weeds

Rate Fall broadcast: use 0.18 lb ai/A (10 oz/A Rely 280, Reckon 280, or Glufosinate 280); Spring broadcast: use 0.30 to 0.37 lb ai/A (16.5-20 oz/A Rely 280, Reckon 280, or Glufosinate 280); Spring directed, shielded spray: use 1.0 to 1.5 lb ai/A (55-82 oz/A Rely 280, Reckon 280, or Glufosinate 280)

Time Apply to established and seedling fields. Treat newly established fields after the first tiller has developed and prior to December 1. Spray established fields when crop begins active growth in early spring, usually prior to April 1.

Remarks One spring broadcast application can be made following a fall broadcast application. Use in the spring as a rescue treatment in established crops or if fall-applied herbicide programs have not been adequate. Glufosinate controls or suppresses annual and roughstalk bluegrass, mannagrass, and some brome species.

Caution Glufosinate may severely injure some crop species. Do not broadcast apply glufosinate on fine fescue, orchardgrass, or *Poa* spp. grown for seed. Directed, shielded sprays are suggested for fine fescues, orchardgrass or *Poa* spp. grown for seed. See specific restrictions and directions on the glufosinate OR SLN labels. Consult a crop adviser or an OSU Extension specialist for more information. Growers assume all liability for crop injury when using glufosinate in grasses grown for seed. Do not graze treated fields for one year following application.

Site of action Group 10: glutamine synthase inhibitor

Chemical family Phosphinic acid

Established Crops

Special-equipment Applications

WICK, WIPER, OR ROLLER APPLICATIONS

glyphosate (several trade names)

Rate 3 lb ae glyphosate (1 gal of 3 lb ae/gal formulation) + 2 gal water

Time Weeds should be at least 6 inches taller than the crop. For best results, perennial weeds should be in early-bud, late-boot, full-bloom, or early-seed stage. Control annual weeds before hard seed stage.

Remarks Use in wick or wiper applicators to control annual and perennial weeds. In heavy infestations, reduce speed to ensure adequate wiper coverage. Two cross-direction applications may improve control. Repeat applications may be required to control dense clumps or severe weed infestations. In roller applicators, a more dilute rate of 3 lb ae glyphosate (1 gal) + 5 gal water has proven satisfactory.

Caution Equipment should be in good condition to avoid dripping or crop contact. Maintain roller speed at 40 to 60 rpm; do not exceed 5 mph. Do not graze or feed within 14 days of wiper application.

Site of action Group 9: inhibits EPSP synthase

Chemical family None generally accepted

SHIELDED SPRAYER APPLICATIONS

glyphosate (several trade names)

Rate Apply 0.75 to 2.25 lb ae (1 to 3 quarts of 3 lb ae formulation) as a broadcast spray in 10 to 20 gal/A total spray volume

Time Apply to actively growing weeds.

Remarks Results are best when grass is planted in uniform, straight rows and crop is small enough to easily pass alongside or through the protective shields.

Caution Grower assumes all responsibility for crop losses from misapplication.

Site of action Group 9: inhibits EPSP synthase

Chemical family None generally accepted

Annual and Perennial Ryegrass

Note Also see *GRASS SEED—New and Established* for herbicides that may be used on many species of grass grown for seed.

bromoxynil + pyrasulfotole (Huskie)

Rate 0.185 to 0.205 lb ai/A bromoxynil + 0.033 to 0.036 lb ai/A pyrasulfotole (13.5 to 15 oz/A Huskie)

Time Apply from preemergence to established perennial and annual ryegrass. See label for weed size recommendations and application timings, but control of most species is best at the 15 fl oz/A rate when weeds have from one to six leaves. Two applications of Huskie can be made per year separated by at least 30 days.

Remarks For most consistent weed control under adverse growing conditions, add AMS or an ammonium nitrogen source as directed by the spray additives section of the label, but do not use these additives if grass crop injury is a concern. Huskie may be tank mixed with a variety of other broadleaf and grass herbicides and other pesticides; see label for instructions. Huskie will control mannagrass in annual ryegrass grown for seed.

Caution See label for crop rotation restrictions. Wheat, triticale, and oats may be planted 1 month after application; most other crops may be planted 9 months after application. Do not graze or cut grass for forage within 7 days of application, or cut grass for hay within 30 days of application. Do not exceed 30 oz/A of Huskie per year. Aerial and chemigation applications are prohibited.

Site of action (bromoxynil) Group 6: photosystem II inhibitor;(pyrasulfotole) Group 27: inhibits 4hydroxyphenylpyruvatedioxygenase (4-HPPD)

Chemical family (bromoxynil) Nitrile; (pyrasulfotole) Isoxazole

dimethenamid-P (Outlook)

Perennial ryegrass only

Rate 0.66 to 0.98 lb ai/A (14 to 21 fl oz/A Outlook)

Time Apply in fall before targeted weeds emerge or in midwinter in a sequential-use program with other herbicides that control emerged weeds.

Remarks Grass seed crops must be established at least 1 year, or have had at least one seed crop harvested before Outlook is applied. Apply higher rates where denser weed infestations are expected. Excessive straw on the field after harvest may reduce weed control. Sufficient rain or irrigation after application is needed for optimum weed control. May be applied by ground or by air (see label).

Caution Applying to perennial ryegrass under stress may injure crop. Do not apply Outlook in tank-mixtures with other herbicides unless risk of crop injury is acceptable. Subsequent applications may injure crop. Do not allow livestock to graze treated fields for 60 days after application. Treated straw, seed, or seed screenings may be fed to livestock following harvest.

Site of action Group 15: inhibits very long chain fatty acid synthesis

Chemical family Chloroacetamide

diuron (several trade names)

Perennial ryegrass; Annual ryegrass for the creation of rows; Oregon and Washington only

Rate 0.8 to 2.4 lb ai/A (1 to 3 lb/A of an 80DF formulation)

Time At the onset of fall rains and before weeds are beyond the 2- to 4-leaf stage.

Remarks Do not apply to perennial ryegrass less than 1 year old. There are several suppliers of diuron; check labels for crop and geographical restrictions. Application rate on perennial ryegrass depends on geographical location. See labels for instructions on the use of directed sprays of diuron for row creation while planting annual ryegrass or after annual ryegrass has emerged prior to the 2-leaf stage.

Site of action Group 7: photosystem II inhibitor

Chemical family Substituted urea

EPTC (Eptam 7 EC Selective Herbicide)

Rate 3.01 to 4.38 lb ai/A (3.5 to 5.0 pints/A of Eptam)

Time Apply to dry soil in established grass seed fields prior to any weed emergence immediately before rain or irrigation to minimize losses to volatilization.

Remarks For established perennial ryegrass seed fields. Rainfall or irrigation in the amount of 0.25 to 0.5 inches within 36 hr of application is needed to activate the herbicide.

Caution See Eptam label for use precautions and use restrictions. Use Eptam only once during the growing season.

Site of action Group 8: inhibitor of lipid synthesis; not ACCase inhibition

Chemical family Thiocarbamate

ethofumesate (several trade names)

West of Cascades in Oregon and Washington only

Rate 0.75 to 1.9 lb ai/A (1.5 to 3.75 pints/A product)

Time Apply after planting ryegrass but no later than four-leaf stage of weeds. Apply preemergence or early postemergence of annual ryegrass, or early postemergence (two leaves) of perennial ryegrass. Apply before two-leaf stage to control rattail fescue and wild oat. Apply preemergence to annual bluegrass for best control.

Remarks To control ethofumesate-susceptible biotypes of annual bluegrass, mannagrass (*Glyceria* spp.), rattail fescue, volunteer cereals, wild oat, and other winter annuals. Use higher application rates if weeds are emerged or rattail fescue and volunteer wheat are present. Carbon-banded fields should have 2 inches or more of rain to dissipate the carbon band before applying ethofumesate. Ethofumesate is most effective when applied to a firm seedbed that is free from crop residue. Soil surface should be moist at the time of application. Rain or sprinkler irrigation should follow soon after application to increase herbicide effectiveness.

Caution Do not graze treated fields. Do not rotate with any crops other than sugar beets or ryegrass for 12 months after application.

Site of action Group 16: unknown

Chemical family Benzofuran

flufenacet + metribuzin (Axiom DF)

Rate 0.3 to 0.4 lb ai/A flufenacet + 0.076 to 0.111 lb ai/A metribuzin (9 to 13 oz/A Axiom) in established perennial ryegrass; 0.27 to 0.34 lb ai/A flufenacet + 0.068 to 0.085 lb ai/A metribuzin (8 to 10 oz/A Axiom applied in a band) in annual ryegrass for row creation with a shielded sprayer.

Time Apply before weeds emerge, or no later than the two-leaf stage of volunteer grasses in established perennial ryegrass fields. Applications after mid-November may result in crop injury and/or poor weed control.

Remarks For established perennial ryegrass seed fields only (at least 1 year old, or after first seed harvest) or for row creation in annual ryegrass grown for seed. Weed control may be reduced if heavy straw loads remain on fields after harvest. Rain or irrigation after application is needed for sufficient weed control activity.

Caution Do not apply in tank-mixtures with postemergence herbicides. Applying oxyfluorfen or photosynthesis-inhibiting postemergence herbicides within 4 weeks of Axiom may injure perennial ryegrass. Application to perennial ryegrass after the second harvest may injure crop. Rates of 9 to 11 oz/A minimize injury in perennial ryegrass seed fields, especially in areas of the field with light soil textures. Preharvest interval is 120 days. Do not apply more than once per year. Do not allow animals to graze treated fields for a minimum of 30 days following application.

Site of action (flufenacet) Group 15: inhibits very long chain fatty acid synthesis; (metribuzin) Group 5: photosystem II inhibitor

Chemical family (flufenacet) Oxyacetamide; (metribuzin) Triazinone

indaziflam (Alion Herbicide)

Rate 0.025-0.0375 lb ai/A (2.0 to 3.0 oz/A of Alion)

Time Apply to dry soil in established grass seed fields prior to any weed emergence before rain or irrigation.

Remarks For established perennial ryegrass seed fields.

Caution See Alion label for use precautions and use restrictions. Use the 3.0 oz rate only east of the Cascades. Use Alion only once (either at carbon-planting or once in an established stand) to minimize risk of herbicide carryover to subsequent rotational crops i.e., do not apply to established fields if Alion was used during the establishment phase (carbon-seeding) of the stand or apply late in the predicted life of the grass seed stand.

Site of action Group 29: inhibition of cellulose biosynthesis

Chemical family Fluoroalkyl triazine

mesotrione (Callisto)

Rate 0.094 to 0.188 lb ai/A (3 to 6 oz/A Callisto)

Time Apply preemergence to bare soil or as an early postemergence application to emerged annual ryegrass to control grasses such as ethofumesate-resistant biotypes of mannagrass. Apply preemergence to bare soil or early postemergence to perennial ryegrass grown for seed.

Remarks The 3-oz/A rate will control mannagrass in annual ryegrass grown for seed. Use higher application rates for suppression of other grass and broadleaf weed species and for extended soil residual control. Adding crop oil concentrate or nonionic surfactant at 1% v/v will optimize activity of postemergence applications. In addition, urea ammonium nitrate at 2.5% v/v or ammonium sulfate at 8.5 lb/100 gal of spray solution may be added, but the risk of grass seed crop injury increases at rates above 3 oz/A of Callisto.

Caution Preharvest interval for seed and straw harvest after applications of Callisto is 60 days for perennial and annual ryegrass grown for seed. Do not graze or feed forage from treated fields within 14 days following harvest of seed or straw and at least 74 days after application. Do not exceed two applications or 9 oz/A of Callisto per year. Do not tank mix Callisto with other pesticides with EC formulations or crop injury will result from postemergence applications.

Site of action Group 27: inhibits 4hydroxyphenylpyruvatedioxygenase (4-HPPD)

Chemical family Triketone

metribuzin (several trade names)

Perennial ryegrass only; Washington, western Oregon, and Crook, Deschutes, Jefferson, and Wasco counties of Oregon only

Rate 0.25 to 0.375 lb ai/A in Washington; 0.25 to 0.56 lb ai/A in Oregon

Time When volunteer grasses are in the one- to two-leaf stage after fall rain or irrigation but before active spring growth.

Remarks Established grass crops only. Control of volunteer crop and grass weeds may be improved by adding a surfactant or crop oil blend at rates recommended on the wetting agent label.

Caution Allow at least 28 days after application before grazing. Allow at least 120 days between application and seed harvest. See additional cautions on individual labels.

Site of action Group 5: photosystem II inhibitor

Chemical family Triazinone

oxyfluorfen (Goal 2XL or Galigan 2E)

Perennial ryegrass only; Oregon only

Rate 0.03 to 0.046 lb ai/A (2 to 3 oz/A Goal 2XL or Galigan 2E)

Time Apply on new plantings that have at least one tiller or more per plant. Applications to plants with less than one tiller may result in severe crop injury or stand loss. For best results, apply at early postemergence to the target annual broadleaf weeds.

Remarks Oxyfluorfen may be applied alone or in a tank-mix with up to 3 pints/A of ethofumesate. Crop may be discolored temporarily and, when tank mixed with ethofumesate, crop injury may increase. Goal and Galigan SLN labels vary by state.

Caution Application of oxyfluorfen in a tank-mix with ethofumesate is at the sole discretion of the grower and at the grower's own risk. Do not apply to a crop that is under stress, because additional crop injury may occur. Review the specific oxyfluorfen SLN you are using for updated preharvest and grazing restrictions.

Site of action Group 14: protoporphyrinogen oxidase inhibitor

Chemical family Diphenylether

oxyfluorfen (Goal 2XL or Galigan 2E)

Perennial ryegrass only; Oregon and Washington only

Rate 0.125 to 0.375 lb ai/A (8 to 24 oz/A Goal 2XL or Galigan 2E)

Time Apply during fall and midwinter, before or soon after weeds emerge. Apply first before weed (grass) seedlings to be controlled exceed the two-leaf stage, preferably before December 15. Make final applications before mid-January.

Remarks Apply to established fields that have at least six tillers per plant. Fields may be treated more than once but with no more than a total of 24 oz/A during a crop season. Goal and Galigan SLN labels vary by state.

Caution Oxyfluorfen applications might substantially discolor crop foliage. Leaf chlorosis and reduced vegetative growth are typical plant responses to oxyfluorfen treatments. If using a tank-mix with diuron, do not exceed 1.2 lb ai/A diuron in a season. Review the specific oxyfluorfen SLN you are using for updated preharvest and grazing restrictions.

Site of action Group 14: protoporphyrinogen oxidase (PPO) inhibitor

Chemical family Diphenylether

pendimethalin (Prowl H₂O)

Perennial ryegrass only

Rate 2 to 3 lb ai/A (4.2 to 6.3 pints/A Prowl H₂O)

Time Apply at the beginning of significant fall rains, and before weeds germinate. Treatments are most effective with adequate rain or overhead irrigation within 7 days after application.

Remarks For established grass fields only (six or more tillers). Prowl will not control established weeds. See label for specifics on tank-mixes with other herbicides. Removing excessive straw and crop residues may increase effectiveness. Fall applications made to perennial grasses that exceed 6 inches in height may result in reduced weed control due to reduced spray coverage to bare soil.

Caution May temporarily injure grass stands. Tank-mixtures, and applications under extreme weather conditions and to weak stands, may increase crop injury. Do not harvest forage from treated fields within 45 days of application or harvest hay from treated fields within 60 days of application. The PHI for seed production is 90 days and grass seed screenings may not be used in livestock feed. Grass seed straw from treated fields may be fed to livestock and treated fields may be grazed after harvest. Refer to main labels for crop rotation restrictions.

Site of action Group 3: microtubule assembly inhibitor

pyroxasulfone (Zidua SC Herbicide)

West of Cascades in Oregon and Washington only

Rate 0.098 lb ai/A of pyroxasulfone (3.0 oz/A of Zidua SC)

Time Apply before weeds emerge in established perennial ryegrass fields.

Remarks For established perennial ryegrass seed fields west of the cascades. Rainfall or irrigation in the amount of 0.5 inches within 7 to 14 days of application is needed to activate the herbicide.

Caution See Zidua SC label for use precautions and use restrictions. Use Zidua SC only once during the growing season.

Site of action Group 15: inhibits very long chain fatty acid synthesis

pyroxasulfone + flumioxazin (Fierce EZ Herbicide)

Rate 0.032 to 0.064 lb ai/A of flumioxazin + 0.040 to 0.080 lb ai/A of pyroxasulfone (3.0 to 6.0 oz/A of Fierce EZ)

Time Apply before weeds emerge, or no later than the two-leaf stage of volunteer grasses in established perennial ryegrass fields.

Remarks For established perennial ryegrass seed fields. Rainfall or irrigation in the amount of 0.5 inches within 7 to 14 days of application is needed to activate the herbicide.

Caution See Fierce EZ label for use precautions and use restrictions. Use Fierce EZ only once during the growing season.

Site of action (flumioxazin) Group 14: protoporphyrinogen oxidase (PPO) inhibitor, (pyroxasulfone) Group 15: inhibits very long chain fatty acid synthesis

Chemical family (flumioxazin) Dicarboximide; (pyroxasulfone) Isoxazoline

S-metolachlor (several trade names)

Perennial ryegrass only

Rate 0.95 lb ai/A

Time Apply to established stands just before, during, or immediately after the first fall rains or an irrigation. Treat target weeds before they emerge.

Remarks Apply only to stands harvested for seed at least once or planted at least 1 year before treatment. Rain or irrigation is required after application and before weeds emerge for best weed control.

Caution Apply only once during a crop season. Applications when crop is under stress may cause injury. Do not apply after November 15. Tank-mixtures with postemergence herbicides may injure crop. See specific labels for grazing and feeding restrictions based on geography.

Site of action Group 15: inhibits very long chain fatty acid synthesis

Chemical family Chloroacetamide

Highland or Colonial Bentgrass

Note Also see *GRASS SEED—New and Established* for herbicides that may be used on many species of grass grown for seed.

dimethenamid-P (Outlook)

Rate 0.66 to 0.98 lb ai/A (14 to 21 fl oz/A Outlook)

Time Apply in fall before target weeds emerge or in midwinter in a sequential-use program with other herbicides that control emerged weeds.

Remarks Grass seed crops must be established at least 1 year, or have had at least one seed crop harvested, before Outlook is applied. Apply higher rates where denser weed infestations are expected. Excessive straw on the field after harvest may reduce weed control. Sufficient rain or irrigation after application is needed for optimum weed control. May be applied by ground or by air (see label).

Caution Do not apply Outlook in tank-mixtures with other herbicides unless risk of crop injury is acceptable. Subsequent applications may injure crop. Do not allow livestock to graze treated fields for 60 days after application. Treated straw, seed, or seed screenings may be fed to livestock following harvest.

Site of action Group 15: inhibits very long chain fatty acid synthesis

Chemical family Chloroacetamide

diuron (several trade names)

Rate 1.6 to 2.4 lb ai/A (2 to 3 lb/A of an 80DF formulation)

Time Apply at the start of germination of weed seeds after the first fall rains.

Remarks There are several suppliers of diuron; check labels for crop and geographical restrictions. To control weedy annual grasses in established grass stands. Treat before weeds are well established (normally, October 1 to November 15). Use rates of up to 3 lb ai/A diuron for adequate control in situations where heavy residue exists.

Caution Apply only to well-established grasses that have been harvested for seed at least once. Apply uniformly to prevent crop damage in the seed field. Mechanically agitate to keep diuron in suspension. Do not use on sandy soils. Diuron may injure bentgrass top growth.

Site of action Group 7: photosystem II inhibitor

Chemical family Substituted urea

ethofumesate (several trade names)

Rate 0.75 to 1.5 lb ai/A

Time Apply to moist soil surface after fall rains start. Apply to annual bluegrass preemergence through three-leaf stage, and to raitail fescue, volunteer wheat and wild oat before the two-leaf stage.

Remarks Controls most annual broadleaf and grass weeds but not annual or perennial ryegrass.

Caution Spray only fields seeded at least 12 months. Mechanically remove or spread all crop residue before spraying. Do not tank mix with other herbicides. Do not graze treated fields. Do not rotate with any crops other than sugar beets or ryegrass for 12 months after application.

Site of action Group 16: unknown

Chemical family Benzofuran

metribuzin (several trade names)

Oregon only, west of Cascades and in Crook, Deschutes and Wasco counties

Rate 0.285 to 0.375 lb ai/A

Time When volunteer grasses are in the one- to two-leaf stage of growth after fall rains or irrigation and before active spring growth.

Remarks Apply only to established bentgrass that has had at least one seed harvest. Preharvest interval is 120 days.

Caution Do not apply to a crop that is under stress. Do not tank mix with other herbicides. Do not apply more than once per year. Allow at least 28 days after application before grazing or using any plant part for livestock feed or bedding.

Site of action Group 5: photosystem II inhibitor

Chemical family Triazinone

oxyfluorfen (Goal 2XL or Galigan 2E)

Oregon and Washington only

Rate 0.125 to 0.375 lb ai/A (8 to 24 fl oz/A Goal 2XL or Galigan 2E)

Time Apply on established stands in fall and midwinter, before and soon after weeds emerge. Apply first before weed (grass) seedlings to be controlled exceed the two-leaf stage, preferably before December 15. Make final applications before mid-January.

Remarks Apply to established fields with at least six tillers per plant. Fields may be treated more than once but with no more than a total of 24 oz/A during a crop season. Goal and Galigan SLN labels vary by state.

Caution Applications may substantially discolor crop foliage. Leaf chlorosis and reduced vegetative growth is a typical plant response. If using a tank-mix with diuron, do not apply more than 1.2 lb ai/A diuron in a season. Review the specific oxyfluorfen SLN you are using for updated preharvest and grazing restrictions.

Site of action Group 14: protoporphyrinogen oxidase (PPO) inhibitor

Chemical family Diphenylether

pendimethalin (Prowl H₂O)

Rate 2 to 3 lb ai/A (4.2 to 6.3 pints/A Prowl H₂O)

Time Apply at the beginning of significant fall rains and before weeds germinate. Treatments are most effective with adequate rain or overhead irrigation within 7 days after application.

Remarks For established grass fields only (six or more tillers). Prowl will not control established weeds. See label for specifics on tank-mixes with other herbicides. Removing excessive straw and crop residues may increase effectiveness. Fall applications made to perennial grasses which exceed 6 inches in height may result in reduced weed control due to reduced spray coverage to bare soil.

Caution May temporarily injure grass stands. Tank-mixtures and applications in extreme weather and to weak stands may increase crop injury. Do not harvest forage from treated fields within 45 days of application or harvest hay from treated fields within 60 days of application. The PHI for seed production is 90 days and grass seed screenings may not be used in livestock feed. Grass seed straw from treated fields may be fed to livestock and treated fields may be grazed after harvest. Refer to main labels for crop rotation restrictions.

Site of action Group 3: microtubule assembly inhibitor

Chemical family Dinitroaniline

S-metolachlor (several trade names)

Rate 0.95 to 1.27 lb ai/A

Time Apply to established stands just before, during, or immediately after the first fall rains or an irrigation. Treat target weeds before they emerge.

Remarks Apply only to stands harvested for seed at least once or planted at least 1 year before treatment. Rain or irrigation is required after application and before weeds emerge for best weed control.

Caution Apply only once per crop season. Do not apply after November 15. Tank-mixtures with postemergence herbicides may injure crop. See specific labels for grazing and feeding restrictions based on geography.

Site of action Group 15: inhibits very long chain fatty acid synthesis

Chemical family Chloroacetamide

Creeping Bentgrass

Note Also see *GRASS SEED—New and Established* for herbicides that may be used on many species of grass grown for seed.

dimethenamid-P (Outlook)

Rate 0.66 to 0.98 lb ai/A (14 to 21 fl oz/A Outlook)

Time Apply in fall before targeted weeds emerge, or in midwinter in a sequential-use program with other herbicides that control emerged weeds.

Remarks Grass seed crops must be established at least 1 year, or have had at least one seed crop harvested before Outlook is applied. Apply higher rates where denser weed infestations are expected. Excessive straw on the field after harvest may reduce weed control. Sufficient rain or irrigation after application is needed for optimum weed control. May be applied by ground or by air (see label).

Caution Do not apply Outlook in tank-mixtures with other herbicides unless risk of crop injury is acceptable. Subsequent applications may injure crop. Do not allow livestock to graze treated fields for 60 days after application. Treated straw, seed, or seed screenings may be fed to livestock following harvest.

Site of action Group 15: inhibits very long chain fatty acid synthesis

Chemical family Chloroacetamide

ethofumesate (several trade names)

Rate 0.75 to 1.5 lb ai/A

Time Apply to moist soil surface after fall rains start. Apply from preemergence to four-leaf stage of weeds, or before two-leaf stage to control rattail fescue, volunteer wheat and wild oat.

Remarks Controls most annual broadleaf and grass weeds but not annual or perennial ryegrass.

Caution Spray only fields seeded at least 12 months. Mechanically remove or spread all crop residue before spraying. Do not tank mix with other herbicides. Do not graze treated fields. Do not rotate with any crops other than sugar beets or ryegrass for 12 months after application.

Site of action Group 16: unknown

Chemical family Benzofuran

metribuzin (several trade names)

Oregon west of Cascades, and in Crook, Deschutes and Wasco counties

Rate 0.285 to 0.375 lb ai/A

Time When volunteer grasses are in the one- to two-leaf stage of growth after fall rains or irrigation and before active spring growth.

Remarks Apply only to established bentgrass that has had at least one seed harvest. Wait to harvest at least 120 days after applying.

Caution Do not apply to a crop that is under stress. Do not tank mix with other herbicides. Do not apply more than once per year. Allow at least 28 days after application before grazing or using any plant part for livestock feed or bedding. See additional cautions on individual labels.

Site of action Group 5: photosystem II inhibitor

Chemical family Triazinone

oxyfluorfen (Goal 2XL or Galigan 2E)

Oregon and Washington only

Rate 0.125 to 0.375 lb ai/A (8 to 24 fl oz/A Goal 2XL or Galigan 2E)

Time Apply on established stands in fall and midwinter, before and soon after weeds emerge. Apply first before weed (grass) seedlings to be controlled exceed the two-leaf stage, preferably before December 15. Make final applications before mid-January.

Remarks Apply to established fields with at least six tillers per plant. Fields may be treated more than once but with no more than a total of 24 oz/A during a crop season. Goal and Galigan SLN labels vary by state.

Caution Applications may substantially discolor crop foliage; leaf chlorosis and reduced vegetative growth are typical plant responses. If tank mixed with diuron, do not exceed 1.2 lb ai/A diuron in a season. Review the specific oxyfluorfen SLN you are using for updated preharvest and grazing restrictions.

Site of action Group 14: protoporphyrinogen oxidase (PPO) inhibitor

Chemical family Diphenylether

pendimethalin (Prowl H₂O)

Rate 2 to 3 lb ai/A (4.2 to 6.3 pints/A Prowl H₂O)

Time Apply at the beginning of significant fall rains and before weeds germinate. Treatments are most effective with adequate rain or overhead irrigation within 7 days after application.

Remarks For established grass fields only (six or more tillers). Prowl will not control established weeds. See label for specifics on tank-mixes with other herbicides. Removing excessive straw and crop residues may increase effectiveness. Fall applications made to perennial grasses which exceed 6 inches in height may result in reduced weed control due to reduced spray coverage to bare soil.

Caution May temporarily injure grass stands. Tank-mixtures and applications in extreme weather and to weak stands may increase crop injury. Do not harvest forage from treated fields within 45 days of application or harvest hay from treated fields within 60 days of application. The PHI for seed production is 90 days and grass seed screenings may not be used in livestock feed. Grass seed straw from treated fields may be fed to livestock and treated fields may be grazed after harvest. Refer to main labels for crop rotation restrictions.

Site of action Group 3: microtubule assembly inhibitor

Chemical family Dinitroaniline

S-metolachlor (several trade names)

Rate 0.95 to 1.27 lb ai/A

Time Apply to established stands just before, during, or immediately after the first fall rains or an irrigation. Treat target weeds before they emerge.

Remarks Apply only to stands harvested for seed at least once or planted at least 1 year before treatment. Rain or irrigation is required after application and before weeds emerge for best weed control.

Caution Apply only once per crop season. Do not apply after November 15. Tank-mixtures with postemergence herbicides may injure crop. See specific labels for grazing and feeding restrictions based on geography.

Site of action Group 15: inhibits very long chain fatty acid synthesis

Chemical family Chloroacetamide

Kentucky Bluegrass

Note Also see *GRASS SEED—New and Established* for herbicides that may be used on many species of grass grown for seed.

bromoxynil + pyrasulfotole (Huskie)

Rate 0.185 to 0.205 lb ai/A bromoxynil + 0.033 to 0.036 lb ai/A pyrasulfotole (13.5 to 15 oz/A Huskie)

Time Apply from preemergence to established Kentucky bluegrass. See label for weed size recommendations and application timings, but control of most species is best at the 15 fl oz/A rate when weeds have from one to six leaves. Two applications of Huskie can be made per year separated by at least 30 days.

Remarks For most consistent weed control under adverse growing conditions, add ammonium sulfate or an ammonium nitrogen source as directed by the spray additives section of the label, but do not use these additives if grass crop injury is a concern. Huskie may be tank mixed with a variety of other broadleaf and grass herbicides and other pesticides; see label for instructions.

Caution See label for crop rotation restrictions. Wheat, triticale, and oats may be planted 1 month after application; most other crops may be planted 9 months after application. Do not graze or cut grass for forage within 7 days of application, or cut grass for hay within 30 days of application. Do not exceed 30 oz/A of Huskie per acre per year. Aerial and chemigation applications are prohibited.

Site of action (bromoxynil) Group 6: photosystem II inhibitor; (pyrasulfotole) Group 27: inhibits 4hydroxyphenylpyruvatedioxygenase (4-HPPD)

Chemical family (bromoxynil) Nitrile; (pyrasulfotole) Isoxazole

dicamba (Clarity, several trade names)

Rate 0.25 to 2 lb ae/A

Time Apply before broadleaf weeds have more than two true leaves in fall or late summer. Spray within 10 days after the first fall irrigation or fall rain that will start weed germination.

Remarks Suppresses downy brome (cheatgrass), rattail fescue, and other grassy and broadleaf weeds in bluegrasses. Spray when soil is moist.

Caution Spray on well-established grass stands. Mechanically remove or spread all crop residue before spraying. See specific labels for grazing restrictions.

Site of action Group 4: synthetic auxin

Chemical family Benzoic acid

dimethenamid-P (Outlook, several trade names)

Rate 0.66 to 0.98 lb ai/A (14 to 21 fl oz/A Outlook)

Time Apply to established stands in the fall before targeted weeds emerge, or in a sequential-use program with other herbicides that control emerged weeds. Apply prior to irrigation or activating rainfall for best activity.

Remarks Grass seed crops must be established at least 1 year or have had at least one seed crop harvested before Outlook is applied. Apply higher rates where denser weed infestations are expected. Excessive straw on the field after harvest may reduce weed control. Sufficient rain or irrigation after application is needed for optimum weed control. May be applied by ground or by air (see label).

Caution Do not apply Outlook in tank-mixtures with other herbicides unless risk of crop injury is acceptable. Subsequent applications may injure crop. Do not allow livestock to graze treated fields for 60 days after application. Treated straw, seed, or seed screenings may be fed to livestock after harvest.

Site of action Group 15: inhibits very long chain fatty acid synthesis

Chemical family Chloroacetamide

diuron (Karmex DF, several trade names)

Rate Established stands: 1.6 to 2.4 lb ai/A; new establishments: spring-planted seedling stands: 1.6 lb ai/A or less

Time Apply in fall as rains start weed seed germination. Spray before weed establishment, usually in mid-November.

Remarks Controls annual grasses or broadleaf weeds in new or established stands. Does not control downy brome. Apply 2.4 lb ai/A as early as late October, but before November 15. There are several suppliers of diuron. Check specific labels for crop and geographic restrictions, which can vary considerably between formulations. Allowed for new plantings in conjunction with carbon-banding system.

Caution Well-established, vigorous stands of spring-planted grass may be treated the following fall if the crop is planted before April 1 and treatment is not before October 15. Mechanically remove or spread all crop residue before spraying. Grass is injured when the maximum rate is applied for two consecutive years. Use a sprayer with mechanical agitation; be careful to avoid overlaps in the spray pattern. If application uniformity is poor with desired equipment, spray each field twice at half the desired application rate to prevent skips in application.

Site of action Group 7: photosystem II inhibitor

Chemical family Substituted urea

ethofumesate (Nortron, several trade names)

Rate 1.0 lb ai/A

Time Apply to moist soil surface after fall rains start, or with appropriate irrigation. Apply to annual bluegrass preemergence through three-leaf stage and to raitail fescue, cheatgrass, volunteer wheat and wild oat before the two-leaf stage.

Remarks Controls most annual broadleaf and grass weeds but not annual or perennial ryegrass.

Caution Spray only fields seeded at least 12 months. Mechanically remove or spread all crop residue before spraying. Do not tank mix with other herbicides. Do not graze treated fields. Do not rotate with any crops other than sugarbeets or ryegrass for 12 months after application.

Site of action Group 15: inhibits very long chain fatty acid synthesis

Chemical family Benzofuran

flufenacet + metribuzin (Axiom DF)

Rate 0.3 to 0.4 lb ai/A flufenacet + 0.076 to 0.111 lb ai/A metribuzin (9 to 13 oz/A Axiom)

Time Apply before weeds emerge or no later than the two-leaf stage of volunteer grasses. Applications after mid-November may result in crop injury and/or poor weed control.

Remarks For established grass seed fields only, at least 1 year old or after first seed harvest. Excessive straw on field after harvest may reduce weed control. Rain or irrigation after application is needed for weed control.

Caution Do not apply in tank-mixtures with postemergence herbicides. Applying oxyfluorfen or photosynthesis-inhibiting postemergence herbicides within 4 weeks of Axiom applications may injure crop. Do not allow animals to graze treated fields for a minimum of 30 days following application. Preharvest interval is 120 days. Do not apply more than once per year.

Site of action (flufenacet) Group 15: inhibits very long chain fatty acid synthesis; (metribuzin) Group 5: photosystem II inhibitor

Chemical family (flufenacet) Oxyacetamide; (metribuzin) Triazinone

mesotrione (Callisto, several trade names)

Rate 0.094 to 0.188 lb ai/A (3 to 6 oz/A Callisto)

Time Apply preemergence to bare soil (new seedings) or early postemergence to bluegrass grown for seed. Split applications are allowed, with restrictions.

Remarks Use higher application rates for control and suppression of grass and broadleaf weed species, and for extended soil residual control. The addition of a crop oil concentrate or nonionic surfactant at a rate of 1% v/v is recommended to optimize activity of postemergence applications. In addition, urea ammonium nitrate at 2.5% v/v or ammonium sulfate at a rate of 8.5 lb/100 gal of spray solution may be added, but increases the risk of grass seed crop injury at rates above 3oz/A of Callisto.

Caution Preharvest interval for seed and straw harvest is 60 days. Do not graze or feed forage from treated fields within 14 days after harvest of seed or straw, and at least 74 days after application. Do not exceed two applications or 9 oz/A of Callisto per year. Do not make a second application within 14 days of the first. Do not exceed a total of 0.19 lb ai/a (6 oz/a Callisto) in a single application, or a total of 0.282 lb ai/a (9 oz/a Callisto) per year. Do not tank mix Callisto with other pesticides with EC formulations, because crop injury will result from postemergence applications.

Site of action Group 27: inhibits 4hydroxyphenylpyruvatedioxygenase (4-HPPD)

Chemical family Triketone

metribuzin (Tricor, several trade names)

Washington and in Oregon in all counties west of the Cascades; Oregon east of the Cascades only in Crook, Deschutes, and Jefferson counties.

Rate 0.23 to 0.38 lb ai/A Oregon; 0.15 to 0.3 lb ai/A Washington

Time When volunteer grasses are in the one- to two-leaf stage after fall rain or irrigation but before active spring growth.

Remarks For established grass crops only. Improve control of volunteer crop and grass weeds by adding a blend of surfactant and crop oil at rates recommended on adjuvant label(s). Some crop injury is likely on coarser soils east of the Cascades

Caution Preharvest interval is 28 days for grazing, 120 days for seed harvest. See additional cautions on individual labels.

Site of action Group 5: photosystem II inhibitor

Chemical family Triazinone

oxyfluorfen (Goal 2XL or Galigan 2E)

Goal 2XL in Idaho, Oregon, and Washington; Galigan 2E in Oregon and Washington only

Rate 0.125 to 0.375 lb ai/A (8 to 24 oz/A Goal 2XL or Galigan 2E)

Time Apply on established stands during fall (both sides of Cascades) or midwinter (west of Cascades). Apply before or soon after weeds emerge. Apply before grass weed seedlings to be controlled exceed the two-leaf stage. In eastern Oregon, apply prior to onset of full winter dormancy in late November. In western Oregon, applications before December 15 are preferred, and make final applications no later than mid-January.

Remarks Apply to established fields with at least six tillers per plant. Fields may be treated more than once, but do not exceed 0.375 lb ai/a (24 oz/A Goal) total in a crop season. Goal and Galigan 2E labels vary by state. Goal and Galigan SLN labels vary by state. Special local needs labels OR-990006B and WA-020027 (Goal) and OR-010028 and WA-010037 (Galigan).

Caution May discolor crop foliage significantly. Leaf chlorosis and reduced vegetative growth are typical plant responses. If using a tank-mix with diuron, do not exceed 1.2 lb ai/A diuron per season. Review the specific oxyfluorfen label you are using for updated preharvest and grazing restrictions, which may be up to 6 to 12 months.

Site of action Group 14: protoporphyrinogen oxidase (PPO) inhibitor

Chemical family Diphenylether

pendimethalin (Prowl H₂O, several trade names)

Rate 2 to 4 lb ai/a (2.1 to 4.2 quarts/a/a Prowl H₂O)

Time Apply at the beginning of significant fall rains and before weeds germinate. Treatments are most effective with adequate rain or overhead irrigation within 7 days after application.

Remarks For established grass fields only (six or more tillers). Prowl will not control established weeds. See label for specifics on tank-mixes with other herbicides. Removing excessive straw and crop residues may increase effectiveness. Fall applications made to perennial grasses which exceed 6 inches in height may result in reduced weed control due to reduced spray coverage to bare soil.

Caution May temporarily injure grass stands. Tank-mixtures and applications in extreme weather and to weak stands may increase crop injury. Do not harvest forage from treated fields within 45 days of application or harvest hay from treated fields within 60 days of application. The PHI for seed production is 90 days and grass seed screenings may not be used in livestock feed. Grass seed straw from treated fields may be fed to livestock and treated fields may be grazed after harvest. Refer to main labels for crop rotation restrictions.

Site of action Group 3: microtubule assembly inhibitor

Chemical family Dinitroaniline

primisulfuron-methyl (Beacon)

Oregon and Washington only

Rate 0.0356 lb ai/A (0.76 oz/A Beacon)

Time Apply to recently emerged, actively growing weeds no larger than the size listed on the label. The Kentucky bluegrass crop should be growing vigorously under favorable conditions at application time. Avoid applications when low temperatures will fall below 29 F for 3 days before and after application.

Remarks Apply postemergence to seedling and established stands of Kentucky bluegrass that have at least one tiller (4-5 leaves) but before jointing. Applications can be split into two applications of 0.38 oz/A each, but do not exceed 0.76 oz/A. Beacon during one crop season. Special local needs labels OR-960025 and WA-960002. Visit farmassist.com/Labels/IndemnifiedLabels.aspx to obtain label and indemnification agreement. Primisulfuron-methyl not currently available in retail market.

Caution Applications may injure Kentucky bluegrass crop, particularly during times of crop stress or freezing temperatures. Take special care in cleaning spray equipment; read label for directions. Do not apply to bluegrass under stress. Do not irrigate within 4 hr of application. Do not graze or use forage from treated fields until after harvest. Straw and screenings from harvested fields may be fed to livestock. Do not graze within 90 days of application. Preharvest interval is 60 days.

Site of action Group 2: acetolactate synthase (ALS) inhibitor

Chemical family Sulfonylurea

primisulfuron-methyl + dicamba (NorthStar)

Oregon only

Rate 0.023 lb ai/a primisulfuron-methyl + 0.125 lb ae/ac dicamba (5 oz/a NorthStar)

Time Apply to recently emerged, actively growing weeds no larger than the size listed on the label. The Kentucky bluegrass crop should be growing vigorously under favorable conditions at application. Avoid applications when low temperatures will fall below 29 F for 3 days before and after application.

Remarks Apply postemergence to seedling stands of Kentucky bluegrass that have at least one tiller (4-5 leaves) but before jointing in the year of establishment only. A crop oil concentrate is recommended for applications of NorthStar alone. Tank mixing with other herbicides is not recommended. Applications can be split into two applications of 0.38 oz/a each, but do not exceed 0.76 oz/a Beacon during one crop season. Special local needs labels OR-190013. Primisulfuron-methyl not currently available in retail market.

Caution Applications may injure Kentucky bluegrass crop, particularly during times of crop stress or freezing temperatures. Take special care in cleaning spray equipment; read label for directions. Do not apply to bluegrass under stress. Do not irrigate within 4 hours of application. Do not graze or use forage from treated fields until after harvest. Straw and screenings from harvested fields may be fed to livestock. Do not graze within 90 days of application. Preharvest interval is 60 days. Do not apply in tank mixture with, nor within 10 days before or after application of any organophosphate insecticide. Do not exceed a total of 7.6oz/a NorthStar during one crop season.

Site of action (primisulfuron-methyl) Group 2: acetolactate synthase (ALS) inhibitor, (dicamba) Group 4: synthetic auxin

Chemical family (primisulfuron-methyl) Sulfonylurea, (dicamba) Benzoic Acid

S-metolachlor (Dual II Magnum, several trade names)

Rate 0.95 to 1.27 lb ai/A

Time Apply to established stands just before, during, or immediately after the first fall rains or an irrigation. Treat target weeds before they emerge.

Remarks Apply only to stands harvested for seed at least once, or planted at least 1 year before treatment. Rain or irrigation is required after application and before weeds emerge for best weed control.

Caution Apply only once per crop season. Do not apply after November 15. Tank-mixtures with postemergence herbicides may injure crop. See specific labels for grazing and feeding restrictions based on geography.

Site of action Group 15: inhibits very long chain fatty acid synthesis

Chemical family Chloroacetamide

terbacil (Sinbar WDG)

Rate 0.4 to 0.8 lb ai/A (0.5 to 1 lb/A Sinbar WDG)

Time Spray before weed establishment after fall rains start weed germination, usually mid-November. One inch of rain or irrigation is needed after application for good control.

Remarks To control annual grasses or broadleaf weeds in established bluegrass fields. Rotation restrictions may be up to 2 years

Caution Mechanically remove or spread all crop residue before spraying. Apply only to well-established fields that have been harvested at least once for seed. Soil residues may persist for 2 years. Do not graze treated fields. May cause crop injury when crop is under stress caused by weather, insects, or disease. See label for soil type restrictions.

Site of action Group 5: photosystem II inhibitor.

Chemical family Uracil

Fine Fescues (Creeping Red, Chewings, and Hard Fescue)

Note Also see *GRASS SEED—New and Established* for herbicides that may be used on many species of grass grown for seed.

bromoxynil + pyrasulfotole (Huskie)

Rate 0.185 to 0.205 lb ai/A bromoxynil + 0.033 to 0.036 lb ai/A pyrasulfotole (13.5 to 15 oz/A Huskie)

Time Apply from preemergence to established fine fescues. See label for weed size recommendations and application timings, but control of most species is best at the 15 fl oz/A rate when weeds have from one to six leaves. Two applications of Huskie can be made per year separated by at least 30 days.

Remarks For most consistent weed control under adverse growing conditions, add AMS or an ammonium nitrogen source as directed by the spray additives section of the label, but do not use these additives if grass crop injury is a concern. Huskie may be tank mixed with a variety of other broadleaf and grass herbicides and other pesticides; see label for instructions.

Caution See label for crop rotation restrictions. Wheat, triticale, and oats may be planted 1 month after application; most other crops may be planted 9 months after application. Do not graze or cut grass for forage within 7 days of application, or cut grass for hay within 30 days of application. Do not exceed 30 oz/A of Huskie per year. Aerial and chemigation applications are prohibited.

Site of action (bromoxynil) Group 6: photosystem II inhibitor;(pyrasulfotole) Group 27: inhibits 4hydroxyphenylpyruvatedioxygenase (4-HPPD)

Chemical family (bromoxynil) Nitrile; (pyrasulfotole) Isoxazole

dicamba (several trade names)

Rate 0.25 to 1 lb ai/A

Time Apply before broadleaf weeds have more than two leaves in summer or fall. Spray within 10 days after the first fall irrigation or rain starts weed germination.

Remarks Suppresses downy brome (cheatgrass), rattail fescue, and other grassy and broadleaf weeds in creeping red and Chewings fescue. Spray when soil is moist. The maximum use rate per season is 2 lb ai/A.

Caution Spray on well-established stands of grass. Uniformly burn fields, and mechanically spread unburned residues before spraying. See specific labels for grazing restrictions.

Site of action Group 4: synthetic auxin

Chemical family Benzoic acid

dimethenamid-P (Outlook)

Rate 0.66 to 0.98 lb ai/A (14 to 21 fl oz/A Outlook)

Time Apply in the fall before targeted weeds emerge or in midwinter in a sequential-use program with other herbicides that control emerged weeds.

Remarks Grass seed crops must be established at least 1 year or have had at least one seed crop harvested before Outlook is applied. Apply higher rates where denser weed infestations are expected. Excessive straw on the field after harvest may reduce weed control. Sufficient rain or irrigation after application is needed for optimum weed control. May be applied by ground or by air (see label).

Caution Do not apply Outlook in tank-mixtures with other herbicides unless risk of crop injury is acceptable. Subsequent applications may injure crop. Do not allow livestock to graze treated fields for 60 days after application. Treated straw, seed, or seed screenings may be fed to livestock following harvest.

Site of action Group 15: inhibits very long chain fatty acid synthesis

Chemical family Chloroacetamide

diuron (several trade names)

Washington and Oregon only

Rate 0.8 to 1.6 lb ai/A (1 to 2 lb/A of an 80DF formulation)

Time At the onset of fall rains and before weeds are beyond the two- to four-leaf stage.

Remarks Apply only to well-established, vigorous stands of grass. Refer to label for specific directions.

Caution Apply only once a year. Do not use diuron more than 2 year in a row on the same field.

Site of action Group 7: photosystem II inhibitor

Chemical family Substituted urea

EPTC (Eptam 7 EC Selective Herbicide)

Rate 3.01 to 4.38 lb ai/A (3.5 to 5.0 pints/A of Eptam)

Time Apply to dry soil in established grass seed fields prior to any weed emergence immediately before rain or irrigation to minimize losses to volatilization.

Remarks Rainfall or irrigation in the amount of 0.25 to 0.5 inches within 36 hr of application is needed to activate the herbicide.

Caution See Eptam label for use precautions and use restrictions. Use Eptam only once during the growing season.

Site of action Group 8: inhibitor of lipid synthesis; not ACCase inhibition

Chemical family Thiocarbamate

fluazifop (Fusilade DX)

Rate 0.125 to 0.25 lb ai/A (0.5 to 1 pint/A Fusilade DX)

Time Apply to actively growing grasses, 2 to 4 inches tall; normally, this is in November. Early spring timing normally is March.

Remarks Controls grasses in creeping red, Chewings, and hard fescue varieties; does not control broadleaf weeds or sedges. The lower rate normally controls grasses 2 to 4 inches tall, but larger, established grasses (4 to 6 inches) may need higher rate for control. Established quackgrass and bentgrass require the higher rate and may need a second application for adequate control. A total of 0.5 lb ai/A may be applied per season but no more than 0.25 lb ai/A at one time. Special local needs labels OR-950013, ID-040003, and WA-040024.

Caution Do not apply after boot stage. Do not graze treated fields. Use a crop oil concentrate or nonionic surfactant for adequate weed control. Tall fescue does not tolerate fluazifop.

Site of action Group 1: acetyl CoA carboxylase (ACCCase) inhibitor

Chemical family Aryloxyphenoxy propionate

flufenacet + metribuzin (Axiom DF)

Idaho and Washington, and Oregon, except for Jefferson County

Rate 0.3 to 0.4 lb ai/A flufenacet + 0.076 to 0.111 lb ai/A metribuzin (9 to 13 oz/A Axiom)

Time Apply before weeds emerge, or no later than the two-leaf stage of volunteer grasses. Applications after mid-November may result in crop injury and/or poor weed control.

Remarks For established grass seed fields only (at least 1 year old or after first seed harvest). Weed control may be reduced if excessive straw remains on field after harvest. Rain or irrigation after application is needed for good weed control.

Caution Do not apply in tank-mixtures with postemergence herbicides. Applying oxyfluorfen or photosynthesis-inhibiting postemergence herbicides within 4 weeks of Axiom applications may injure crop. Do not allow animals to graze treated fields for a minimum of 30 days following application. Preharvest interval is 120 days. Do not apply more than once per year.

Site of action (flufenacet) Group 15: inhibits very long chain fatty acid synthesis; (metribuzin) Group 5: photosystem II inhibitor

Chemical family (flufenacet) Oxyacetamide; (metribuzin) Triazinone

metribuzin (several trade names)

Western Oregon and Crook, Deschutes, Jefferson, and Wasco counties; and Washington only

Rate 0.25 to 0.38 lb ai/A

Time When volunteer grasses are in the one- to two-leaf stage after fall rain or irrigation but before active spring growth.

Remarks Established grass crops only. Improve volunteer crop and grass weed control by adding a surfactant/crop oil blend at rates recommended on the wetting agent label.

Caution Allow at least 28 days after application before grazing. Preharvest interval is 120 days. See additional cautions on individual labels.

Site of action Group 5: photosystem II inhibitor

Chemical family Triazinone

oxyfluorfen (Goal 2XL or Galigan 2E)

Oregon and Washington only

Rate 0.12 lb ai/A (8 oz/A Goal 2XL or Galigan 2E)

Time Apply on established stands in fall and early winter (September 1 to December 15), before or soon after weeds emerge. Make a single application before weed (grass) seedlings to be controlled exceed the two-leaf stage.

Remarks Apply to established fields with at least six tillers. Apply only once per crop season. Goal and Galigan SLN labels vary by state.

Caution Applications may substantially discolor crop foliage; leaf chlorosis and reduced vegetative growth are typical plant responses. Review the specific oxyfluorfen SLN you are using for updated preharvest and grazing restrictions.

Site of action Group 14: protoporphyrinogen oxidase (PPO) inhibitor

Chemical family Diphenylether

pendimethalin (Prowl H₂O)

Rate 2 to 3 lb ai/A (4.2 to 6.3 pints/A Prowl H₂O)

Time Apply at the beginning of significant fall rains and before weeds germinate. Treatments are most effective with adequate rain or overhead irrigation within 7 days after application.

Remarks For established grass fields only (six or more tillers). Prowl will not control established weeds. See label for specifics on tank-mixes with other herbicides. Removing excessive straw and crop residues may increase effectiveness. Fall applications made to perennial grasses that exceed 6 inches in height may result in reduced weed control due to reduced spray coverage to bare soil.

Caution May temporarily injure grass stands. Tank-mixtures and applications in extreme weather and to weak stands may increase crop injury. Do not harvest forage from treated fields within 45 days of application or harvest hay from treated fields within 60 days of application. The PHI

for seed production is 90 days and grass seed screenings may not be used in livestock feed. Grass seed straw from treated fields may be fed to livestock, and treated fields may be grazed after harvest. Refer to main labels for crop rotation restrictions.

Site of action Group 3: microtubule assembly inhibitor

Chemical family Dinitroaniline

pyroxasulfone + flumioxazin (Fierce EZ Herbicide)

Rate 0.032 to 0.064 lb ai/A of flumioxazin + 0.040 to 0.080 lb ai/A of pyroxasulfone (3.0 to 6.0 oz/A of Fierce EZ)

Time Apply before weeds emerge, or no later than the two-leaf stage of volunteer grasses in established perennial ryegrass fields.

Remarks Rainfall or irrigation in the amount of 0.5 inches within 7 to 14 days of application is needed to activate the herbicide.

Caution See Fierce EZ label for use precautions and use restrictions. Use Fierce EZ only once during the growing season.

Site of action (flumioxazin) Group 14: protoporphyrinogen oxidase (PPO) inhibitor, (pyroxasulfone) Group 15: inhibits very long chain fatty acid synthesis.

Chemical family (flumioxazin) Dicarboximide; (pyroxasulfone) Isoxazoline

sethoxydim (Poast)

Oregon only

Rate 0.28 to 0.47 lb ai/A (1.5 to 2.5 pints/A Poast)

Time Apply when fine fescue is semi-dormant (generally November 1 through March 15).

Remarks To control annual ryegrass, downy brome, German velvetgrass, and colonial and highland bentgrass. Poast does not control broadleaf weeds, sedges, annual bluegrass, or rattail fescue and will injure tall fescue.

Caution Do not feed treated grasses, forage, hay, silage, straw, seed, or seed screenings to livestock.

Site of action Group 1: acetyl CoA carboxylase (ACCase) inhibitor

Chemical family Cyclohexanedione

S-metolachlor (several trade names)

Rate 0.95 lb ai/A

Time Apply to established stands just before, during, or immediately after the first fall rains or an irrigation. Treat target weeds before they emerge.

Remarks Apply only to stands harvested for seed at least once, or planted at least 1 year before treatment. Rain or irrigation is required after application and before weeds emerge for best weed control.

Caution Apply only once during a crop season. Application may injure a crop under stress. Do not apply after November 15. Tank-mixtures with postemergence herbicides may injure crop. See specific labels for grazing and feeding restrictions based on geography.

Site of action Group 15: inhibits very long chain fatty acid synthesis

Chemical family Chloroacetamide

terbacil (Sinbar WDG)

Rate 0.4 to 0.8 lb ai/A (0.5 to 1 lb/A Sinbar WDG)

Time Apply in the fall 4 to 6 weeks after burning fields, and after 2 inches of rain or irrigation to allow ash to disperse.

Remarks Controls downy brome (cheatgrass), rattail fescue, and other grassy and broadleaf weeds in creeping red and Chewings fescue.

Caution One inch of moisture is required within 2 weeks after application for satisfactory weed control. Apply only to well-established fields harvested at least once for seed. Herbicide residues remain in soil up to 2 years. Do not graze treated fields. May injure crops stressed by weather, insects, or disease. See label for soil type restrictions.

Site of action Group 5: photosystem II inhibitor

Chemical family Uracil

Orchardgrass

Note Also see *GRASS SEED—New and Established* for herbicides that may be used on many species of grass grown for seed.

bromoxynil + pyrasulfotole (Huskie)

Rate 0.185 to 0.205 lb ai/A bromoxynil + 0.033 to 0.036 lb ai/A pyrasulfotole (13.5 to 15 oz/A Huskie)

Time Apply from preemergence to established orchardgrass. See label for weed size recommendations and application timings, but control of most species is best at the 15 fl oz/A rate when weeds have from one to six leaves. Two applications of Huskie can be made per year separated by at least 30 days.

Remarks For most consistent weed control under adverse growing conditions, add AMS or an ammonium nitrogen source as directed by the spray additives section of the label, but do not use these additives if grass crop injury is a concern. Huskie may be tank mixed with a variety of other broadleaf and grass herbicides and other pesticides; see label for instructions.

Caution See label for crop rotation restrictions. Wheat, triticale, and oats may be planted 1 month after application; most other crops may be planted 9 months after application. Do not graze or cut grass for forage within 7 days of application, or cut grass for hay within 30 days of application. Do not exceed 30 oz/A of Huskie per year. Aerial and chemigation applications are prohibited.

Site of action (bromoxynil) Group 6: photosystem II inhibitor;(pyrasulfotole) Group 27: inhibits 4hydroxyphenylpyruvatedioxygenase (4-HPPD)

Chemical family (bromoxynil) Nitrile; (pyrasulfotole) Isoxazole

dimethenamid-P (Outlook)

Rate 0.66 to 0.98 lb ai/A (14 to 21 fl oz/A Outlook)

Time Apply in fall before targeted weeds emerge or in midwinter in a sequential-use program with other herbicides that control emerged weeds.

Remarks Grass seed crops must be established at least 1 year or have had at least one seed crop harvested before Outlook is applied. Apply higher rates where denser weed infestations are expected. Excessive straw on the field after harvest may reduce weed control. Sufficient rain or irrigation after application is needed for optimum weed control. May be applied by ground or by air (see label).

Caution Do not apply Outlook in tank-mixtures with other herbicides unless risk of crop injury is acceptable. Subsequent applications may injure crop. Do not allow livestock to graze treated fields for 60 days after application. Treated straw, seed, or seed screenings may be fed to livestock following harvest.

Site of action Group 15: inhibits very long chain fatty acid synthesis

Chemical family Chloroacetamide

diuron (several trade names)

Western Oregon only

Rate Established stands 1.6 to 2.4 lb ai/A; new establishments 1.6 lb ai/A or less

Time Apply in fall as rains start weed seed germination. Spray before weeds establish, usually in mid-November.

Remarks Controls annual grasses or broadleaf weeds in new or established stands. A split application more effectively controls annual bluegrass. Apply 2.4 lb ai/A in late October and before November 15. There are several suppliers of diuron. Check labels for crop and geographical restrictions.

Caution Well-established, vigorous grass stands planted before April 1 may be treated after October 15. Uniformly spread or bale crop residue before spraying. Use higher rates if considerable crop residue remains in the field. Higher rates 2 years in succession will injure grass. Use a sprayer with mechanical agitation; be careful to avoid spray pattern overlaps. Spray each field twice at half the desired application rate to prevent skips in application.

Site of action Group 7: photosystem II inhibitor

Chemical family Substituted urea

EPTC (Eptam 7 EC Selective Herbicide)

Rate 3.01 to 4.38 lb ai/A (3.5 to 5.0 pints/A of Eptam)

Time Apply to dry soil in established grass seed fields prior to any weed emergence immediately before rain or irrigation to minimize losses to volatilization.

Remarks Rainfall or irrigation in the amount of 0.25 to 0.5 inches within 36 hr of application is needed to activate the herbicide.

Caution See Eptam label for use precautions and use restrictions. Use Eptam only once during the growing season.

Site of action Group 8: inhibitor of lipid synthesis; not ACCase inhibition

Chemical family thiocarbamate

flufenacet + metribuzin (Axiom DF)

Idaho, Washington, and Oregon, except for Jefferson County

Rate 0.3 to 0.4 lb ai/A flufenacet + 0.076 to 0.111 lb ai/A metribuzin (9 to 13 oz/A Axiom)

Time Apply before weeds emerge or no later than the two-leaf stage of volunteer grasses. Applications after mid-November may injure crop and/or poorly control weeds.

Remarks For established grass seed fields only (at least 1 year old, or after first seed harvest). Weed control may be less if excessive straw is on field after harvest. Sufficient rain or irrigation after application is needed for good weed control.

Caution Do not apply in tank-mixtures with postemergence herbicides. Applying oxyfluorfen or photosynthesis-inhibiting postemergence herbicides within 4 weeks of Axiom may injure crop. Do not allow animals to graze treated fields for a minimum of 30 days following application. Preharvest interval is 120 days. Do not apply more than once per year. Crops have been injured at rates of 11 oz/A and above.

Site of action (flufenacet) Group 15: inhibits very long-chain fatty acid synthesis; (metribuzin) Group 5: photosystem II inhibitor

Chemical family (flufenacet) Oxyacetamide; (metribuzin) Triazinone

metribuzin (several trade names)

Oregon only, west of Cascades and in Crook, Wasco, Deschutes, and Jefferson counties

Rate 0.25 to 0.38 lb ai/A

Time When volunteer grasses are in the one- to two-leaf stage, after fall rain or irrigation but before active spring growth.

Remarks Established grass crops only. Improve volunteer crop and grass weed control by adding a blend of surfactant and crop oil at rates recommended on the wetting agent label.

Caution Allow at least 28 days after application before grazing. Preharvest interval is 120 days. See additional cautions on individual labels.

Site of action Group 5: photosystem II inhibitor

Chemical family Triazinone

oxyfluorfen (Goal 2XL or Galigan 2E)

Oregon and Washington only

Rate 0.125 to 0.375 lb ai/A (8 to 24 oz/A Goal 2XL or Galigan 2E)

Time Apply on established stands in fall and midwinter, before or soon after weeds emerge. Apply first before target grass weed seedlings exceed the two-leaf stage, preferably before December 15. Final applications should be before mid-January.

Remarks Apply to established fields with at least six tillers per plant. Fields may be treated more than once, but do not exceed 24 oz/A total during a crop season. Goal and Galigan SLN labels vary by state.

Caution Applications may substantially discolor crop foliage; leaf chlorosis and reduced vegetative growth are typical plant responses. If tank mixed with diuron, do not exceed 1.2 lb ai/A diuron in a season. Review the specific oxyfluorfen SLN label you are using for updated preharvest and grazing restrictions.

Site of action Group 14: protoporphyrinogen oxidase (PPO) inhibitor

Chemical family Diphenylether

pendimethalin (Prowl H₂O)

Rate 2 to 3 lb ai/A (4.2 to 6.3 pints/A Prowl H₂O)

Time Apply at the beginning of significant fall rains and before weeds germinate. Treatments are most effective with adequate rain or overhead irrigation within 7 days after application.

Remarks For established grass fields only (six or more tillers). Prowl will not control established weeds. See label for specifics on tank-mixes with other herbicides. Removing excessive straw and crop residues may increase effectiveness. Fall applications made to perennial grasses which exceed 6 inches in height may result in reduced weed control due to reduced spray coverage to bare soil.

Caution May temporarily injure grass stands. Tank-mixtures and applications in extreme weather and to weak stands may increase crop injury. Do not harvest forage from treated fields within 45 days of application or harvest hay from treated fields within 60 days of application. The PHI for seed production is 90 days and grass seed screenings may not be used in livestock feed. Grass seed straw from treated fields may be fed to livestock and treated fields may be grazed after harvest. Refer to main labels for crop rotation restrictions.

Site of action Group 3: microtubule assembly inhibitor

Chemical family Dinitroaniline

pronamide (Kerb SC)

Oregon only

Rate 0.25 to 0.375 lb ai/A (10 to 15 oz/A Kerb SC)

Time Apply only on established stands that have produced at least one seed crop. Apply during fall and early winter but not after mid-January.

Remarks Apply between November and mid-January after fall rains have moistened soil and soil temperature is 55°F or less. Apply only once; do not exceed 0.375 lb ai/A Kerb in any one growing season. Special local needs label OR-110013.

Caution **A restricted-use herbicide.** Do not apply to sandy or gravelly areas or to a crop under stress. Do not graze treated fields within 180 days of application. Preharvest interval is 180 days.

Site of action Group 3: microtubule assembly inhibitor

Chemical family Benzamide

pyroxasulfone + flumioxazin (Fierce EZ Herbicide)

Rate 0.032 to 0.064 lb ai/A of flumioxazin + 0.040- 0.080 lb ai/A of pyroxasulfone (3.0 to 6.0 oz/A of Fierce EZ)

Time Apply before weeds emerge, or no later than the two-leaf stage of volunteer grasses in established perennial ryegrass fields.

Remarks Rainfall or irrigation in the amount of 0.5 inches within 7 to 14 days of application is needed to activate the herbicide.

Caution See Fierce EZ label for use precautions and use restrictions. Use Fierce EZ only once during the growing season.

Site of action (flumioxazin) Group 14: protoporphyrinogen oxidase (PPO) inhibitor, (pyroxasulfone) Group 15: inhibits very long chain fatty acid synthesis

Chemical family (flumioxazin) Dicarboximide; (pyroxasulfone) Isoxazoline

S-metolachlor (several trade names)

Rate 0.95 to 1.27 lb ai/A

Time Apply to established stands just before, during, or immediately after the first fall rains or an irrigation. Treat target weeds before they emerge.

Remarks Apply only to stands harvested for seed at least once or planted at least 1 year before treatment. Rain or irrigation is required after application and before weeds emerge for best weed control.

Caution Apply only once in a crop season. Do not apply after November 15. Tank-mixtures with postemergence herbicides may injure crop. See specific labels for grazing and feeding restrictions based on geography.

Site of action Group 15: inhibits very long chain fatty acid synthesis

Chemical family Chloroacetamide

Tall Fescue

Note Also see *GRASS SEED—New and Established* for herbicides that may be used on many species of grass grown for seed.

bromoxynil + pyrasulfotole (Huskie)

Rate 0.185 to 0.205 lb ai/A bromoxynil + 0.033 to 0.036 lb ai/A pyrasulfotole (13.5 to 15 oz/A Huskie)

Time Apply from preemergence to established tall fescue. See label for weed size recommendations and application timings, but control of most species is best at the 15 fl oz/A rate when weeds have from one to six leaves. Two applications of Huskie can be made per year, separated by at least 30 days.

Remarks For most consistent weed control under adverse growing conditions, add AMS or an ammonium nitrogen source as directed by the spray additives section of the label, but do not use these additives if grass crop injury is a concern. Huskie may be tank mixed with a variety of other broadleaf and grass herbicides and other pesticides; see label for instructions.

Caution See label for crop rotation restrictions. Wheat, triticale, and oats may be planted 1 month after application; most other crops may be planted 9 months after application. Do not graze or cut grass for forage within 7 days of application, or cut grass for hay within 30 days of application. Do not exceed 30 oz/A of Huskie per year. Aerial and chemigation applications are prohibited.

Site of action (bromoxynil) Group 6: photosystem II inhibitor;(pyrasulfotole) Group 27: inhibits 4hydroxyphenylpyruvatedioxygenase (4-HPPD)

Chemical family (bromoxynil) Nitrile; (pyrasulfotole) Isoxazole

chlorsulfuron (Glean XP)

Rate 0.012 lb ai/A (0.25 oz/A Glean XP)

Time Apply to broadleaf weeds, including wild carrot, in tall fescue grown for seed in late summer or early fall after seed harvest.

Remarks Apply with NIS to maximize weed control efficacy and apply with 0.5 to 1.0 lb ai/A of 2,4-D to improve crop safety. Apply when the tall fescue has less than 6 inches of regrowth.

Caution Applications to tall fescue may cause crop injury including reduced crop height and reduced seed yield, particularly if applications are delayed until late fall or spring and made when the tall fescue is actively growing. There are no grazing restrictions following applications of Glean XP. See Glean XP label for crop rotation restrictions.

Site of action Group 2: acetolactate synthase (ALS) inhibitor

Chemical family Sulfonylurea

dimethenamid-P (Outlook)

Rate 0.66 to 0.98 lb ai/A (14 to 21 fl oz/A Outlook)

Time Apply in the fall before targeted weeds emerge or in midwinter in a sequential-use program with other herbicides that control emerged weeds.

Remarks Grass seed crops must be established at least 1 year, or have had at least one seed crop harvested before Outlook is applied. Apply higher rates where denser weed infestations are expected. Excessive straw on the field after harvest may reduce weed control. Sufficient rain or irrigation after application is needed for optimum weed control. May be applied by ground or by air (see label).

Caution Do not apply Outlook in tank-mixtures with other herbicides unless risk of crop injury is acceptable. Subsequent applications may injure crop. Do not allow livestock to graze treated fields for 60 days after application. Treated straw, seed, or seed screenings may be fed to livestock following harvest.

Site of action Group 15: inhibits very long chain fatty acid synthesis

Chemical family Chloroacetamide

diuron (several trade names)

Rate Established stands: 1.6 to 2.4 lb ai/A. New establishments: 1.6 lb ai/A or less

Time Apply in the fall as rains start the germination of weed seeds. Spray before weeds establish, usually in mid-November.

Remarks Controls annual grasses or broadleaf weeds in new or established stands. Apply 2.4 lb ai/A in late October and before November 15. There are several suppliers of diuron. Check labels for crop and geographical restrictions.

Caution Well-established, vigorous stands of spring-planted grass (new establishments) may be treated the next fall if the crop is planted before April 1 and diuron is not applied before October 15. Mechanically spread unbaled crop residue uniformly before spraying. Higher application rates 2 years in succession will damage grass. Use a sprayer with mechanical agitation; avoid overlaps in the spray pattern. Spray each field twice at half the desired application rate to prevent skips in application.

Site of action Group 7: photosystem II inhibitor

Chemical family Substituted urea

EPTC (Eptam 7 EC Selective Herbicide)

Rate 3.01 to 4.38 lb ai/A (3.5 to 5.0 pints/A of Eptam)

Time Apply to dry soil in established grass seed fields prior to any weed emergence immediately before rain or irrigation to minimize losses to volatilization.

Remarks Rainfall or irrigation in the amount of 0.25 to 0.5 inches within 36 hr of application is needed to activate the herbicide.

Caution See Eptam label for use precautions and use restrictions. Use Eptam only once during the growing season.

Site of action Group 8: inhibitor of lipid synthesis; not ACCase inhibition

Chemical family Thiocarbamate

ethofumesate (several trade names)

Western Oregon and Washington only

Rate 0.75 to 1.9 lb ai/A (1.5 to 3.75 pints/A product)

Time Apply early postemergence of crop (two leaves) to control rattail fescue, volunteer wheat and wild oats, but no later than the four-leaf stage of weeds.

Remarks To control annual bluegrass, rattail fescue, volunteer cereals, wild oat, and other winter annuals. Use higher application rate on emerged weeds including rattail fescue and volunteer wheat. Carbon-banded fields need 2 inches or more of rain to dissipate the carbon band before application. Ethofumesate is most effective when applied to a firm seedbed free of crop residue. Soil surface should be moist at the time of application. Rain or sprinkler irrigation should follow soon after application to increase herbicide effectiveness.

Caution Do not graze treated fields. Do not rotate with any crops other than sugar beet or ryegrass for 12 months after application.

Site of action Group 16: unknown

Chemical family Benzofuran

flufenacet + metribuzin (Axiom DF)

Idaho and Washington, and Oregon except for Jefferson County

Rate 0.3 to 0.4 lb ai/A flufenacet + 0.076 to 0.111 lb ai/A metribuzin (9 to 13 oz/A Axiom)

Time Apply before weeds emerge or no later than the two-leaf stage of volunteer grasses. Applications after mid-November may result in crop injury and/or poor weed control.

Remarks For established grass seed fields only (at least 1 year old or after first seed harvest). Excessive straw on field may reduce weed control. Rain or irrigation after application is needed for sufficient weed control.

Caution Do not apply in tank-mixtures with postemergence herbicides. Applying oxyfluorfen or photosynthesis-inhibiting postemergence herbicides within 4 weeks of Axiom may injure crop. Do not allow animals to graze treated fields for a minimum of 30 days following application. Preharvest interval is 120 days. Do not apply more than once per year.

Site of action (flufenacet) Group 15: inhibits very long chain fatty acid synthesis; (metribuzin) Group 5: photosystem II inhibitor

Chemical family (flufenacet) Oxyacetamide; (metribuzin) Triazinone

indaziflam (Alion Herbicide)

Rate 0.025 to 0.0375 lb ai/A (2.0 to 3.0 oz/A of Alion)

Time Apply to dry soil in established grass seed fields prior to any weed emergence before rain or irrigation.

Remarks For established tall fescue seed fields.

Caution See Alion label for use precautions and use restrictions. Use the 3.0 oz rate only east of the Cascades. Use Alion only once (either at carbon-planting or once in an established stand) to minimize risk of herbicide carryover to subsequent rotational crops i.e., do not apply to established fields if Alion was used during the establishment phase (carbon-seeding) of the stand or apply late in the predicted life of the grass seed stand.

Site of action Group 29: inhibition of cellulose biosynthesis

Chemical family Fluoroalkyl triazine

mesotrione (Callisto)

Rate 0.094 to 0.188 lb ai/A (3 to 6 oz/A Callisto)

Time Apply preemergence to bare soil or early postemergence to tall fescue grown for seed.

Remarks Use higher application rates for control and suppression of grass and broadleaf weed species and for extended soil residual control. The addition of a crop oil concentrate or nonionic surfactant at a rate of 1% v/v is recommended to optimize activity of postemergence applications. In addition, urea ammonium nitrate at 2.5% v/v or ammonium sulfate at a rate of 8.5 lb/100 gal of spray solution may be added, but increases the risk of grass seed crop injury at rates above 3 oz/A of Callisto.

Caution Preharvest interval for seed and straw harvest is 60 days. Do not graze or feed forage from treated fields within 14 days after harvest of seed or straw, and at least 74 days after application. Do not exceed two applications or 9 oz/A of Callisto per year. Do not tank mix Callisto with other pesticides with EC formulations or crop injury will result from postemergence applications.

Site of action Group 27: inhibits 4hydroxyphenylpyruvatedioxygenase (4-HPPD)

Chemical family Triketone

metribuzin (several trade names)

Oregon west of the Cascades and in Crook, Deschutes, Jefferson, and Wasco counties, and Washington only

Rate 0.25 to 0.56 lb ai/A Oregon; 0.25 to 0.38 lb ai/A Washington

Time When volunteer grasses are in the one- to two-leaf stage after fall rain or irrigation but before active spring growth.

Remarks Established grass crops only. Improve volunteer crop and grass weed control by adding a surfactant or crop oil blend at rates recommended on the wetting agent label. Up to 3 applications may be made to tall fescue, but do not apply more than 0.56 lb ai/A per year.

Caution Allow at least 28 days after application before grazing. Preharvest interval is 120 days. See additional cautions on individual labels.

Site of action Group 5: photosystem II inhibitor

Chemical family Triazinone

oxyfluorfen (Goal 2XL or Galigan 2E)

Oregon only

Rate 0.03 to 0.046 lb ai/A (2 to 3 oz/A Goal 2XL or Galigan 2E)

Time Apply on new plantings that have at least one tiller or more per plant. Applications to plants with less than one tiller may result in severe crop injury or stand loss. For best results, apply at early postemergence to the target annual broadleaf weeds.

Remarks Oxyfluorfen may be applied alone or in a tank-mix with up to 3 pints/A of ethofumesate. Crop may be discolored temporarily and, when tank mixed with ethofumesate, crop injury may increase. Goal and Galigan SLN labels vary by state.

Caution Application of oxyfluorfen in a tank-mix with ethofumesate is at the sole discretion of the grower and at the grower's own risk. Do not apply to a crop that is under stress, because additional crop injury may occur. Review the specific oxyfluorfen SLN label you are using for updated preharvest and grazing restrictions.

Site of action Group 14: protoporphyrinogen oxidase (PPO) inhibitor

Chemical family Diphenylether

oxyfluorfen (Goal 2XL or Galigan 2E)

Oregon and Washington only

Rate 0.125 to 0.375 lb ai/A (8 to 24 oz/A Goal 2XL or Galigan 2E)

Time Apply during fall and midwinter, before or soon after weeds emerge. Apply first before weeds (grass) seedlings to be controlled exceed the two-leaf stage, preferably before December 15. Make final applications before mid-January.

Remarks Apply to established fields that have at least six tillers per plant. Fields may be treated more than once but with no more than a total of 24 oz/A during a crop season. Goal and Galigan SLN labels vary by state.

Caution Oxyfluorfen applications might substantially discolor crop foliage. Leaf chlorosis and reduced vegetative growth are typical plant responses to oxyfluorfen treatments. If using a tank-mix with diuron, do not exceed 1.2 lb ai/A diuron in a season. Review the specific oxyfluorfen SLN label you are using for updated preharvest and grazing restrictions.

Site of action Group 14: protoporphyrinogen oxidase inhibitor

Chemical family Diphenylether

pendimethalin (Prowl H₂O)

Rate 2 to 3 lb ai/A (4.2 to 6.3 pints/A Prowl H₂O)

Time Apply at the beginning of significant fall rains and before weeds germinate. Treatments are most effective with adequate rain or overhead irrigation within 7 days after application.

Remarks For established grass fields only (six or more tillers). Prowl will not control established weeds. See label for specifics on tank-mixes with other herbicides. Removing excessive straw and crop residues may increase effectiveness. Fall applications made to perennial grasses that exceed 6 inches in height may result in reduced weed control due to reduced spray coverage to bare soil.

Caution May temporarily injure grass stands. Tank-mixtures and applications in extreme weather and to weak stands may increase crop injury. Do not harvest forage from treated fields within 45 days of application or harvest hay from treated fields within 60 days of application. The PHI for seed production is 90 days and grass seed screenings may not be used in livestock feed. Grass seed straw from treated fields may be fed to livestock and treated fields may be grazed after harvest. Refer to main labels for crop rotation restrictions.

Site of action Group 3: microtubule assembly inhibitor

Chemical family Dinitroaniline

pyroxasulfone (Zidua SC Herbicide)

West of Cascades in Oregon and Washington only

Rate 0.098 lb ai/A of pyroxasulfone (3.0 oz/A of Zidua SC)

Time Apply before weeds emerge in established tall fescue fields.

Remarks For established tall fescue seed fields west of the cascades. Rainfall or irrigation in the amount of 0.5 inches within 7 to 14 days of application is needed to activate the herbicide.

Caution See Zidua SC label for use precautions and use restrictions. Use Zidua SC only once during the growing season.

Site of action Group 15: inhibits very long chain fatty acid synthesis

Chemical family Isoxazoline

pyroxasulfone + flumioxazin (Fierce EZ Herbicide)

Rate 0.032 to 0.064 lb ai/A of flumioxazin + 0.040 to 0.080 lb ai/A of pyroxasulfone (3.0 to 6.0 oz/A of Fierce EZ)

Time Apply before weeds emerge, or no later than the two-leaf stage of volunteer grasses in established perennial ryegrass fields.

Remarks Rainfall or irrigation in the amount of 0.5 inches within 7 to 14 days of application is needed to activate the herbicide.

Caution See Fierce EZ label for use precautions and use restrictions. Use Fierce EZ only once during the growing season.

Site of action (flumioxazin) Group 14: protoporphyrinogen oxidase (PPO) inhibitor, (pyroxasulfone) Group 15: inhibits very long chain fatty acid synthesis

Chemical family (flumioxazin) Dicarboximide; (pyroxasulfone) Isoxazoline

S-metolachlor (several trade names)

Rate 0.95 to 1.27 lb ai/A

Time Apply to established stands just before, during, or immediately after the first fall rains or an irrigation. Treat target weeds before they emerge.

Remarks Apply only to stands harvested for seed at least once or planted at least 1 year before treatment. Rain or irrigation is required after application and before weeds emerge for best weed control.

Caution Apply only once per crop season. Do not apply after November 15. Tank-mixtures with postemergence herbicides may injure crop. See specific labels for grazing and feeding restrictions based on geography.

Site of action Group 15: inhibits very long chain fatty acid synthesis

Chemical family Chloroacetamide

terbacil (Sinbar WDG)

Rate 0.4 to 0.8 lb ai/A (0.5 to 1 lb/A Sinbar WDG)

Time Apply in fall or early winter when temperatures are cool and grass is not actively growing.

Remarks For established grass seed fields only. Results are best if straw is removed by baling. A heavy layer of straw reduces weed control. Weed control improves if applied after rain has wetted the soil; rain after application moves herbicide into the root zone, increasing effectiveness. See label for soil type restrictions.

Caution Apply to established fields that have had at least one seed crop. Do not plant treated fields to another crop within 2 years of application. Do not graze treated fields or feed hay products before seed harvest. Preharvest interval is 90 days. Straw and seed screenings may be fed to livestock.

Site of action Group 5: photosystem II inhibitor

Chemical family Uracil

Timothy

Note Also see *GRASS SEED—New and Established* for herbicides that may be used on many species of grass grown for seed.

flufenacet + metribuzin (Axiom DF)

Idaho and Washington, and Oregon except for Jefferson County

Rate 0.267 to 0.31 lb ai/A flufenacet + 0.067 to 0.85 lb ai/A metribuzin (8 to 10 oz/A Axiom)

Time Apply before weeds emerge or no later than the two-leaf stage of volunteer grasses. Applications after mid-November may result in crop injury and/or poor weed control.

Remarks For established Timothy seed fields only (at least 1 year old or after first seed or hay harvest). Excessive straw on field may reduce weed control. Rain or irrigation after application is needed for sufficient weed control.

Caution Do not apply in tank-mixtures with diuron or postemergence herbicides. Do not apply to soils with less than 1.0% organic matter or to soils with a pH greater than 7.5 or severe crop injury may occur. Do not allow animals to graze treated fields following application. Preharvest interval is 120 days. Do not apply more than once per year.

Site of action (flufenacet) Group 15: inhibits very long chain fatty acid synthesis; (metribuzin) Group 5: photosystem II inhibitor

Chemical family (flufenacet) Oxyacetamide; (metribuzin) Triazinone

indaziflam (Alion Herbicide)

Rate 0.025 to 0.0375 lb ai/A (2.0 to 3.0 oz/A of Alion)

Time Apply to dry soil in established grass seed fields prior to any weed emergence before rain or irrigation.

Remarks For established timothy seed or hay fields.

Caution See Alion label for use precautions, use restrictions and hay harvest restrictions. Use the 3.0 oz rate only east of the Cascades. Use Alion only once (either at carbon-planting or once in an established stand) to minimize risk of herbicide carryover to subsequent rotational crops i.e., do not apply to established fields if Alion was used during the establishment phase (carbon-seeding) of the stand or late in the predicted life of the grass seed stand.

Site of action Group 29: inhibition of cellulose biosynthesis

Chemical family Fluoroalkyl triazine