

# SECTION J.

## POTATO

Pamela J.S. Hutchinson

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### Volunteer Grain, Weed, or Grass Cover Crop Control before Planting Potatoes

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#### carfentrazone (Aim EC)

**Rate** Up to 0.031 lb ai/a (2 fl oz/a Aim EC)

**Time** Apply before potatoes have been planted.

**Application methods** Ground application in a minimum of 10 gal/a or aerial in a minimum of 3 gal/a. Use higher spray volumes when there is a dense weed population or crop canopy. Apply Aim EC with a crop oil concentrate at 1% v/v or a methylated seed oil at a minimum of 1 quart/a or 1% v/v when applied in volumes of more than 20 gal/a.

**Remarks** Apply to actively growing weeds not more than 4 inches tall or rosettes 3 inches in diameter. Coverage is essential for good control. Tank-mixes with other herbicides may increase spectrum of control.

**Caution** Do not exceed 0.031 lb ai/a (2 fl oz Aim EC) for preplant and/or preemergence burndown treatments. Do not exceed 0.181 lb ai/a (11.6 fl oz Aim EC) total per crop season. This total allowable usage applies to all applications made to the field per calendar year including burndown treatments and harvest-aide.

**Tank-mixtures** Tank-mixes with other herbicides labeled for preplant burndown applications in potato, such as glyphosate or paraquat, may increase spectrum of control. Read and follow applicable "Restrictions and Limitations and Directions for Use" on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures.

**Re-cropping restrictions** Following an application of Aim EC, a registered crop may be planted at any time.

**Rotational cropping restrictions** A field may be rotated to a registered crop at any time after an Aim EC application. All other crops may be planted after 12 months.

**Site of action** Group 14: protoporphyrinogen oxidase (Protox) inhibitor

**Chemical family** Triazolinone

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#### EPTC (Eptam 7E)

**Rate** 3.5 to 9 pints/a (3 to 7.9 lb ai/a EPTAM 7E). For quack-grass control, preplant: 4.5 pints/a (4 lb ai/a). For hairy nightshade, preplant: use a minimum if 5 pints/a (4.4 lb ai/a)

**Time** Preplant, preplant application impregnated on dry bulk fertilizer.

**Application methods** Soil surface must be free of dew and incidental moisture, and dry to at least 0.5 inch deep. Eptam is highly volatile. Incorporate into soil to prevent losing the herbicide. Any cultivation after application should be shallow (this means half the depth that the herbicide was incorporated). Whenever possible, apply and incorporate in the same operation. If application and incorporation are separate, Eptam must be incorporated the

same day as it is applied. Preplant: apply and incorporate just before planting.

**Incorporation methods** Preplant: incorporate 2 to 3 inches deep with power-driven cultivation equipment, or set tandem disks, field cultivators, or rotary-driven or spring-toothed cultivators to cut 4 to 6 inches deep. See label for equipment-specific recommendations. If potatoes are to be hilled after applying, be sure to mix herbicide 3 inches deep or more. For semiarid areas of eastern Washington, eastern Oregon, and Idaho only: 1). if Eptam is applied preplant and incorporated separately, incorporate the same day as application; 2). apply and incorporate dry bulk fertilizer impregnated with Eptam on the same day; 3). sprinkler-incorporate Eptam immediately after ground application with 0.5 to 0.75 inch water. Application and incorporation must be within 5 days after the last tillage; results will be poor if weeds have germinated.

**Remarks** Eptam is not effective on emerged weeds.

**Caution** Do not exceed 14 pints/a (12.25 lb ai/a) per crop year. Preharvest interval is 30 days. Using a Dammer Diker (reservoir tillage) after applying Eptam brings untreated soil to the surface; weed control may be reduced.

**Tank-mixtures** Read and follow applicable "Restrictions and Limitations and Directions for Use" on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures. Eptam may be applied preplant in a tank-mixture with Treflan HFP. See the registered labels for rates.

**Re-cropping restrictions** No re-cropping or rotational restrictions for Eptam on label.

**Site of action** Group 8: lipid synthesis inhibitor but not an ACCase inhibitor

**Chemical family** Thiocarbamate

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#### glyphosate (Glyphosate Original, Roundup PowerMAX, Roundup WeatherMAX, Roundup Custom, Roundup Original Max, or others)

**Rate** 0.38 to 0.75 lb ae/a for volunteer grains. See labels for specific grains and rates.

**Time** Apply when annual grain is less than 18 inches tall and before planting potatoes.

**Application methods** Ground or aerial: apply in 3 to 10 gal/a water by ground or 3 to 5 gal/a water by air. Some glyphosate formulations require using nonionic surfactant; see label for details on additive use. Adding 1 to 2% dry ammonium sulfate (AMS) by weight or 8.5 to 17 lb/100 gal spray mix may increase performance. Also may use the equivalent rate of AMS in a liquid formulation.

**Remarks** Good growing conditions enhance volunteer grain control with glyphosate.

**Caution** Glyphosate has no soil-residual activity and will not control weeds emerging after application. Follow all use restrictions and precautions on label.

**Tank-mixtures** Tank-mixtures are not stated/approved on most labels. Read and follow applicable “Restrictions and Limitations and Directions for Use” on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures.

**Site of action** Group 9: inhibits EPSP synthase

**Chemical family** None generally accepted

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### metolachlor (Stalwart or others)

**Rate** Preplant: 1 to 2 pints/a (1 to 2 lb ai/a product). Use lower rate on coarse soils or soils low in organic matter (OM). Use higher rate on soils that are relatively fine or high in OM. Up to 2.75 pints/a can be used on soils with 6% to 20% OM.

**Time** Preplant: do not apply as a preplant-incorporated and as a preemergence treatment.

**Application methods** Ground or aerial. Stalwart may be applied impregnated on dry fertilizer.

**Incorporation methods** Preplant: incorporate into top 2 inches of soil using a finishing disk, harrow, rolling cultivator, or similar implement within 14 days of planting. Evenly distribute herbicide in top 2 inches of soil. Do not damage potato seed pieces or sprouts with incorporation equipment.

**Remarks** Effectiveness will be reduced if later cultivation exposes untreated soil. If conditions are cool and wet after application, Stalwart may delay maturity and/or reduce yield of Superior and other early-maturing varieties.

**Caution** Do not use on muck or peat soils.

**Tank-mixtures** Read and follow applicable “Restrictions and Limitations and Directions for Use” on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures.

**Re-cropping restrictions** If a crop treated with Stalwart fails, any Stalwart-labeled crop may be planted immediately. Do not make a second broadcast application of Stalwart. If Stalwart was banded in the failed crop and the second crop is planted in the untreated row middles, a second banded treatment may be applied.

**Rotational cropping restrictions** Alfalfa may be planted after 4 months; barley, oats, rye, or wheat may be planted at 4.5 months; and tomato may be planted 6 months after Stalwart application. Clover may be planted 8 months after. Any Stalwart-labeled crop or root crops, tobacco, barley, buckwheat, milo (sorghum), oat, rye, wheat, cabbage, or peppers may be planted the spring after Stalwart applications the previous growing season. All other rotational crops may be planted 12 months after a layby application. Any Stalwart-labeled crop or tobacco, cabbage, or peppers may be planted the next spring after layby or multiple applications of Stalwart.

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

**Chemical family** Chloroacetamide

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### metribuzin (TriCor DF 75%)

**Rate** Preplant-incorporated in Idaho only; 0.67 to 1.33 lb/a (0.5 to 1 lb ai/a Tricor DF 75). Other metribuzin formulations may or may not have preplant-incorporated application timing on the label. Follow current label restrictions.

**Time** Apply preplant-incorporated as a broadcast spray or impregnated on dry fertilizer.

**Application methods** Ground, aerial, or impregnated or coated on 500 to 1,200 lb/a dry bulk fertilizer.

**Incorporation methods** Preplant applications: incorporate evenly 4 to 6 inches deep by double-disking at right angles.

**Remarks** Metribuzin may not control triazine-resistant weeds. Refer to the metribuzin label for proper rate for soil type, dry bulk fertilizer application information and all other recommendations, cautions, or special precautions that must be followed.

**Caution** Atlantic, Bellchip, CalWhite, Cascade, Centennial Russet, Cherry Red, Chieftan, Chipbelle, Dark Red Norland, Hi Plains, Hilite Russet, Jelly, Keystone Russet, Mazama, Modoc, Norchip, Nordonna, NorValley, Owyhee Russet, Red LaSoda, Red Norland, Shepody, Silverton Russet, Snowden, Superior, Wallowa Russet, Western Russet, White Pearl and White Rose varieties are susceptible/moderately susceptible to metribuzin and may be injured. Other new varieties may be sensitive to metribuzin. When growing varieties for the first time, do not treat entire acreage until potato sensitivity is determined.

**Tank-mixtures** Read and follow applicable “Restrictions and Limitations and Directions for Use” on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures.

**Re-cropping restrictions** None on label.

**Rotational cropping restrictions** Do not plant onions, lettuce, cole crops, or cucurbits during the growing season following metribuzin applications. Do not plant sugar beets for 18 months after metribuzin application. Certain cereal varieties are sensitive to metribuzin (see cereal section of label) and should not be planted during the growing season after metribuzin use, unless moldboard plowing deeply enough to mix the upper 8 inches of soil and potato vines left in rows after harvest are uniformly distributed over the soil surface before plowing.

**Site of action** Group 5: photosystem II inhibitor

**Chemical family** Triazinone

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### paraquat (Gramoxone SL or Inteon, 2 lb paraquat cation/gal; Firestorm, 3 lb paraquat cation/gal; or others)

**Rate** 1 to 2 pints/a (0.25 to 0.5 lb ae/a) Gramoxone SL or Inteon; or 0.7 to 1.3 pints/a (0.26 to 0.5 lb ae/a) Firestorm) for preplant control of other volunteer grains, weeds, or grass cover crops. For volunteer barley control in Idaho, Oregon, and Washington only: use 0.5 to 1 pint/a (0.125 to 0.25 lb ae/a) Gramoxone SL or Inteon; 0.4 to 0.7 pints/a (0.15 to 0.26 lb ae/a) Firestorm to preformed beds before planting potatoes. Do not exceed three applications of Firestorm per year.

**Time** Apply before planting potatoes. Grass or volunteer cereal grain control is best if applied before tillering or after boot stage.

**Application methods** Ground or aerial. Add nonionic surfactant with 75% or more surface-active agent at 0.125% v/v (1 pint/100 gal spray mix), or crop oil concentrate at 1% v/v (1 gal/100 gal spray mix) for ground applications, or 1 pint/a for aerial applications.

**Remarks** Nonspecific, postemergence herbicide. Kills most green plant growth on contact, so good spray coverage is essential. Rainfast 30 minutes after application. Paraquat has no residual soil activity on crops planted later or weeds germinating later.

**Caution** A restricted-use herbicide. Follow all restrictions and precautions on label. Requires special safety equipment for handling, mixing, and spraying.

**Tank-mixtures** Must be applied alone for volunteer barley control, otherwise, see label for other allowable tank-mix combinations.

**Site of action** Group 22: photosystem I electron diversion

**Chemical family** Bipyrilidilium

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### **S-metolachlor (Dual Magnum)**

**Rate** Preplant: 0.95 to 1.9 lb ai/a (1 to 2 pints/a), using lower rates on soils that are coarse or low in organic matter. Note: S-metolachlor also is formulated as Dual II Magnum (7.64 lb ai/gal and includes a safener for corn) and as Dual IIG Magnum (16% G). Refer to labels to determine rates, timing, etc. for use in potatoes.

**Time** Apply preplant-incorporated or preplant-incorporated impregnated on dry bulk fertilizer.

**Application methods** Ground or aerial.

**Incorporation methods** Preplant-incorporated: incorporate before planting using a finishing disk, harrow, rolling cultivator, or similar implement that can uniformly incorporate herbicide into top 3 inches of soil.

**Remarks** If soil is cool and wet after application, Dual Magnum may delay maturity and/or reduce yield of Superior and other early-maturing varieties.

**Caution** Do not apply both at preplant-incorporated and at preemergence. Do not use on muck or peat soils. Crop may be injured after Dual Magnum if soil moisture is abnormally high during early crop development. Do not harvest within 60 days after the at-planting to preemergence dragoff/after hilling application or within 40 days after a postemergence layby/after final hilling application.

**Tank-mixtures** Read and follow the applicable "Restrictions and Limitations and Directions for Use" on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures.

**Re-cropping restrictions** If potato crop fails, corn, soybeans, potatoes, safflower, or other Dual Magnum-registered crops may be replanted immediately. Do not make a second broadcast application.

**Rotational cropping restrictions** Do not plant barley, oats, rye, or wheat until 4.5 months after application. Alfalfa may be planted 4 months after application. Clover may be seeded 9 months after application. Any crop labeled for Dual Magnum use and pod and root crops, buckwheat, or milo (sorghum) may be planted the spring after treatment.

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

**Chemical family** Chloroacetamide

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### **S-metolachlor + glyphosate (Sequence, a formulated premix of 3 lb ai S-metolachlor + 2.25 lb ae/gal glyphosate)**

**Rate** Do not exceed 2.5 pints/a formulated product on coarse soils, 3.75 pints/a formulated product on medium soils with less than 3% organic matter, or 4 pints/a formulated product on fine textured soils with greater than 3% organic matter. Do not exceed 4 pints/a of Sequence per season.

**Time** Apply before potatoes have been planted. Sequence may be applied up to 30 days before planting.

**Application methods** Ground in 15 to 40 gal/a or aerial in 3 to 15 gal/a water. Do not apply this product through any type of irrigation system. When foliage is dense, spray volume should be increased to ensure coverage of the target weeds. Flat-fan nozzles will result in the most effective application. Control of emerged weeds may be improved by adding dry ammonium sulfate at 8.5 to 17 pounds/100 gallons of water. Liquid formulations of AMS may be used at an equivalent rate.

**Remarks** Sequence is considered a foliar systemic herbicide which may be applied to control a broad spectrum of emerged weeds and can provide some residual control of certain weeds listed on the label. If rainfall or irrigation is not received within 7 days after application of Sequence, residual weed control may be reduced. Under these conditions, cultivate or use other weed control measures if weeds develop. If emerged at application time, weeds must be actively growing. For best possible annual weed control, apply to weeds 6 inches or less in height. If annual weeds have been mowed or grazed prior to application, wait for 3 to 4 inches of new growth to appear prior to application. When perennial weeds have been mowed or grazed, refer to the label for the recommended stage that new growth should reach prior to application.

**Caution** Application must be made before crop emergence. Contact with potato foliage will result in crop injury. If cool, wet conditions occur after application, Sequence may delay maturity and/or reduce yield of "Superior" or other early-maturing varieties. Do not harvest within 60 days after application.

**Tank-mixtures** Sequence can be tank mixed with metribuzin or Prowl for control or suppression of annual and perennial weeds, provided that the tank-mix product label allows use of the product. Refer to the Sequence label for weeds controlled and application rates for these tank-mixtures.

**Re-cropping restrictions** If crop treated with Sequence alone is lost, corn, legume vegetables (succulent or dried), potatoes, sorghum, soybeans, sunflowers, or transplanted tomatoes may be replanted immediately.

**Rotational cropping restrictions** Do not plant barley, oats, rye, or wheat before 4.5 months after application; alfalfa 4 months; tomato 6 months; or clover 9 months. Buckwheat, milo (sorghum) cabbage, stone fruits, or tree nuts may also be planted in the spring following treatment.

**Site of action** Group 15: inhibits very long chain fatty acid synthesis; Group 9: inhibits EPSP synthase

**Chemical family** Chloroacetamide; none generally accepted

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### **trifluralin (Treflan HFP, 4 lb ai/gal; or others)**

**Rate** Treflan HFP may only be applied preplant when tank-mixed with Eptam: 1 pint/a (0.5 lb ai/a) on coarse soils; 1.25 to 1.5 pints/a (0.625 to 0.75 lb ai/a) on medium-texture soils; 1.5 pints/a on coarse or medium-texture soils with 2 to 5% organic matter (OM); 1.5 to 2 pints/a (0.75 to 1 lb ai/a) on fine-texture soils; and 2 pints/a on fine-texture soils with 2 to 5% OM. On soils with 5% to 10% OM, use 2 pints/a. In Idaho, Oregon, and Washington, use lower rate in areas receiving less than 20 inches/year total rain and irrigation. Treflan HFP applications may be split on soils with less than 2% OM in Idaho, Oregon, and Washington: 0.75 pint/a before planting + 0.75 pint/a postemergence, when potato plants have fully emerged.

**Time** Preplant: only when tank mixed with Eptam.

**Application methods** Ground.

**Incorporation methods** Mechanically incorporate thoroughly into 2 to 3 inches of soil as soon as possible but no later than 24 hours after application.

**Remarks** Existing weeds must be destroyed by tillage before applying herbicide, because Treflan HFP does not control established weeds. Weed control may be erratic if cultivation exposes untreated soil between rows.

**Caution** Strictly adhere to label rates and precautions to prevent crop injury. If cultivation is required after Treflan HFP application, avoid completely covering potato plants with treated soil. If treated soil is concentrated over the potato row/hill, emergence may be slowed and stems can become brittle. Do not apply to wet soils; weed control may be poor.

**Tank-mixtures** Read and follow applicable "Restrictions and Limitations and Directions for Use" on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures. Preplant: only tank mixed with Eptam.

**Rotational cropping restrictions** In Idaho, Oregon, and Washington after a spring application of Treflan HFP, wait at least 12 months to plant sugar beets, red beets, spinach, corn, sorghum (milo), proso millet, oat, and annual or perennial grass crops or mixtures. Do not plant any of these crops for 18 months after application in fields that have not been irrigated, or that have been fallowed without irrigation or cultivation. Moldboard plowing 12 inches deep before planting these crops can reduce the possibility of crop injury. Do not plant vegetable crops, other than labeled for preplant application of Treflan HFP, within 5 months after application.

**Site of action** Group 3: microtubule assembly inhibitor

**Chemical family** Dinitroaniline

## Annual Grass and Broadleaf Weed Control After Planting

### carfentrazone (Aim EC)

**Rate** Up to 0.031 lb ai/a (2 fl oz/a Aim EC)

**Time** Apply during planting or up to 24 hours after potatoes have been planted. Applications must be made before the crop emerges.

**Application methods** Ground in a minimum of 10 gal/a or aerial in a minimum of 3 gal/a. Use higher spray volumes when there is a dense weed population or crop canopy. Apply Aim EC with a crop oil concentrate at 1% v/v or a methylated seed oil at a minimum of 1 quart/a or 1% v/v when applied in volumes of more than 20 gal/a.

**Remarks** Apply to actively growing weeds not more than 4 inches tall or rosettes 3 inches in diameter. Coverage is essential for good control. Tank-mixes with other herbicides may increase spectrum of control.

**Caution** Do not exceed 0.031 lb ai/a (2 fl oz Aim EC) for pre-plant and/or preemergence burndown treatments. Do not exceed 0.181 lb ai/a (11.6 fl oz Aim EC) total per crop season. This total allowable usage applies to all applications made to the field per calendar year including burndown treatments and harvest-aide.

**Tank-mixtures** Tank-mixes with other herbicides labeled for preemergence burndown applications in potato such as glyphosate or paraquat may increase spectrum of control. Read and follow applicable "Restrictions and Limitations and Directions

for Use" on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures.

**Re-cropping restrictions** Following an application of Aim EC, a registered crop may be planted at any time.

**Rotational cropping restrictions** A field may be rotated to a registered crop at any time after an Aim EC application. All other crops may be planted after 12 months.

**Site of action** Group 14: protoporphyrinogen oxidase (Protox) inhibitor

**Chemical family** Triazolinone

### dimethenamid-P (Outlook 6EC, 6 lb ai/gal)

**Rate** 12 to 18 fl oz/a (0.56 to 0.84 lb ai/a) in coarse soils and 18 to 21 fl oz/a (0.84 to 1 lb ai/a) in medium- or fine-textured soils. One application only. Do not exceed 21 fl oz/a per season.

**Time** Apply preemergence only after planting or dragoff.

**Application methods** Preemergence by ground, chemigation, aerial, or impregnated onto dry bulk fertilizer application. Will not control weeds emerged from soil. Application must be made to clean-tilled soil or with other herbicides that control emerged weeds. Chemigate only through center pivot, lateral move, solid set, or hand move irrigation systems. Apply in at least 0.33 to 0.67 inch of water, using the lower volume on coarser soils and the higher volume on finer soils. Applying in more than 1 inch volume may reduce weed control. See labels for specific application methods and requirements.

**Incorporation methods** For effective control after ground or aerial preemergence application, rain or sprinkler irrigation or shallow mechanical incorporation is required to move the herbicide into the upper soil surface where weed seeds germinate. Performance is best if either rain or overhead irrigation is within 7 days after application.

**Remarks** In cold or wet growing conditions, Outlook may cause delayed emergence or early-season stunting of potatoes.

**Caution** To avoid adverse effects on endangered plant species, comply with the following mitigation measures where these species grow in the counties listed below. Aerial applications must leave a 150-ft untreated buffer between treatment area and endangered plant populations. Ground applications must use low-pressure nozzles that produce only medium to coarse or very coarse droplets and leave a 35-ft untreated buffer between treatment area and endangered plant populations. In Idaho, Kootenai County; in Oregon, Baker, Benton, Josephine, Klamath, Lane, Marion, and Union counties; in Washington, Lincoln County.

**Tank-mixtures** Read and follow applicable "Restrictions and Limitations and Directions for Use" on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures. Outlook may be applied before, in tank-mixtures with, or after the use of one or more of these registered herbicides: Chateau, Eptam, rimsulfuron, Poast Plus, Prowl, Select, metribuzin, Treflan HFP, glyphosate, or paraquat.

**Re-cropping restrictions** If Outlook has been applied to potatoes and the crop fails due to weather or other reasons, replanting potatoes is not recommended. Any other crop for which Outlook soil applications are registered may be planted (e.g., corn, dry bean, grain, horseradish, sorghum, soybean).

**Rotational cropping restrictions** Fall-seeded cereal crops may be planted 4 months after Outlook application. There are no

rotational crop restrictions the spring after application in the previous year's potato crop.

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

**Chemical family** Chloroacetamide

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### EPTC (Eptam 7E, 7 lb ai/gal)

**Rate** 3.5 to 9 pints/a (3 to 7.9 lb ai/a) preemergence, 3.5 to 7 pints/a (3 to 6 lb ai/a) drag-off or early postemergence. For nut-sedge control, preemergence/dragoff: 7 pints/a. Do not exceed 14 pints/a (12.25 lb ai/a) per crop year.

**Time** Dragoff/preemergence, or early postemergence. Preharvest interval is 30 days.

**Application methods** Soil surface must be free of dew and incidental moisture, and dry to at least 0.5 inch deep. Incorporate into soil to prevent losing the herbicide. Any cultivation after application should be shallow (i.e., half the depth that the herbicide was incorporated). Preemergence: ground-apply after planting and before emergence, and incorporate. Eptam can be ground-applied preemergence at dragoff, or after hilling, and incorporated with spike-toothed harrows or cultivation equipment. See label for equipment-specific details. Eptam can be applied preemergence by chemigation after clean cultivation. In eastern Washington, eastern Oregon, and Idaho only, ground-apply Eptam preemergence and sprinkler-incorporate with irrigation; see instructions below. Eptam applied preemergence is most effective when applied immediately after hilling to a weed-free surface, because it is not effective on emerged weeds. Postemergence (layby): apply as a directed spray to soil after potatoes emerge and incorporate. Eptam is not effective as a foliar spray on emerged weeds.

**Incorporation methods** Preemergence: incorporate with power-driven cultivation equipment or rolling cultivators set to cut 2 to 3 inches deep, or with rotary hoes/row wheels set to cut 1 to 1.5 inches deep. Take care that machinery does not damage potato seed pieces or elongating sprouts. Chemigate preemergence applications before weeds emerge, or after a clean cultivation, by metering into sufficient irrigation water to penetrate 3 to 4 inches deep. Preemergence at dragoff: use spike-tooth harrows or cultivation equipment to incorporate. Preemergence after hilling: ground-apply and sprinkler-incorporate immediately with 0.5 to 0.75 inch water (although label says to sprinkler-incorporate within 36 hours after ground application). Application and incorporation must be within 5 days after the last tillage; results will be poor if weeds have germinated. Postemergence (layby): apply as a directed spray to soil after potatoes emerge and incorporate postplant treatments 2 to 3 inches deep with a rolling cultivator or other equipment suggested on label for postplant incorporation. Take care that machinery does not damage potato seed pieces or elongating sprouts. Apply with chemigation by metering into sufficient water to penetrate 3 to 4 inches deep. Apply Eptam before weeds emerge or after a clean cultivation. For semiarid areas of eastern Washington, eastern Oregon, and Idaho only: sprinkler-incorporate Eptam immediately after ground application with 0.5 to 0.75 inch water. Application and incorporation must be within 5 days after the last tillage; results will be poor if weeds have germinated.

**Remarks** Eptam is not effective on emerged weeds. Eptam is highly volatile. It must be applied to soil that is free from dew and other moisture, and dry to at least 0.5 inch deep. Whenever possible, apply and incorporate in the same operation. If

application and incorporation are separate, Eptam must be incorporated the same day as it is applied.

**Caution** Do not exceed 14 pints/a (12.25 lb ai/a) per crop year. Preharvest interval is 45 days. Using a Dammer Diker (reservoir tillage) after applying Eptam brings untreated soil to the surface; weed control may be reduced.

**Tank-mixtures** Read and follow applicable "Restrictions and Limitations and Directions for Use" on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures. Eptam may be applied in tank-mixtures with one or more of these registered herbicides: preemergence—Chateau, rimsulfuron, Outlook, Prowl, metribuzin, or in a three-way tank-mixture with Dual Magnum + Prowl; postemergence—with metribuzin (up to 6-inch potato height), rimsulfuron. In the Pacific Northwest and northern regions defined on label, Eptam + metribuzin tank-mixtures can be applied only by chemigation.

**Re-cropping restrictions** No re-cropping or rotational restrictions for Eptam on label.

**Site of action** Group 8: lipid synthesis inhibitor but not an ACCase inhibitor

**Chemical family** Thiocarbamate

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### ethalfluralin (Sonalan HFP, 3 lb ai/gal)

**Rate** 1.33 to 2.67 pints/a (0.5 to 1 lb ai/a). Rate ranges for coarse-, medium-, and fine-textured soils: 1.33 to 2 pints/a, 2 to 2.67 pints/a, 2.67 pints/a

**Time** After planting, and prior to potato emergence only. If incorporation by rainfall or sprinkler irrigation is planned, then apply immediately after planting for best results. Do not apply after potato emergence.

**Application methods** Preemergence-ground or chemigation (overhead sprinkler irrigation in 0.5 to 1 inch water).

**Incorporation methods** Preemergence: by rainfall or sprinkler incorporation 0.5 to 1 inch of water. If continuous rainfall or irrigation of 0.5 to 1 inch water occurs within 2 days of application, then no further incorporation is needed. Sonalan HFP can be incorporated mechanically if rainfall or irrigation does not occur within 2 days after application. Mix thoroughly in the top 2 to 3 inches of soil. Set incorporation equipment so that the bed and furrow will be uniformly covered with a layer of treated soil. Avoid disturbing seed pieces and/or unemerged shoots. Do not expose untreated soil during the mechanical incorporation process. Do not incorporate using furrow irrigation.

**Remarks** Rainfall or sprinkler irrigation prior to application tends to seal the soil surface. When rain or sprinkler irrigation incorporation is intended, Sonalan HFP moves more effectively into the weed germination zone if it is applied immediately after tillage and planting. Sonalan HFP may be shallowly cultivated after application and incorporation without reducing weed control, as long as no untreated soil is exposed.

**Caution** Do not exceed 2.67 pints/a per season. Do not apply after crop emergence.

**Tank-mixtures** Read and follow applicable "Restrictions and Limitations and Directions for Use" on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures.

**Re-cropping restrictions** If replanting is required, then plant only crops listed on the Sonalan HFP labels.

**Rotational cropping restrictions** Sugar beets may be planted no earlier than 8 months after application and a moldboard plowing operation to a depth of at least 12 inches before planting. No other rotational cropping restrictions are listed on the label for Idaho, Oregon, or Washington; however, refer to the label for special rotation restrictions in other states.

**Site of action** Group 3: microtubule assembly inhibitor

**Chemical family** Dinitroaniline

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### flumioxazin (Chateau 51% WDG)

**Rate** 1.5 oz/a (0.047 lb ai/a) for preemergence suppression of weeds such as hairy nightshade, common lambsquarters, Palmer amaranth, redroot pigweed, and wild mustard. 1.5 oz/a suppresses weeds listed when applied to soils with up to 5% organic matter. Do not exceed 1.5 oz/a in a single application or growing season.

**Time** Apply after hilling but before potatoes emerge. At least 2 inches of soil must cover the vegetative part of the potato plant at application. If applied to potatoes with less than 2 inches of soil cover, or during or after potatoes emerge, potato crop may be injured. Chateau may not control weeds that germinate after application but before an activating rain or irrigation.

**Application methods** Ground, chemigation (center pivot only, end guns must be turned off), and aerial. Best timing is shortly after hilling, before potatoes emerge. See labels for specific application methods and requirements. Use 10 to 30 gal/a spray solution to ensure adequate coverage. Apply via chemigation in 0.5 to 0.75 inches water during the first sprinkler set.

**Incorporation methods** Moisture is necessary to activate Chateau in soil for residual weed control. When moisture after application is not adequate, at least 0.25 inch sprinkler irrigation may improve weed control. Rain or irrigation should be as soon as possible and within 7 days after application, and before the most advanced potato sprouts are within 2 inches of the settled soil surface. Mechanically incorporating into soil or cultivating after applying reduces residual weed control is not recommended.

**Remarks** Chateau has low solubility compared with most other herbicides used in potato production. Low herbicide solubility usually leads to low mobility in the soil profile. Thus, Chateau most likely will not move out of the weed-seed germination zone. Application to poorly drained soil and/or during cool, wet weather may injure crop. Treated soil splashed on newly emerged crops may temporarily injure crop. Potato varieties may vary in their response to Chateau.

**Caution** At least 2 inches of settled soil must cover the vegetative part of the potato plant at application or crop can be damaged. After applying Chateau, properly clean spray equipment before applying other materials to any crop foliage; see "Sprayer Cleanup" on labels for specific information. No preharvest interval is listed on labels.

**Tank-mixtures** Tank mix Chateau with other preemergence-labeled herbicides for broad-spectrum weed control. Read and follow applicable "Restrictions and Limitations and Directions for Use" on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures.

**Re-cropping and rotational restrictions** Replanting potatoes is not recommended if the treated potato crop fails (e.g., due to hail or other bad weather). If potatoes are replanted do not reapply Chateau. Soybeans may be planted immediately after the Chateau application. Field corn, sorghum, sunflower, or wheat

can be planted 30 days after a Chateau application if at least 1 inch of rain or irrigation has occurred between application and replanting. Barley, dry and snap beans, peas, rye, and sweet corn may be planted 3 months after application. Alfalfa, canola, clover, oats, and sugar beets may be planted 4 months after application if soil is tilled before planting, or 8 months after application if soil is not tilled before planting. All other crops not listed may be planted 4 months after application if soil is tilled prior to planting, or 8 months after application if soil is not tilled before planting if a successful soil bioassay was performed before planting. See labels for all other crops not listed.

**Site of action** Group 14: protoporphyrinogen oxidase (Protox) inhibitor

**Chemical family** N-phenylphthalimide

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### fomesafen (Reflex 2 lb ai/gal)

For use in potatoes grown under overhead irrigation, only.

**Idaho:** only for distribution and use in potatoes within the counties of Ada, Bingham, Bonneville, Canyon, Cassia, Clark, Elmore, Gooding, Jefferson, Jerome, Minidoka, Owyhee, Payette, Power, and Twin Falls. (EPA Special Local Needs, 24c label ID-110004 expiring April 10, 2019).

**Oregon:** only for distribution and use in potatoes within the counties of Malheur, Morrow, and Umatilla. (EPA Special Local Needs, 24c label OR-140001 expiring December 31, 2023).

**Washington:** only for distribution and use in potatoes in the counties of Adams, Benton, Franklin, and Grant (EPA Special Local Needs, 24c label WA-130008 expiring December 31, 2022).

NOTE: all 24(c) labels expire on date stated or until otherwise amended, withdrawn, canceled, suspended, or ended. Check your state department of agriculture pesticide registration for current 24(c) in your state..

**Rate** 1 pint/a (0.25 lb ai/a)

**Time** Preemergence (only) after planting but before potato emergence.

**Application methods** Ground, chemigation (center pivot only), and aerial. Best timing is shortly after hilling, before potatoes and weeds emerge. Ground application: use a minimum of 10 gal/a spray solution to ensure adequate coverage. Apply via center pivot chemigation only in 0.5 to 1 inches water. Use the lower volume (0.5 inch) on coarser soils and the higher volume (1 inch) on fine-textured soils. Application in more than 1 inch of water may reduce weed control by moving the herbicide below the effective zone in the soil profile. When sprinkler distribution patterns do not overlap sufficiently, unacceptable weed control may result and where sprinkler distribution patterns overlap excessively, crop injury may result. Read and follow all chemigation instructions on the Reflex label. Aerial application: should be made in a minimum of 5 gal/a spray solution and with a maximum of 40 PSI pressure.

**Incorporation methods** Because moisture is necessary to activate Reflex in soil for residual weed control, the herbicide may be more effective if rainfall or irrigation occurs shortly after ground or aerial application. If adequate rainfall is not received after a Reflex application, at least 0.25 inch overhead sprinkler irrigation before potatoes and weeds emerge may improve weed control. Mechanically incorporating into soil or cultivating after applying reduces residual weed control is not recommended.

**Remarks** Reflex effectiveness will be reduced if later cultural practices expose nontreated soil. Potato varieties may vary in

their response to Reflex. Always determine tolerance before using Reflex on a variety for the first time. Some variety tolerance research results may be available through university research and extension personnel.

**Caution** Do not use Reflex in potatoes grown for seed. Do not exceed 1 pint /a of Reflex per season. Do not apply to a field more than once every two years. Do not harvest potatoes treated with Reflex within 70 days of application. Application to emerged potato plants will cause severe crop injury. Apply only to soils with less than 2% organic matter. Do not apply after June 1.

**Tank-mixtures** Reflex may be applied preemergence with other potato herbicides labeled for this timing and application methods. Read and follow applicable restrictions and limitations and directions for Use on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures. If you have no previous experience mixing Reflex with these potato herbicides under your conditions, perform a compatibility test before attempting large-scale mixing (see tank-mix compatibility test sections on the labels).

**Re-cropping and rotational restrictions** If replanting is necessary, the field may be replanted to cotton, dry beans, potatoes, snap beans, or soybeans with no delay. During replanting, minimize soil disturbance to preserve the herbicide barrier for effective weed control. Do not make a second application of Reflex or other fomesafen-containing product as crop injury or illegal residues may occur in harvested crops. The following rotational crops may be planted immediately after applying Reflex: cotton; dry beans; potatoes; snap beans; or soybeans. Wheat can be planted 4 months after application if a successful field bioassay has been performed. The minimum rotational interval after Reflex application for all other crops not listed on the label is 18 months after application, however, a successful field bioassay must be performed before planting these crops. Refer to the "Field Bioassay Instructions" section on the label for details. Do not graze rotated small grain crops or harvest forage or straw for livestock. To prevent injury to rotational crops, a minimum of 22 inches cumulative irrigation must occur during the period after Reflex application through potato harvest. Avoid overlapping spray or chemigation swaths or injury to rotational crops could occur.

**Site of action** Group 14: protoporphyrinogen oxidase (Protox) inhibitor

**Chemical family** Nitrophenylether

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### **glyphosate (Glyphosate Original, Roundup PowerMAX, Roundup WeatherMAX, Roundup Custom, Roundup Original Max; or others)**

**Rate** 0.38 to 1.1 lb ae/a for most species

**Time** Delay herbicide application to allow maximum weed emergence but apply before potatoes emerge. Herbicide will not control weeds that emerge after application. In coarse or sandy soils, apply before potato sprouting to minimize crop damage.

**Application methods** See label for rates and gal/a of water recommended for specific species. Some glyphosate formulations require use of nonionic surfactant; see label for details on additive use. Adding 1% to 2% dry ammonium sulfate (AMS) by weight or 8.5 to 17 lb/100 gal spray-mix may increase performance. The equivalent rate of AMS in a liquid formulation also may be used.

**Remarks** Good growing conditions enhance glyphosate activity.

**Caution** Glyphosate applied after crop emergence will injure or kill potatoes. Follow all use restrictions and precautions on label.

Tank-mixtures are not stated or approved on most glyphosate labels. Read and follow applicable "Restrictions and Limitations and Directions for Use" on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures.

**Site of action** Group 9: inhibits EPSP synthase

**Chemical family** None generally accepted

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### **linuron (Linex, 4 lb ai/gal)**

**Idaho:** EPA Special Local Needs, 24(c) label ID -130001 expiring December 31, 2020.

**Oregon:** EPA Special Local Needs, 24(c) label OR-160005 (expiring December 31, 2021). Limited to potatoes grown in eastern Oregon and the Klamath Basin in southern Oregon only. Do not apply this product to potatoes grown west of the Cascade Mountain Range in Oregon.

**Washington:** EPA Special Local Needs, 24(c) label WA-130002 (expiring December 31, 2019).

**NOTE:** all 24(c) labels expire on date stated or until otherwise amended, withdrawn, canceled, suspended, or ended. Check your state department of agriculture pesticide registration for current 24(c) in your state.

Refer to the 24(c) label for weeds specified for your state.

**Rate** 1 to 2 pints/a (0.5 to 1 lb ai/a) Use the lower end of the rate range for potatoes grown on calcareous or low organic matter (OM) soils.

**Time** Preemergence (only) after planting and the last hilling operation but before potato emergence. Apply and incorporate Linex before potatoes are cracking through the soil surface. Make only one application per year.

**Application methods** Ground or chemigation [linear (lateral) move, center pivot and solid set]. Do not apply by air.

**Incorporation methods** Best results are obtained when applied to moist soils. Irrigate powder dry soils before application.

For ground application, sprinkler-incorporate before potato emergence. Chemigation: apply in 1/3 to 1 inch water through a traveling system metering into the water the entire application period or in the last 30 minutes of solid-set or hand-moved irrigation systems. Use lower water volume on coarse soils and higher volume on fine-texture soils.

**Remarks** Effectiveness will be reduced if later cultivation exposes untreated soil. Always test this product and any tank-mix combinations first on a small scale for varietal tolerance. Soils high in clay or organic matter (OM) content require higher rates than soil low in clay or OM content to attain equivalent herbicide performance. If emerged weeds are present, a light surfactant may be used. Results of weeds already emerged could vary by rate applied, species, and environmental conditions.

**Caution** Do not apply by air. Apply and incorporate Linex before potatoes are cracking through the soil surface. Use caution when applying to soils with less than 1% OM including calcareous soils since the potato crop can be more susceptible to injury in these conditions.

**Re-cropping restrictions** If a crop treated with Linex fails, any crop registered for the rate applied may be planted immediately. Thoroughly re-work the field. Do not make a second Linex application.

**Rotational cropping restrictions** Any crop registered for the Linex rate applied may be planted immediately. Otherwise, West of the Rockies do not plant any other crop until 12 months after the last Linex application.

**Site of action** Group 7: Photosystem II inhibitor but different binding site than Groups 5 or 6.

**Chemical family** Urea

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**metolachlor (Stalwart or others, 8 lb ai/gal)**

**Rate** Preemergence: 1 to 2 pints/a (1 to 2 lb ai/a). After hilling/layby: 1.67 pints/a (1.67 lb ai/a). Use lower rate on coarse soils or soils low in organic matter (OM). Use higher rate on soils that are relatively fine or high in OM. Up to 2.75 pints/a can be used on soils with 6% to 20% OM.

**Time** Preemergence before weeds emerge, or postemergence after hilling/layby. Do not apply as both a preplant-incorporated and a preemergence treatment. The layby application can be made over a previous application of this product, but do not exceed 3.7 pints/a Stalwart per season. Do not harvest potatoes within 60 days of the preemergence application from planting to dragoff, or within 40 days after a layby application.

**Application methods** Ground, chemigation (center pivot only, preemergence only), or aerial. Stalwart may be applied impregnated on dry fertilizer.

**Incorporation methods** Preemergence: apply after planting or after dragoff or hilling operations before potato or weeds emerge. Postemergence after hilling/layby: application will not control emerged weeds. Sprinkler-incorporate preemergence or layby applications within 7 to 10 days. Chemigation: apply preemergence only in 0.5 to 1 inch irrigation water. Meter into water during entire application period. Use lower water volume on coarse soils and higher volume on fine-texture soils. More than 1 inch chemigation water volume can reduce weed control if herbicide moves below effective zone in soil.

**Remarks** Effectiveness will be reduced if later cultivation exposes untreated soil. If conditions are cool and wet after application, Stalwart may delay maturity and/or reduce yield of "Superior" and other early-maturing varieties.

**Caution** Do not use on muck or peat soils.

**Tank-mixtures** Read and follow applicable "Restrictions and Limitations and Directions for Use" on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures. Stalwart may be applied with metribuzin preemergence. Apply this tank-mix postemergence only as a directed or semi-directed spray to avoid chlorosis, minor necrosis, or leaf discoloration. Stalwart may be applied with Prowl preemergence, preemergence incorporated, or early postemergence, as Prowl label directs. Stalwart may be applied in a three-way tank-mixture with Prowl + Eptam.

**Re-cropping restrictions** If a crop treated with Stalwart fails, any Stalwart-labeled crop may be planted immediately. Do not make a second broadcast application of Stalwart. If Stalwart was banded in the failed crop and the second crop is planted in the untreated row middles, a second banded treatment may be applied.

**Rotational cropping restrictions** Alfalfa may be planted after 4 months; barley, oats, rye, or wheat may be planted at 4.5 months; and tomato may be planted 6 months after Stalwart application. Clover may be planted 8 months after application. Any Stalwart-labeled crop or root crops, tobacco, barley, buckwheat,

milo (sorghum), oat, rye, wheat, cabbage, or peppers may be planted the spring after Stalwart applications the previous growing season. All other rotational crops may be planted 12 months after a layby application. Any Stalwart-labeled crop or tobacco, cabbage, or peppers may be planted the next spring after layby or multiple applications of Stalwart.

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

**Chemical family** Chloroacetamide

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**metribuzin (Metribuzin 4L or others, 4 lb ai/gal; or Metribuzin 75; TriCor DF or others, 75%)**

**Rate** Preemergence: use 0.5 to 2 pints/a metribuzin 4L or 0.33 to 1.3 lb/a of other DF (0.25 to 1 lb ai/a) not exceeding 0.5 lb ai/a on sandy soils or sensitive varieties; use 0.25 to 0.5 lb ai/a to control wild mustard only. Postemergence for redroot pigweed and common lambsquarters: use 0.5 to 1 pint/a metribuzin 4L, or 0.33 to 0.67 lb/a of the DF (0.25 to 0.5 lb ai/a). Postemergence for other weeds listed on label: use 1 pint/a metribuzin 4L or 0.67 lb/a of the DF (0.5 lb ai/a). Split applications, preemergence + postemergence: not exceeding 1 lb ai/a total per season. Split applications (postemergence + postemergence) in Idaho, Oregon, and Washington only: two postemergence applications can be made if metribuzin has been applied postemergence. Redroot pigweed and common lambsquarters only: 0.5 to 1 pint/a metribuzin 4L or 0.33 to 0.67 lb/a of the DF (0.25 to 0.5 lb ai/a), not to exceed 0.375 lb ai/a per application on coarse (sandy) soils with low organic matter. For other weeds listed on label and for hairy nightshade suppression, on medium and heavy soils: 0.5 lb ai/a per application. Allow at least 14 days before the second postemergence application. Postemergence for redroot pigweed and common lambsquarters: use 0.5 to 1 pint/a metribuzin 4L, or 0.33 to 0.67 lb/a of the DF (0.25 to 0.5 lb ai/a). Postemergence for other weeds listed on label—use 1 pint/a metribuzin 4 or 0.67 lb/a of the DF (0.5 lb ai/a). Split applications, preemergence + postemergence: not exceeding 1 lb ai/a total per season. Split applications (postemergence + postemergence) in Idaho, Oregon, and Washington only: two postemergence applications can be made if metribuzin has been applied postemergence. Redroot pigweed and common lambsquarters only: 0.5 to 1 pint/a metribuzin 4L or 0.33 to 0.67 lb/a of the DF (0.25 to 0.5 lb ai/a), not to exceed 0.375 lb ai/a per application on coarse (sandy) soils with low organic matter. For other weeds listed on label and for hairy nightshade suppression, on medium and heavy soils: 0.5 lb ai/a per application. Allow at least 14 days before the second postemergence application. Common cocklebur, most mustards, shepherdspurse, or most grass species listed on label are controlled with preemergence but not postemergence applications. Russian thistle can be controlled only with postemergence applications. Other weeds listed on label may be controlled with preemergence or postemergence applications, except for barnyardgrass and common sunflower, which require two applications for control. See supplemental label for rates in seed potato fields.

**Time** Both formulations may be applied preemergence or postemergence before weeds are 1 inch tall; or preemergence + postemergence or twice postemergence 14 days apart if not used preemergence. For optimum control with postemergence metribuzin, apply before weeds are 1 inch tall. Do not apply within 24 hours of applying other pesticides. Do not apply after June 30 if treated land is to be planted to crops other than potatoes. Do not apply metribuzin within 60 days of harvest.

**Application methods** Ground, chemigation, or aerial.

**Incorporation methods** Do not mechanically incorporate preemergence metribuzin treatments. Metribuzin may be applied preemergence and/or early postemergence through center pivot, solid set, and lateral roll system sprinklers. Apply proper rate in 0.25 to 0.75 inch of water (0.25 to 0.5 inch on sandy soil) as a continuous injection in center pivot and self-propelled wheel move systems, or in the last 15 to 30 min of set-in solid-set sprinkler irrigation systems.

**Remarks** Metribuzin may not control triazine-resistant weeds populations. If applying postemergence with ground equipment, overhead moisture from rain or sprinkler irrigation within 24 hours after application may decrease control. Mechanical cultivation after treatment reduces weed control and may injure potato.

**Caution** Atlantic, Bellchip, CalWhite, Cascade, Centennial Russet, Cherry Red, Chieftan, Chipbelle, Dark Red Norland, Hi Plains, Hilite Russet, Jelly, Keystone Russet, Mazama, Modoc, Norchip, Nordonna, NorValley, Owyhee Russet, Red LaSoda, Red Norland, Shepody, Silverton Russet, Snowden, Superior, Wallowa Russet, Western Russet, White Pearl and White Rose varieties are susceptible/moderately susceptible to metribuzin and may be injured. Do not apply postemergence to early-maturing, smooth-skinned, white-skinned, or red-skinned varieties of potato. Other new varieties may be sensitive to metribuzin applied preemergence or postemergence. When growing varieties for the first time, do not treat entire acreage until potato sensitivity is determined. Do not apply postemergence within 3 days after cloudy, cool, or wet weather. Do not apply to potatoes under stress (moisture, disease, mechanical injury, nutrient deficiency, frost damage, or excessive heat), or crop may be injured.

**Tank-mixtures** Read and follow applicable "Restrictions and Limitations and Directions for Use" on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures. Metribuzin may be applied in two- or three-way tank-mixtures with Chateau, Dual Magnum, Eptam (chemigation only), rimsulfuron, Outlook, or Prowl, and preemergence only in three-way tank-mixtures with rimsulfuron + Dual Magnum, Eptam, or Prowl, or with Dual Magnum + Eptam.

**Re-cropping restrictions** None on label.

**Rotational cropping restrictions** Do not plant onions, lettuce, cole and Brassica crops, or cucurbits during the growing season following metribuzin applications. Do not plant sugar beets for 18 months after metribuzin application. Certain cereal varieties are sensitive to metribuzin (see cereal section of label) and should not be planted during the growing season after metribuzin use unless moldboard plowing deeply enough to mix the upper 8 inches of soil and potato vines left in rows after harvest are uniformly distributed over the soil surface before plowing.

**Site of action** Group 5: photosystem II inhibitor

**Chemical family** Triazinone

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**paraquat (Gramoxone SL or Inteon, 2 lb paraquat cation/gal; Firestorm, 3 lb paraquat cation/gal; or others)**

**Rate** 1 to 2 pints/a (0.25 to 0.5 lb ae/a) Gramoxone SL or Inteon; or 0.7 to 1.3 pints/a (0.26 to 0.49 lb ae/a) Firestorm. Do not exceed three applications of Firestorm per year.

**Time** Apply after weeds emerge but before potatoes emerge. Delay application to allow maximum weed emergence, but apply no later than ground cracking, before potatoes emerge. Paraquat

will not control weeds that emerge after application. Do not exceed three applications per year.

**Application methods** Ground or aerial. Add a nonionic surfactant containing 75% or more surface-active agent at 0.125% v/v (1 pint/100 gal spray mix) or crop oil concentrate at 1% v/v (1 gal/100 gal spray mix) for ground applications or 1 pint/a for aerial applications. The herbicide kills most green plant growth on contact; thus good spray coverage is essential.

**Remarks** Nonselective, postemergence herbicide. Paraquat is rainfast 30 minutes after application.

**Caution** A restricted-use herbicide. Applications after crop emerges have reduced yields because of injury. Follow all use restrictions and precautions on label. Requires special safety equipment for handling, mixing, and spraying.

**Tank-mixtures** See label for allowed tank-mixtures. Read and follow applicable "Restrictions and Limitations and Directions for Use" on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures.

**Site of action** Group 22: photosystem I electron diversion

**Chemical family** Bipyridilium

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**pendimethalin (Prowl 3.3EC, 3.3 lb ai/gal; or Prowl H2O, 3.8 lb ai/gal)**

**Rate** Prowl 3.3EC: 1.2 to 1.8 pints/a (0.5 to 0.74 lb ai/a) in coarse soil; 1.8 to 2.4 pints/a (0.74 to 1 lb ai/a) in medium-texture soil with less than 3% organic matter; 2.4 to 3.6 pints/a (1 to 1.5 lb ai/a) in medium-texture soil with more than 3% organic matter or fine-texture soil with less than 3% organic matter; and 3.6 pints/a (1.5 lb ai/a) in fine-texture soil with more than 3% organic matter. Prowl H2O: 1.5 pints/a (0.7 lb ai/a) in coarse soil; 2 pints/a (0.95 lb ai/a) in medium-texture soil with less than 3% organic matter; and 3 pints/a (1.4 lb ai/a) in medium-texture soil with more than 3% organic matter or in fine-texture soil.

**Time** Preemergence and preemergence-incorporated after planting but before potatoes and weeds emerge, and early postemergence up to the 6-inch stage of potato growth. Preemergence-incorporated applications can also be made before or at dragoff.

**Application methods** Ground, chemigation, or aerial. Prowl can be applied preemergence in liquid fertilizer or impregnated onto dry fertilizer (see label for specific requirements/restrictions).

**Incorporation methods** Preemergence ground or aerial applications must have rain, irrigation, or shallow mechanical incorporation to move herbicide into the upper soil surface where weeds germinate. Prowl is most effective with adequate rain or irrigation within 7 days of application. During the shallow mechanical incorporation for preemergence-incorporated applications, take care that equipment does not damage seed pieces or elongating sprouts. Preemergence-incorporated application can be made and incorporated before, at, or after dragoff but before potato and weeds emerge. In furrow-irrigated fields, apply after final hilling and thoroughly incorporate 1 to 2 inches deep with equipment that will not damage potato seed pieces or elongating sprouts. Chemigate with 0.5 to 0.75 inch irrigation water during the first sprinkler set. Apply only through center pivot, lateral move, end tow, side/wheel roll, traveler, big gun, solid set, or hand move irrigation systems.

**Remarks** Will not control established weeds. Prowl is most effective with adequate rain or overhead irrigation after application.

**Caution** Do not exceed maximum rate allowed for any soil type. Do not apply postemergence if potatoes are stressed because the crop may be injured. Do not apply to peat or muck soils. Do not apply more than once per season. “White Rose” may be injured if Prowl H2O is applied during or before cool and/or wet weather.

**Tank-mixtures** Read and follow applicable “Restrictions and Limitations and Directions for Use” on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures. Prowl may be applied preemergence with Chateau, Eptam, Dual Magnum, rimsulfuron, Outlook, and/or metribuzin. Prowl + Eptam may be applied early postemergence by chemigation only (from potato crop emergence to 6 inch height). Prowl + metribuzin may be applied early postemergence. Prowl + Eptam + metribuzin may be applied by ground or chemigation preemergence in Idaho, Oregon, or Washington only. Prowl + Eptam + metribuzin may be applied early postemergence by chemigation only.

**Re-cropping restrictions** If crop fails because of weather, any crop registered for preplant-incorporated applications of Prowl may be replanted without adverse effects the same year. If replanting is necessary, do not work the soil deeper than the treated zone.

**Rotational cropping restrictions** Wheat and barley may be planted 4 months after application. Do not plant sugar beets, red beets, or spinach for 12 months after application; plow soil 12 inches deep before planting these crops. All other crops can be planted the following year. If crop fails where irrigation is necessary to produce the crop treated with Prowl, and the treated land is fallowed in summer, do not plant winter wheat or winter barley as follow crops that fall.

**Site of action** Group 3: microtubule assembly inhibitor

**Chemical family** Dinitroaniline

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### **rimsulfuron (Matrix SG; Matrix FNV; Solida; or others 25%)**

**Rate** Preemergence or postemergence: use 1 to 1.5 oz/a (0.0156 to 0.023 lb ai/a); can split preemergence + postemergence or postemergence + postemergence. Do not exceed a total of 2.5 oz/a (0.039 lb ai/a).

**Time** May be applied preemergence after hilling or dragoff but before potatoes and weeds emerge; postemergence when weeds are small (less than 1 inch high or across for most species); as a split preemergence + postemergence application; or as a split postemergence + postemergence application. For best results, apply rimsulfuron immediately after hilling, dragoff, or (reservoir tillage) operation to a clean, newly prepared seedbed. Depending on rain or other environmental conditions and the density of potato variety top growth (e.g., varieties such as “Russet Norkotah” may have poor top growth), a second rimsulfuron application may be needed to control second flushes of germinating annual weeds and new growth of treated perennials from underground roots or stolons. Make the second application 14 to 28 days after the first, and apply to small weeds that are less than 1 inch high or diameter that are actively growing. Quackgrass and crabgrass control may be better with postemergence than preemergence applications. For best Canada thistle control, apply rimsulfuron when weeds are small and actively growing. Quackgrass and Canada thistle not emerged at application require a second postemergence application for control.

**Application methods** Ground, chemigation, or aerial. Postemergence alone, always use a surfactant—a nonionic

surfactant (NIS) at 0.125 to 0.25% v/v (1 to 2 pints/100 gal spray mix)—or a crop oil concentrate (COC) or methylated seed oil (MSO) at 1% v/v (1 gal/100 gal spray mix). Postemergence + metribuzin, use an NIS only; adding other adjuvant types such as MSO or COC may reduce crop tolerance. Do not apply aerially during a temperature inversion, when winds are gusty, or when conditions favor poor coverage and/or off-target spray movement.

**Incorporation methods** Chemigation: apply rimsulfuron in 0.33 to 1 inch/a water (0.33 to 0.5 inch on sandy soils) as a continuous injection in center pivot and self-propelled wheel move systems. For hand line and solid-set sprinkler irrigation systems, inject at the beginning of the set and apply 0.33 to 1 inch water. Research in Idaho shows that chemigated rimsulfuron controls weeds more consistently if applied preemergence and at the full labeled rate of 0.023 lb ai/a (1.5 oz/a). If rimsulfuron is chemigated after weeds emerge, weeds must be very small (cotyledon to two-leaf stage) for acceptable control, and a nonionic surfactant must be added to the spray mix. After preemergence ground or aerial applications, activate rimsulfuron in soil with 0.33 to 1 inch sprinkler irrigation (or a single rain) as soon as possible or within 5 days after application. Activating sprinkler irrigation is required regardless of soil moisture level at planting, and unless a single rain after application equals the activation moisture requirements. Follow postemergence ground or aerial applications by 0.33 to 1 inch of rain or sprinkler irrigation no sooner than 4 hours or later than 5 days for soil activation and best weed control. After preemergence or postemergence applications, apply at least 0.33 inch sprinkler irrigation to sandy soil, 0.5 inch to sandy loam, 0.75 inch to silt, and 1 inch to clay.

**Remarks** Rimsulfuron is a sulfonyleurea herbicide. Biotypes of kochia, prickly lettuce, and Russian thistle resistant to sulfonyleurea herbicides are present in Idaho, Oregon, and Washington; rimsulfuron will not control them. Therefore, use resistance-management strategies with rimsulfuron. A key strategy is to tank mix rimsulfuron with a herbicide that has a different mechanism of action and is effective on the resistant species. Also, cultural practices such as tillage, preventing weed escapes from going to seed, and good sanitation can help delay development of herbicide-resistant weed populations. Rimsulfuron is active on hairy nightshade but does not control cutleaf nightshade. When both hairy and cutleaf nightshade are present in a field, tank mix rimsulfuron with Eptam, Chateau, Dual Magnum, Outlook, or Stalwart to control both species. For information about rimsulfuron used in seed potatoes, see “Rimsulfuron—potatoes grown for seed” below.

**Caution** Applied postemergence, rimsulfuron may temporarily yellow potato foliage. Under environmental stress (cool, wet weather or hot or humid weather), rimsulfuron applied postemergence also may cause leaf malformations and stunt growth. Potatoes recover within 7 to 15 days. To reduce potential injury, apply only if the weather has been sunny at least 3 successive days. Avoid using COC or MSO adjuvants when potatoes are under heat stress. Do not use on seed potatoes unless permitted by a supplemental label. Do not apply within 60 days of harvest. Do not cultivate later than 7 days before or for 7 days after a postemergence application. Optimum time for cultivation after postemergence application is 7 to 14 days. Avoid spray drift. Rimsulfuron can be very active even at low dosages, and many crops, including small grains, canola, sugar beet, peas, and onions, are very sensitive to rimsulfuron drift.

**Tank-mixtures** Read and follow applicable “Restrictions and Limitations and Directions for Use” on all product labels in a

tank-mixture. The most restrictive labeling applies to use of tank-mixtures. Preemergence tank-mixtures can be made with Chateau, Dual Magnum, Eptam, Outlook, Prowl 3.3EC or Prowl H2O, and/or metribuzin. Postemergence tank-mixtures can be made with metribuzin (use an NIS only) or Eptam (1 pint/a Eptam; include 2 lb/a spray-grade ammonium sulfate and methylated seed oil or organo-silicon/modified seed oil blend; for best results, rain or sprinkler irrigation of 0.33 to 1 inch no sooner than 4 hr but not later than 1 day after application). Rimsulfuron may be tank mixed with suitable registered fungicides in postemergence applications; see label for specific combinations and instructions.

**Re-cropping restrictions** No specifics are stated on labels.

**Rotational cropping restrictions** Corn may be planted any time; winter wheat may be planted after 4 mo; barley, spring wheat, and spring oats after 9 months except in certain Idaho counties (Teton, Caribou, Madison east of Hwy. 20, and Fremont east of Hwy. 20) where barley may be planted after 18 months; beans (dry and succulent), sweet corn, sunflowers, and soybeans after 10 months; and sugar beets after 18 months. Alfalfa, mint, and grass/pasture/hay seed may be planted after 4 months, onions after 10 months, and peas after 8 months if potatoes were grown under sprinkler irrigation with a minimum of 18 inches water per season in sand, loamy sand, and sandy loam soils having not more than 1.5% organic matter. Rate restrictions apply to some counties in Washington and Oregon. Refer to supplemental labels. Rotation intervals may need to extend to 18 months if drought prevails after application and before planting the rotation crop unless supplemental sprinkler irrigation has been more than 15 inches during the potato growing season. Rotation interval may need to extend to 18 months after applying in seed potato production if production practices decrease water amount/irrigation frequency and/or time for Matrix breakdown: that is, late planting. See supplemental label for details.

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

**Chemical family** Sulfonylurea

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### **rimsulfuron (Matrix SG; Matrix FNV; Solida; or others, 25%)**

Potatoes grown for seed

**Rate** Preemergence: 1.5 oz/a. Postemergence: 1 to 1.5 oz/a. Split preemergence: 1 to 1.5 oz/a followed by postemergence at 1 oz/a. Postemergence: 1 oz/a followed by postemergence at 1 oz/a. Do not exceed 2.5 oz/a per year.

**Remarks** May be used on potatoes grown for seed that use field-grown tubers as the planted seed piece, and are at least the progeny of the first field planting (first field planting uses laboratory-tested stocks that may be tissue-cultured plantlets, greenhouse-produced microtubers, minitubers, stem cuttings, or line selections). Do not use on potatoes grown for seed if grown from microtubers or transplants; these may be referred to as Generation 1, Nuclear, Elite 1, or Pre-Elite.

**Incorporation methods** To activate preemergence applications, moisture must be supplied by a single rain or sprinkler irrigation of 0.33 to 1 inch depending on soil texture (apply at least 0.33 inch to sandy soils, at least 0.5 inch to sandy loam soils, at least 0.75 inch to silt soils, and at least 1 inch to clay soils) within 5 days after application, to move herbicide 2 to 3 inches into the soil.

**Caution** Do not apply to plants stressed by cold, drought, herbicide injury, and/or insect or disease injury. Consider informing

your state seed certification agency or inspector that this herbicide has been applied to your seed potatoes. Application to crop under stress (such as drought, frost, or extreme temperatures or temperature variations) may cause temporary chlorosis, leaf crinkling, pinching of terminal leaflet, and/or mottled leaf color. These may be similar to virus symptoms but usually disappear within 5 to 15 days of application.

**Rotational cropping restrictions** The rotational crop interval for spring barley is extended to 18 months due to the generally shorter growing seasons and different cultural practices in seed production in California, Idaho, Oregon, Montana, South Dakota, Washington, Colorado, and parts of North Dakota (all counties in North Dakota except Pembina, Towner, Walsh, Grand Forks, Trail, and Cass). The rotational planting interval for other crops on label may need to be extended to 18 months if seed potato production decreases water and/or time for herbicide breakdown. Practices that may shorten the breakdown are late planting or less frequent irrigations compared with commercial potato production practices. Potatoes can be planted any time after using this herbicide in potatoes grown for seed.

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

**Chemical family** Sulfonylurea

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### **S-metolachlor (Dual Magnum, 7.62 lb ai/gal)**

**Rate** Preplant incorporated: 1 to 2 pints/a to the soil and incorporate into the top 3 inches before planting. Preemergence: 1 to 2 pints/a (0.95 to 1.9 lb ai/a), using lower rates on soils that are coarse or low in organic matter. Up to 2.6 pt/a of Dual Magnum alone may be used where soil organic matter is between 6% and 20%. Do not apply preemergence after preplant incorporated application. Postemergence (layby/after final hilling): 1.67 pints/a (1.6 lb ai/a). Postemergence application may be applied over a previous Dual Magnum application, but do not apply more than 3.6 pints/a of Dual Magnum in a single crop season. Postplant incorporated application may be made any time after planting to drag-off but before potato emergence.

**Note:** S-metolachlor also is formulated as Dual II Magnum (7.64 lb ai/gal and includes a safener for corn) and as Dual IIG Magnum (16% G). Refer to labels of those herbicides to determine rates, timing, etc. for use in potatoes.

**Time** Apply preplant or post-plant incorporated, preemergence, or postemergence layby/after final hilling. Postemergence application will not control emerged weeds. In furrow-irrigated fields, apply after final hilling and incorporate with equipment that will not damage potato seed pieces or elongating sprouts.

**Application methods** Ground, chemigation (center pivot irrigation systems only), aerial.

**Incorporation methods**

**Preplant:** Incorporate into the top 3 inches before planting, using a finishing disk, harrow, rolling cultivator, or similar implement. During planting and later cultural practices, avoid bringing untreated soil to the surface. Postplant incorporated application: use an implement that evenly distributes Dual Magnum in the top 2 inches of soil. Do not damage potato seed pieces or sprouts with incorporation equipment.

**Preemergence (before potato and weeds emerge):** If available, sprinkler irrigate within 2 days after application. Apply 0.5 to 1 inch of water. Use lower water volume on coarse-textured soils and higher volume (1 inch) on fine-textured soils. If irrigation is not possible and rain does not occur within 2 days after planting and application, weed control may be decreased. Under these

conditions, a uniform, shallow cultivation can be made as soon as weeds emerge, or incorporate with an implement that evenly distributes herbicide into top inches of soil. Do not damage seed pieces or sprouts with incorporation equipment. Postemergence (layby/after final hilling): this application will not control emerged weeds. Dual Magnum may be applied postemergence over a previous application, but do not exceed 3.6 pints/a in a single growing season.

**Preemergence or postemergence through chemigation:** Dual Magnum may be applied preemergence or postemergence through center-pivot irrigation systems. Apply the proper rate, depending on soil type, in 0.5 to 1 inch of water before weeds emerge. Uniform water incorporation (first water after application) is important.

Dual Magnum can be applied preplant or post-plant incorporated: Apply Dual Magnum at 1 to 2 pints/a to the soil and incorporate into the top 3 inches before planting, using a finishing disk, harrow, rolling cultivator, or similar implement. During planting and later cultural practices, avoid bringing untreated soil to the surface. Postplant incorporated application may be made any time after planting to drag-off, but before potato emergence. Use an implement that evenly distributes Dual Magnum in the top 2 inches of soil. Do not damage potato seed pieces or sprouts with incorporation equipment.

**Caution** If applied preplant incorporated, do not follow with a preemergence application. Do not use on muck or peat soils. Crop may be injured after Dual Magnum if soil moisture is abnormally high during early crop development. Do not harvest within 60 days after the at-planting to preemergence dragoff/after hilling application or within 40 days after a postemergence layby/after final hilling application.

**Tank-mixtures** Read and follow the applicable "Restrictions and Limitations and Directions for Use" on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures. Dual Magnum may be used in a two-way tank-mix with rimsulfuron, Prowl H2O, or metribuzin and in a three-way tank-mix with Eptam + Prowl or rimsulfuron + metribuzin (preemergence only).

**Re-cropping restrictions** If potato crop fails, corn, soybeans, potatoes, safflower, or other Dual Magnum-registered crops may be replanted immediately, provided that the rate of Dual Magnum applied to the lost potato crop was not greater than the labeled rate for the crop to be replanted. Do not make a second broadcast application.

**Rotational cropping restrictions** Do not plant barley, oats, rye, or wheat until 4.5 months after application. Alfalfa may be planted 4 months after application. Clover may be seeded 9 months after application. Any crop labeled for Dual Magnum use and pod and root crops, buckwheat, or milo (sorghum) may be planted the spring after treatment.

**Site of action** (S-metolachlor) Group 15: inhibits very long chain fatty acid synthesis

**Chemical family** Chloroacetamide

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### **S-metolachlor + glyphosate (Sequence, a formulated premix of 3 lb ai S-metolachlor + 2.25 lb ae/gal glyphosate)**

**Rate** Do not exceed 2.5 pints/a formulated product on coarse soils, 3.75 pints/a formulated product on medium soils with less than 3% organic matter, or 4 pints/a formulated product on

fine textured soils with greater than 3% organic matter. Do not exceed 4 pints of Sequence per acre per season.

**Time** Sequence may be applied during or after planting but before crop emergence.

**Application methods** Ground in 15 to 40 gal/a or aerial in 3 to 15 gal/a water. Do not apply this product through any type of irrigation system. When foliage is dense, spray volume should be increased to ensure coverage of the target weeds. Flat-fan nozzles will result in the most effective application. Control of emerged weeds may be improved by adding dry ammonium sulfate at 8.5 to 17 lb/100 gallons of water. Liquid formulations of AMS may be used at an equivalent rate.

**Remarks** Sequence is considered a foliar systemic herbicide that may be applied to control a broad spectrum of emerged weeds and can provide some residual control of certain weeds listed on the label. If rainfall or irrigation is not received within 7 days after application of Sequence, residual weed control may be reduced. Under these conditions, cultivate or use other weed control measures if weeds develop. If emerged at application time, weeds must be actively growing. For best possible annual weed control, apply to weeds 6 inches or less in height. If annual weeds have been mowed or grazed prior to application, wait for 3 to 4 inches of new growth to appear prior to application. When perennial weeds have been mowed or grazed, refer to the label for the recommended stage that new growth should reach prior to application.

**Caution** Application must be made before crop emergence. Contact with potato foliage will result in crop injury. If cool, wet conditions occur after application, Sequence may delay maturity and/or reduce yield of "Superior" or other early-maturing varieties. Do not harvest within 60 days after application.

**Tank-mixtures** Sequence can be tank-mixed with metribuzin or Prowl for control or suppression of annual and perennial weeds provided that the tank-mix product label allows use of the product. Refer to the Sequence label for weeds controlled and application rates for these tank-mixtures.

**Re-cropping restrictions** If crop treated with Sequence alone is lost, corn, legume vegetables (succulent or dried), potatoes, sorghum, soybeans, sunflowers, or transplanted tomatoes may be replanted immediately.

**Rotational cropping restrictions** Do not plant barley, oats, rye, or wheat before 4.5 months after application; alfalfa 4 months; tomato 6 months; or clover 9 months. Buckwheat, milo (sorghum) cabbage, stone fruits, or tree nuts may also be planted in the spring following treatment.

**Site of action** (S-metolachlor) Group 15: inhibits very long chain fatty acid synthesis; (glyphosate) Group 9: inhibits EPSP synthase

**Chemical family** (S-metolachlor) Chloroacetamide; (glyphosate) none generally accepted

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### **S-metolachlor + metribuzin (Boundary 6.5 EC, a formulated premix of 5.25 lb ai S-metolachlor + 1.25 lb ai/gal metribuzin)**

**Rate** Preemergence: 1.5 to 2.9 pints/a (1 lb ai/a S-metolachlor + 0.23 lb ai/a metribuzin to 1.9 lb ai/a S-metolachlor + 0.45 lb ai/a metribuzin). Postemergence (for application in center pivot

irrigation water only): 1.5 to 2.2 pints/a (1 lb ai/a S-metolachlor + 0.23 lb ai/a metribuzin to 1.3 lb ai/a S-metolachlor + 0.34 lb ai/a metribuzin). Refer to label for rate ranges according to soil texture. Two applications permitted per year. In soils with 3 to 10% OM, do not exceed 5.1 pints/a per year (3.35 lb ai/a S-metolachlor + 0.8 lb ai/a metribuzin). In soils with 0.5 to 3% OM, do not exceed 4.95 pints/a per year (3.25 lb ai/a S-metolachlor + 0.77 lb ai/a metribuzin). Do not exceed 1 lb ai/a of metribuzin per year.

**Time** Preemergence: after planting but before crop emergence. Postemergence: after drag-off if that is usual practice, but at least 60 days before harvest.

**Application methods** Preemergence: ground, irrigation (center pivot irrigation equipment), or aerial. Postemergence: center pivot irrigation equipment only. Meter into the irrigation water during the entire period of water application. Apply in 0.5 to 1 inch of water. More than 1 inch of water at application may reduce weed control by moving the herbicide below the effective zone in the soil. Refer to the "Center Pivot Irrigation Application" section of the label for more chemigation application information.

**Incorporation methods** Rain or irrigation is required to activate Boundary 6.5EC. In areas of low rainfall, follow a preemergence application with irrigation of 0.25 to 0.5 inch of water. Do not irrigate heavily immediately after application.

**Remarks** Boundary 6.5EC is recommended for preemergence weed control prior to or after potatoes emerge. Boundary 6.5EC has some postemergence activity on weeds, but the consistency and spectrum of weed control is much better preemergence for weeds. As with many surface-applied herbicides, weed control and crop tolerance may vary with rainfall and/or soil texture.

**Caution** Preplant-incorporated applications are not recommended due to an increased risk of crop injury. Boundary 6.5EC is not recommended for muck or peat soils. Do not apply Boundary 6.5EC postemergence if the weather in the next 3 days is predicted to be cool, wet, or cloudy, as crop injury may occur. Do not harvest within 60 days of the last Boundary 6.5EC application. Do not apply after June 30 in Idaho, Oregon, or Washington if the treated land will be planted to a crop other than potatoes in the fall. See previous entries in this section for potato variety sensitivity to metribuzin. In general, do not apply postemergence to early-maturing, smooth-skinned, white-skinned, or red-skinned varieties of potato. Preemergence applications may cause crop injury under adverse weather conditions, on coarse soils, under high soil pH, and with higher use rates. Potato varieties may vary in their response to a given herbicide application. When using Boundary 6.5EC for the first time on a particular variety, always determine crop tolerance before using on a field-scale.

**Tank-mixtures** Read and follow the applicable "Restrictions and Limitations and Directions for Use" on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures. For preemergence applications in potatoes, Boundary 6.5EC may be tank mixed with other pesticide products registered for use in this way and timing in potatoes. For postemergence applications (center pivot irrigation applications only), i.e., where potato vines are exposed, there may be increased risk of crop injury from certain product mixtures. At this application timing, tank mix Boundary 6.5EC only with pesticide products that allow tank mixing and postemergence chemigation on their product label.

**Re-cropping restrictions** If replanting is necessary in fields previously treated with Boundary 6.5EC, the field may be replanted to soybeans or potatoes. Before replanting, refer to the specific crop use sections for recommendations, precautions, and restrictions.

**Rotational cropping restrictions** Do not plant winter barley, winter wheat, or alfalfa until 4.5 months after application. Corn, peas, spring barley, or spring wheat may be planted 8 months after application. Do not plant asparagus, forage grasses, lentils, tomatoes, or other crops not listed (except root crops) until 12 months after application. Onions, sugar beets, and other root crops may not be planted until 18 months after application.

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

**Chemical family** (S-metolachlor) Chloroacetamide; (metribuzin) Triazinone

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### **sulfentrazone (only Sulfentrazone 39.6 SC, 4 lb ai/gal; or Willowood Sulfentrazone 45C, 4 lb ai/gal)**

**Rate** 3 to 8 fl oz/a (0.094 to 0.25 lb ai/a) depending on soil texture, percentage of organic matter (OM), and pH. Do not apply more than 8.0 fl oz/a (0.25 lb ai/a) in the 12 months after the first application. Use sulfentrazone rates in the lower range when soil pH is above 7. This herbicide is usually more available in the soil solution for uptake when soil pH is above 7 than in soils with lower pH. Availability influences weed control effectiveness and crop response.

Coarse soils with less than or equal to 3% OM—3.0 to 4.5 fl oz/a; coarse soils with 3% or more OM—4.5 to 6.0 fl oz/a. Do not apply to soils classified as sand and with less than 1% OM.

Medium-texture soils with less than 1.5% OM—3 to 4.5 fl oz/a; medium-texture soils with 1.5 to 3% OM—3.75 to 6 fl oz/a; medium-texture soils with more than 3% OM—5.25 to 6.75 fl oz/a.

Refer to the EPA-approved labels for a soil categories chart and for information on fine-texture soil rates.

**Time** Apply after planting and dragoff but before potato crop emerges. Do not apply to emerged potatoes. If applied during or after potato emergence, crop response may be undesirable.

**Application methods** Ground, aerial, and chemigation. Make chemigation application only with center pivot, lateral move, end tow, solid set, or hand move irrigation systems. Apply in 0.25 to 0.5 inch water/a. Refer to the EPA-approved labels for specific application methods/requirements.

**Application incorporation** Performance is best with either rain or overhead irrigation within 7 days after application. If dry conditions exist for 7 days post-application, incorporate sulfentrazone into the soil to a depth no more than 2 inches.

**Remarks** Potato varieties may vary in their response to sulfentrazone. Factors such as heavy rain after application; cool and moist conditions before row closure; stress from heat; and soil conditions such as coarse texture, low organic matter, or high pH may affect crop response to the herbicide and herbicide availability, increasing risk of adverse crop response.

**Caution** Irrigation with highly alkaline water (high pH) after applying sulfentrazone may increase the amount of herbicide available in the soil solution for uptake by the potato crop. Crop injury can occur from irrigation with water having pH above 7.5.

**Tank-mixtures** Read and follow applicable “Restrictions and Limitations and Directions for Use” on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures including directions for re-cropping. Sulfentrazone may be applied with other soil-applied herbicides labeled for use in potatoes. Use a herbicide providing grass control with sulfentrazone.

**Recropping restrictions** If initial planting of labeled crops fails to produce a stand, only crops labeled for sulfentrazone or any tank-mix partner used, whichever is more restrictive, may be planted.

**Rotational crop restrictions (Minimum rotational intervals)** Cabbage, dry shell peas and beans, lima beans, mint, potato, soybean, and sunflower, and spring wheat (Pacific Northwest states ID, OR, WA only) may be planted any time after sulfentrazone use in potatoes. Other intervals include 4 months: barley, rye, triticale, and wheat (other than spring wheat in ID, OR, WA); 10 months: field corn, sorghum; 12 months: sweet potato, other cereal grains such as buckwheat, oat, pearl or proso millet, and teosinte; 18 months: sweet or popcorn; and 24 months: canola. Sugar beet may not be planted for 36 months after application in potato. See the EPA-approved labels for all other crops not listed. When sulfentrazone is tank mixed with another product(s), read and follow the directions for all tank mix partners.

**Site of action** Group 14: protoporphyrinogen oxidase (Protox) inhibitor

**Chemical family** Triazolinone

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**sulfentrazone + metribuzin (only Willowood Sulfentrazone MTZ DF, a formulated premix of 0.27 lb ai metribuzin + 0.18 lb ai sulfentrazone per pound of product (total of 0.45 lb active ingredient per pound of product))**

**Rate** 8.3 to 22.2 oz/a (0.14 lb ai/a metribuzin + 0.09 lb ai/a sulfentrazone to 0.37 lb ai/a metribuzin + 0.25 lb ai/a sulfentrazone) depending on soil texture, percentage of organic matter (OM), and pH. Do not apply more than 22.2 oz/a Sulfentrazone MTZ DF (0.37 lb ai/a metribuzin + 0.25 lb ai/a sulfentrazone) or more than 0.25 lb ai/a sulfentrazone from any source in the 12 months after the first application. Use rates in the lower range when soil pH is above 7. This herbicide is usually more available in the soil solution for uptake when soil pH is above 7 than in soils with lower pH. Availability influences weed control effectiveness and crop response.

Coarse soils with less than or equal to 3% OM—8.3 to 12.5 oz/a; coarse soils with greater than 3% OM—12.5 to 16.7 oz/a. Do not apply to soils classified as sand and with less than 1% OM.

Medium-texture soils with less than 1.5% OM—8.3 to 12.5 oz/a; medium-texture soils with 1.5 to 3% OM—10.4 to 16.7 oz/a; medium-texture soils with more than 3% OM—14.6 to 18.8 oz/a.

Refer to the EPA-approved labels for a soil categories chart and for information on fine-texture soil rates.

**Time** Apply after planting and dragoff but before potato crop emerges. Do not apply to emerged potatoes. If applied during or after potato emergence, crop response may be undesirable.

**Application methods** Ground, aerial, and chemigation. Make chemigation application only with center pivot, lateral move, end tow, solid set, or hand move irrigation systems. Apply in 0.25 to

0.5 inch water/a. Refer to the EPA-approved labels for specific application methods/requirements.

**Application incorporation** Performance is best with either rain or overhead irrigation within 7 days after application. If dry conditions exist for 7 days post-application, incorporate Willowood Sulfentrazone MTZ DF into the soil to a depth no more than 2 inches.

**Remarks** Potato varieties may vary in their response to Willowood Sulfentrazone MTZ DF. When making an application of Willowood Sulfentrazone MTZ DF on an untested variety, always determine the crop tolerance prior to planting or spraying with this product. Some potato varieties, including Sangre, Shepody and Snowden, have shown sensitivity to application of Willowood Sulfentrazone MTZ DF. Varieties sensitive to applications of metribuzin will more than likely be sensitive to Willowood Sulfentrazone MTZ DF. Caution should especially be used if planting these varieties on marginal coarse soils. Factors such as heavy rain after application; cool and moist conditions before row closure; stress from heat; and soil conditions such as coarse texture, low organic matter, or high pH may affect crop response to the herbicide and herbicide availability, increasing risk of adverse crop response.

**Caution** Irrigation with highly alkaline water (high pH) after applying Willowood Sulfentrazone MTZ DF may increase the amount of herbicide available in the soil solution for uptake by the potato crop. Crop injury can occur from irrigation with water having pH above 7.5.

**Tank-mixtures** Read and follow applicable “Restrictions and Limitations and Directions for Use” on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures including directions for re-cropping. Willowood Sulfentrazone MTZ DF may be applied with other soil-applied herbicides labeled for use in potatoes.

**Recropping restrictions** If initial planting of labeled crops fails to produce a stand, only crops labeled for Willowood Sulfentrazone MTZ DF or any tank-mix partner used, whichever is more restrictive, may be planted.

**Rotational crop restrictions (Minimum rotational intervals)** Field corn, popcorn, and soybeans may be planted any time after Willowood Sulfentrazone MTZ DF use in potatoes. Other intervals include 4 months: barley, wheat; 12 months: alfalfa, dry beans, potatoes, sunflower; 18 months: sorghum, sweet corn; and 24 months: canola. Sugar beet may be planted 24 months after application and a successful bioassay. Crops with rotational intervals that are greater than 12 months after a Willowood Sulfentrazone MTZ DF application are the result of crop injury concerns. These crops should only be planted following a successful bioassay. Sorghum may be planted after 12 months where Willowood Sulfentrazone MTZ DF was applied at rates 20 oz/acre or less in the previous cropping season.

See the EPA-approved labels for all other crops not listed. When Willowood Sulfentrazone MTZ DF is tank mixed with another product(s), read and follow the directions for all tank mix partners.

**Site of action** (sulfentrazone) Group 14: protoporphyrinogen oxidase (Protox) inhibitor; (metribuzin) Group 5: photosystem II inhibitor.

**Chemical family** (sulfentrazone) Triazolinone; (metribuzin) Triazinone

## Grass Control Only

### clethodim (Select 2EC, 2 lb ai/gal)

**Rate** 6 to 16 fl oz/a (0.094 to 0.25 lb ai/a). See label for recommended rates on specific grass species and growth stages. Use the high rate under heavy grass pressure and/or when grasses have reached maximum height. Do not exceed a total of 32 fl oz/a per season. Does not control broadleaves.

**Time** Apply to actively growing grasses with recommended weed heights. Apply when the first grass species in a mixed-grass-weed population reaches the recommended growth stage for treatment. Where irrigation supplements limited rain, apply Select as soon as possible within 7 days after irrigation. In arid regions, a second application generally controls perennial grasses more effectively than a single application. Make the second application 2 to 3 weeks after the first. Do not apply a postemergence broadleaf herbicide within 1 day after a Select application; grass control may be reduced. Do not cultivate less than 7 days before or after applying Select. Do not apply Select if rain is expected within 1 hour after application. Preharvest interval is 30 days.

**Application methods** Ground or aerial. Always use a crop oil concentrate (COC), 1 quart/a COC for ground applications and 1% v/v (but not less than 1 pint/a) COC for aerial applications. One to 2 quarts/a liquid fertilizer or 2.5 to 4 lb/a spray-grade ammonium sulfate (AMS) may be added to the spray mix in addition to COC. Adding AMS improves control for difficult species such as quackgrass, wild oat, volunteer cereals, or volunteer corn. Do not apply by chemigation.

**Remarks** Select controls annual and perennial grasses; Select does not control sedges or broadleaves. Do not apply to stressed grass plants; control may be reduced. Perennial grass control is best if rhizomes or stolons are cut up before planting crop, to stimulate maximum emergence of grass shoots. Minor leaf spotting on treated potato plants may occur under certain environmental conditions, but new foliage will be unaffected.

**Caution** Grass crops such as corn, sorghum, rice, small grains, and turf are highly sensitive to Select. The Select 2EC label does not specify uses in potato grown for seed.

**Tank-mixtures** Mixtures of Select and broadleaf herbicides may reduce grass control. An additional Select application may be necessary. Do not apply Select if broadleaf weeds are tall or dense enough to prevent proper coverage. Read and follow applicable "Restrictions and Limitations and Directions for Use" on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures.

**Re-cropping restrictions** None on the label.

**Rotational cropping restrictions** None on the label.

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

**Chemical family** Cyclohexanedione

### sethoxydim (Poast 1.5 lb ai/gal; or Poast Plus 1.0 lb ai/gal)

**Rate** Most annual grasses: 1.5 pints/a Poast; or 2.25 pints/a Poast Plus (0.28 lb ai/a). Volunteer cereals: 2 pints/a Poast or 3 pints/a Poast Plus (0.375 lb ai/a). See the quackgrass and wild oat sections for specific rates and directions for control of these grasses. Does not control broadleaves.

**Time** Apply to actively growing annual grasses at stage of grass growth indicated on label. To control volunteer cereals, apply before tillering up to 4 inches tall. Do not cultivate within 5 days before or 7 days after application. Cultivating 7 days or later after application may help provide season-long control. Do not apply within 30 days of harvest.

**Application methods** Ground or aerial. In irrigated areas, it may be necessary to irrigate before treatment to ensure active weed growth. Always add a nonphytotoxic oil concentrate to the spray tank at 32 oz/a or methylated seed oil at 20 oz/a or Dash HC at 16 oz/a.

**Remarks** See labels for specific rates for weed species and weed size. Poast or Poast Plus is most effective on actively growing grasses before they reach the maximum size listed on label. Larger, more mature grasses can often be controlled but may require two applications. Poast or Poast Plus will not control annual bluegrass or any of the fine fescues and is relatively weak on downy brome.

**Caution** Control may be erratic on grasses stressed by drought, temperature extremes, insect damage, herbicide injury, or other factors. Do not apply if rain is expected within 1 hour after application. Do not apply through any type of irrigation equipment.

**Tank-mixtures** Poast or Poast Plus can only be tank mixed with metribuzin in potatoes. Read and follow applicable "Restrictions and Limitations and Directions for Use" on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures. Do not apply this tank-mix if grasses to be controlled include rhizome Johnsongrass, quackgrass, Bermudagrass, wirestem muhly, volunteer corn or cereal, shattercane, red rice, or itchgrass.

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

**Chemical family** Cyclohexanedione

## Quackgrass

### EPTC (Eptam 7E, 7 lb ai/a)

**Rate** 4.5 pints/a (4 lb ai/a)

**Time** Apply and incorporate just before planting potatoes.

**Remarks** Thoroughly till quackgrass before application; chop rhizomes into pieces 2 to 3 inches or smaller. Eptam must be incorporated immediately and thoroughly after application, either with a rotovator or by cross-disking. Use on mineral soils containing less than 10% organic matter. See previous entries in this section for application and incorporation methods, remarks, cautions, re-cropping and rotational cropping restriction, and site of action/chemical family information specific to this herbicide.

**Site of action** Group 8: lipid synthesis inhibitor but not an ACCase inhibitor

**Chemical family** Thiocarbamate

### rimsulfuron (Matrix SG; Matrix FNV; Solida; or others 25%)

**Rate** 1 to 1.5 oz/a of the 25% DF (0.0156 to 0.023 lb ai/a) + non-ionic surfactant at 0.125 to 0.25% v/v (1 to 2 pints/100 gal spray solution) or crop oil concentrate or methylated seed oil at 1% v/v (1 gal/100 gal spray solution)

**Time** Apply postemergence to 4- to 6-inch quackgrass.

**Remarks** Also may use as a split postemergence + postemergence application. Use 1 to 1.5 oz/a rimsulfuron + 0.125 to 0.25% nonionic surfactant (1 to 2 pints/100 gal spray solution) at each application; do not exceed a total of 2.5 oz/a rimsulfuron. In split applications, make the second 14 to 28 days after the first. See previous entries in this section for application and incorporation methods, remarks, cautions, re-cropping and rotational cropping restriction, and site of action and chemical family information specific to this herbicide. Applied postemergence, rimsulfuron may temporarily yellow potato foliage. Under environmental stress (cool, wet or hot or humid weather), rimsulfuron applied postemergence also may stunt growth and cause leaf malformations. Potatoes recover within 7 to 15 days. To reduce injury, apply only if it has been sunny at least 3 successive days. Do not use on seed potatoes unless permitted by a supplemental label.

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

**Chemical family** Sulfonylurea

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### **sethoxydim (Poast, 1.5 lb ai/gal; or Poast Plus, 1 lb ai/gal)**

**Rate** 2.5 pints/a Poast or 3.75 pints/a Poast Plus (0.47 lb ai/a)

**Time** Apply when quackgrass shoots are 6 to 8 inches tall. A second application at 0.28 lb ai/a (1.5 pints/a Poast or 2.25 pints/a Poast Plus) may be needed if quackgrass re-grows. Best results usually require repeated applications.

**Remarks** Always add a nonphytotoxic oil concentrate to spray tank at 2 pints/a. Add nitrogen to improve control. Cultivate 7 to 14 days after an initial or sequential application to aid control. May not eradicate quackgrass. Do not tank mix Poast or Poast Plus with other herbicides for control of quackgrass. See previous entries in this section for application and incorporation methods, remarks, cautions, re-cropping and rotational cropping restrictions specific to this herbicide.

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

**Chemical family** Cyclohexanedione

### **Wild Oat**

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#### **EPTC (Eptam 7E, 7 lb ai/gal)**

**Rate** 3.5 to 7 pints/a (3 to 6 lb ai/a)

**Time** Apply and immediately incorporate into soil before planting potatoes or after clean cultivation.

**Remarks** If applied preplant, thoroughly incorporate into soil immediately after applying 2 to 3 inches deep by cross-disking 4 to 6 inches deep or by tilling with a power-driven rotary tiller cutting 2 to 3 inches deep. If applied after planting, incorporate either mechanically into the top 2 to 3 inches of soil or by sprinkler irrigation. See previous entries in this section for application and incorporation methods, remarks, cautions, re-cropping and rotational cropping restrictions, and site of action and chemical family information for this herbicide.

**Site of action** Group 8: lipid synthesis inhibitor but not an ACCase inhibitor

**Chemical family** Thiocarbamate

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### **Paraquat (SL or Inteon, 2 lb paraquat cation/gal; Firestorm, 3 lb paraquat cation/gal; or others or glyphosate (various formulations))**

**Rate** Apply to fallow ground before planting potatoes: 1.5 to 4 pints/a Gramoxone SL or Inteon (0.75 to 1 lb ae/a); after planting and before potatoes emerge: 1 to 2 pints Gramoxone SL or Inteon (0.5 to 1 lb ae/a) or 1.3 pints/a (0.49 lb ae/a) Firestorm + a non-ionic surfactant with 75% or more surface-active agent at 0.125% v/v (1 pint/100 gal spray mix) or crop oil concentrate at 1% v/v (1 gal/100 gal spray mix) for ground applications or 1 pint/a for aerial applications. Glyphosate: 0.38 lb ae/a.

**Time** Apply Gramoxone SL or Inteon to fallow ground before planting potatoes. Apply Gramoxone SL or Inteon, Firestorm, or glyphosate before potatoes emerge.

**Remarks** These materials control only wild oat emerged at the time of application. Wild oat emerging later will not be controlled. Some glyphosate formulations require nonionic surfactant; see label for details. Adding 1 to 2% dry ammonium sulfate (AMS) by weight or 8.5 to 17 lb/100 gal spray-mix may increase performance. The equivalent rate of AMS in a liquid formulation also may be used.

**Caution** Paraquat is a restricted-use herbicide. Do not apply either paraquat or glyphosate if potatoes have emerged, because crop may be injured. See previous entries in this section for application and incorporation methods, remarks, cautions, re-cropping and rotational cropping restriction, and site of action and chemical family information for this herbicide.

**Site of action** (paraquat) Group 22: photosystem 1 electron diversion; (glyphosate) Group 9: inhibits EPSP synthase

**Chemical family** (paraquat) bipyridilium; (glyphosate) none generally accepted

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### **rimsulfuron (Matrix SG; Matrix FNV; Solida; or others, 25%)**

**Rate** 1 to 1.5 oz/a (0.0156 to 0.023 lb ai/a rimsulfuron + non-ionic surfactant at 0.125% to 0.25% v/v (1 to 2 pints/100 gal spray solution) or 1% v/v (1 gal/100 gal spray solution) crop oil concentrate or methylated seed oil if weeds are emerged.

**Time** May be applied preemergence after hilling or dragoff but before potatoes and wild oat emerge or postemergence to wild oat in the two- to four-leaf stage (3 to 5 inches tall).

**Remarks** Tank-mixes are in Annual Grass and Broadleaf Weeds section. See previous entries in this section for application and incorporation methods, remarks, cautions, re-cropping and rotational cropping restrictions, and site of action and chemical family information for this herbicide.

**Caution** Applied postemergence, rimsulfuron may temporarily yellow potato foliage. Under environmental stress (cool, wet, or hot or humid weather), rimsulfuron applied postemergence also may stunt growth and cause leaf malformations. Potatoes recover within 7 to 15 days. To reduce potential injury, apply only if the weather has been sunny for at least 3 successive days. Do not use on seed potatoes unless permitted by a supplemental label.

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

**Chemical family** Sulfonylurea

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**sethoxydim (Poast, 1.5 lb ai/gal; or Poast Plus, 1 lb ai/gal)**

**Rate** 1.5 pints/a Poast; or 2.25 pints/a Poast Plus (0.28 lb ai/a)

**Time** Apply to actively growing wild oat up to 4 inches tall.

**Remarks** Always add a nonphytotoxic oil concentrate to the spray tank at 2 pints/a or methylated seed oil at 20 oz/a or Dash HC at 16 oz/a. Depending on the crop, the addition of ammonium nitrate or ammonium sulfate is recommended.

**Caution** Control may be erratic on grasses stressed by drought, temperature extremes, insect damage, herbicide injury, and other factors. Do not apply if rain is expected within 1 hour after applying. Do not cultivate within 5 days before or 7 days after applying. Preharvest interval is 30 days. Poast or Poast Plus can only be tank mixed with metribuzin in potatoes. See previous entries in this section for application and incorporation methods, remarks, cautions, re-cropping and rotational cropping restrictions specific to this herbicide.

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

**Chemical family** Cyclohexanedione

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**Tank-Mixtures**

Note: Not all tank-mixtures labeled for use in potatoes are listed. See the potato herbicide labels for other allowed tank-mixtures. Read and follow applicable "Restrictions and Limitations and Directions for Use" on all product labels in a tank-mixture. The most restrictive labeling applies to use of tank-mixtures.

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**EPTC (Eptam) + metribuzin (Metribuzin 4L or others, 4 lb ai/gal; or Metribuzin 75; TriCor DF or others, 75%)**

**Rate** 3.5 pints/a Eptam on coarse soils or 4.5 pints/a Eptam on fine-texture soils + 0.5 to 1 pint/a 4L or 0.33 to 0.67 lb/a 75%

**Time** May apply before planting; during or after hilling, when applied postemergence and broadcast by ground, until potatoes are 4 inches tall; or, when applied through a sprinkler irrigation system, until potatoes are 6 inches tall. Thoroughly incorporate the tank-mixture into top 2 to 3 inches of soil mechanically or by sprinkler irrigation.

**Remarks** Use lower rates on coarse soils. Incorporate immediately after application. When metered into irrigation systems, use 0.5 to 0.75 inch of water/a with a center pivot system. For solid-set wheel lines or hand lines, apply herbicide mixture in 0.5 to 1 inch of water. For best results, wet soil 3 to 4 inches deep during chemigation. See previous entries in this section for application and incorporation methods, remarks, cautions, and re-cropping and rotational cropping restriction information for these herbicides.

**Caution** See previous entries in this section for potato variety sensitivity to metribuzin. In general, do not apply this tank-mixture postemergence to early-maturing, smooth-skinned, white-skinned, or red-skinned varieties of potato.

**Site of action** (EPTC) Group 8: lipid synthesis inhibitor but not an ACCase inhibitor; (metribuzin) Group 5: photosystem II inhibitor

**Chemical family** (EPTC) thiocarbamate; (metribuzin) triazinone

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**pendimethalin (Prowl 3.3 EC or Prowl H2O) + EPTC (Eptam)**

**Rate** 1.2 to 2.4 pints/a Prowl 3.3EC or 1.5 to 3 pints/a Prowl H2O + 3.5 to 7 pints/a Eptam

**Time** Apply after planting but before potatoes and weeds emerge.

**Remarks** Use lower rates on coarse soils and higher rates on finer, heavier soils. The tank-mixture will not control emerged weeds.

**Caution** Follow Prowl 3.3 EC or Prowl H2O and Eptam labels' most restrictive directions, timing, limitations, precautions, and restrictions on use in potatoes. See the previous sections in this chapter for application and incorporation methods, remarks, cautions, and re-cropping and rotational cropping restriction information for these herbicides.

**Site of action** (pendimethalin) Group 3: microtubule assembly inhibitor; (EPTC) Group 8: lipid synthesis inhibitor but not an ACCase inhibitor

**Chemical family** (pendimethalin) Dinitroaniline; (EPTC) Thiocarbamate

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**pendimethalin (Prowl 3.3EC or Prowl H2O) + metribuzin (Metribuzin 4L or others, 4 lb ai/gal; or Metribuzin 75; TriCor DF or others, 75%)**

**Rate** Preemergence: use 1.2 to 3.6 pints/a Prowl 3.3EC or 1.5 to 3 pints/a Prowl H2O + 1 to 2 pints/a metribuzin 4 or 0.67 to 1.33 lb/a metribuzin 75%DF. Early postemergence: use 1.2 to 3.6 pints/a Prowl 3.3EC or + 0.5 to 1 pint/a metribuzin 4 or 0.33 to 0.67 lb/a metribuzin 75%DF.

**Time** Apply as a tank-mix, after planting up to the 6-inch stage of potato growth. Mixture also may be applied through sprinkler systems.

**Remarks** Use lower rates on coarse soils. About 0.5 inch of overhead moisture is needed to move herbicides into sandy soils and up to 0.9 inch into silt-loam soils. For best control, apply before weeds are 1 inch tall. See the previous entries in this section for application and incorporation methods, remarks, cautions, and re-cropping and rotational cropping restriction information for these herbicides.

**Caution** Do not apply within 24 hours of applying other pesticides. Do not mechanically incorporate this combination into soil; doing so decreases weed control and may injure potatoes. See the previous entries in this section for potato variety sensitivity to metribuzin. In general, do not apply this tank-mixture postemergence to early-maturing, smooth-skinned, white-skinned, or red-skinned varieties of potato.

**Site of action** (pendimethalin) Group 3: microtubule assembly inhibitor; (metribuzin) Group 5: photosystem II inhibitor

**Chemical family** (pendimethalin) dinitroaniline; (metribuzin) triazinone

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**pendimethalin (3.3EC or Prowl H2O) + metribuzin (Metribuzin 4L or others, 4 lb ai/gal; or Metribuzin 75; TriCor DF or others, 75%) + EPTC (Eptam)**

**Rate** 1.2 to 2.4 pints/a Prowl 3.3EC or 1.5 to 4 pints/a Prowl H2O + 0.5 to 1 pint/a metribuzin 4, or 0.33 to 0.67 lb/a metribuzin 75%DF + 3 to 3.5 pints/a Eptam

**Time** Apply with ground equipment or through sprinkler irrigation systems, as a tank-mix after planting but before potatoes and

weeds emerge. Mixture also may be applied through sprinkler systems postemergence, from crop emergence up to 6-inch stage of potato growth.

**Remarks** Use lower rates on coarse soils. Tank-mix will not control established weeds; destroy them before application. See the previous entries in this section for application and incorporation methods, remarks, cautions, and re-cropping and rotational cropping restriction information specific to these herbicides.

**Caution** Do not use on peat or muck soils. Do not apply if potatoes are stressed from cold and wet or hot and dry conditions, or crop may be injured. See previous entries in this section for potato variety sensitivity to metribuzin. In general, do not apply this tank-mixture postemergence to early-maturing, smooth-skinned, white-skinned, or red-skinned varieties of potato.

**Site of action** (pendimethalin) Group 3: microtubule assembly inhibitor; (metribuzin) Group 5: photosystem II inhibitor; (EPTC) Group 8: lipid synthesis inhibitor but not an ACCase inhibitor

**Chemical family** (pendimethalin) Dinitroaniline; (metribuzin) Triazinone; (EPTC) Thiocarbamate

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**rimsulfuron (Matrix SG; Matrix FNV; Solida; and others, 25%) + metribuzin (Metribuzin 4L or others, 4 lb ai/gal; or Metribuzin 75; TriCor DF or others, 75%)**

**Rate** Preemergence: use 1 to 1.5 oz/a rimsulfuron + 0.5 to 1.125 pint/a metribuzin 4 or 0.33 to 0.75 lb/a metribuzin 75%DF. Postemergence: use 1 to 1.5 oz/a rimsulfuron + 0.5 to 1 pint/a metribuzin 4 or 0.33 to 0.67 lb/a metribuzin 75%DF. Use a nonionic surfactant at 0.125% v/v (1 pint/100 gal) if weeds have emerged.

**Time** After planting or dragoff but before crop and weeds emerge, or postemergence when weeds are small (less than 1 inch high or across for most species).

**Remarks** This tank-mixture can improve control of common lambsquarters, Russian thistle, kochia, and wild buckwheat better than rimsulfuron alone. The mixture also is an effective resistance-management tool for ALS-inhibitor-resistant species that are controlled by metribuzin and for triazine-resistant species that are controlled by rimsulfuron. Rimsulfuron + metribuzin controls hairy nightshade but not cutleaf nightshade. When both hairy and cutleaf nightshade infest a field, tank mix rimsulfuron + metribuzin with Eptam or Dual Magnum or other potato herbicides controlling cutleaf nightshade in order to control both species. If a split application is used (preemergence + postemergence or postemergence + postemergence), do not exceed a total of 0.039 lb ai/a (2.5 oz/a 25%DF) rimsulfuron. Follow the metribuzin label recommendations on rates for split applications. See previous entries in this section for application and incorporation methods, remarks, cautions, and re-cropping and rotational cropping restriction information for these herbicides.

**Caution** See previous entries in this section for potato variety sensitivity to metribuzin. In general, do not apply this tank-mixture postemergence to early-maturing, smooth-skinned, white-skinned, or red-skinned varieties of potato. Using crop oil concentrate or methylated seed oil adjuvants is not recommended with the rimsulfuron + metribuzin tank-mix postemergence. Applied postemergence, this mixture may temporarily yellow potato foliage. Under environmental stress (cool, wet, or hot or humid weather), this mixture applied postemergence also may cause leaf malformations and stunted growth. Potatoes recover

within 7 to 15 days. To reduce potential injury, apply mixture only if the weather has been sunny for at least 3 successive days. Do not use on seed potatoes unless permitted by a supplemental label. Apply postemergence before potatoes are 14 inches tall and before June 30. Do not apply within 60 days of harvest.

**Site of action** (rimsulfuron) Group 2: acetolactate synthase (ALS) inhibitor; (metribuzin) Group 5: photosystem II inhibitor

**Chemical family** (rimsulfuron) Sulfonylurea; (metribuzin) Triazinone

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**rimsulfuron (Matrix SG; Matrix FNV; Solida; or others, 25%) + EPTC (Eptam)**

**Rate** 1 to 1.5 oz/a rimsulfuron + 3.5 to 7 pints/a Eptam

**Time** Apply preemergence before potatoes and weeds emerge and after dragoff or hilling. To avoid placing rimsulfuron too deep, incorporate the tank-mix with sprinkler irrigation rather than machinery. Apply postemergence, before potatoes are 4 to 6 inches tall, with a nonionic surfactant at 0.125% v/v (1 pint/100 gal spray solution) if weeds have emerged. This tank-mixture may be applied preemergence or early postemergence through chemigation. If your area does not allow sprinkler irrigation incorporation, then apply Eptam and rimsulfuron in a split application. (Semi-arid regions of Idaho, Oregon, and Washington allow sprinkler irrigation incorporation.)

**Remarks** Tank-mix controls crabgrass, hairy nightshade, cutleaf nightshade, and common lambsquarters more effectively than rimsulfuron alone. A three-way mixture of rimsulfuron + Eptam + Dual Magnum or of rimsulfuron + Eptam + Prowl 3.3 EC or H<sub>2</sub>O may be used after planting but before potatoes and weeds emerge. See the previous entries in this section for application and incorporation methods, remarks, cautions, and re-cropping and rotational cropping restriction information for these herbicides.

**Caution** Applied postemergence, rimsulfuron + Eptam may temporarily yellow potato foliage. Under environmental stress (cool, wet, or hot or humid weather), mixture applied postemergence also may stunt growth and cause leaf malformations. Potatoes recover within 7 to 15 days. To reduce injury, apply mixture only if the weather has been sunny at least 3 successive days. Do not use on seed potatoes unless permitted by a supplemental label.

**Site of action** (rimsulfuron) Group 2: acetolactate synthase (ALS) inhibitor; (EPTC) Group 8: lipid synthesis inhibitor but not an ACCase inhibitor

**Chemical family** (rimsulfuron) Sulfonylurea; (EPTC) Thiocarbamate

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**rimsulfuron (Matrix SG; Matrix FNV; Solida; or others, 25%) + EPTC (Eptam at a reduced rate) + MSO or OS/MSO + AMS**

Postemergence

**Rate** 1 to 1.5 oz/a rimsulfuron + 1 pint/a Eptam

**Time** Apply postemergence. Include either 1% v/v (1 gal/100 gal spray mix) of a methylated seed oil (MSO) or 0.5% v/v (0.5 gal/100 gal spray mix) of an organosilicone modified adjuvant (OS/MSO). Also include 2 lb/a of a spray-grade ammonium sulfate (AMS). This tank-mixture may be applied early postemergence through chemigation.

**Remarks** For best results, rain or sprinkler irrigation is needed no sooner than 4 hours but not more than 1 day after application.

Rain or irrigation should be 0.33 to 1 inch depending on soil texture: in sandy soils, apply at least 0.33 inch; in sandy loam soils at least 0.5 inch; in silt soils at least 0.75 inch; and in clay soils at least 1 inch. Additional Eptam can be chemigated during the sprinkler incorporation process if desired. Read and follow all use directions, restrictions, and precautions on Eptam 7E label before use. If Eptam label conflicts with this rimsulfuron label, do not use Eptam as a tank-mix partner as described in this section. See the previous entries in this section for application and incorporation methods, remarks, cautions, and re-cropping and rotational cropping restriction information for these herbicides.

**Caution** This tank-mixture may cause leaf burn and temporary yellowing if applied in hot weather. Adding fungicides may increase the level of crop injury. In warm, moist weather, the expression of herbicide symptoms is accelerated; in cold, dry weather, expression of herbicide symptoms is delayed and may be more variable in weed control.

**Site of action** (rimsulfuron) Group 2: acetolactate synthase (ALS) inhibitor; (EPTC) Group 8: lipid synthesis inhibitor but not an ACCase inhibitor

**Chemical family** (rimsulfuron) Sulfonylurea; (EPTC) Thiocarbamate

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**rimsulfuron (Matrix SG; Matrix FNV; Solida; or others, 25%) + metribuzin (Metribuzin 4L or others, 4 lb ai/gal; or Metribuzin 75; TriCor DF or others, 75%) + EPTC (Eptam) or S-metolachlor (Dual Magnum) or pendimethalin (Prowl 3.3EC or Prowl H2O)**

**Rate** 1 to 1.5 oz/a rimsulfuron + 0.5 to 1 pint/a metribuzin 4 or 0.33 to 0.67 lb/a metribuzin 75%DF + 3.5 to 4.5 pints/a Eptam or 1.5 to 2 pints/a Dual Magnum or 1.2 to 2.4 pints/a of Prowl 3.3EC or 1.5 to 3 pints/a Prowl H2O

**Time** Apply after planting or after hilling or dragoff, but before potatoes or weeds emerge. The rimsulfuron + metribuzin + Eptam mixture also may be applied postemergence to small weeds (less than 1 inch high or across) before potatoes are 4 to 6 inches tall.

**Remarks** Three-way mixtures of rimsulfuron + metribuzin + Eptam or Dual Magnum or Prowl 3.3EC or Prowl H2O control hairy nightshade in heavily infested fields better than rimsulfuron + metribuzin or rimsulfuron alone. Whether to use Eptam, Dual Magnum, Prowl 3.3 EC or Prowl H2O in the three-way mix depends on which other weeds infest the field. See herbicide efficacy tables for common weed species at the end of this section. See the previous entries in this section for application and incorporation methods, remarks, cautions, and re-cropping and rotational cropping restriction information for these herbicides.

**Caution** Read and follow all label recommendations for companion herbicides. If recommendations conflict with rimsulfuron label, do not use in a tank-mix with rimsulfuron. Use lower rates on coarse, sandy soils and the higher rate on fine-texture soils. If using the rimsulfuron + metribuzin + Eptam mix postemergence, use nonionic surfactant at 0.125% v/v (1 pint/100 gal spray solution). Do not use on seed potatoes unless a supplemental label permits. See previous entries in this section for potato variety sensitivity to metribuzin. In general, do not apply this tank-mixture postemergence to early-maturing, smooth-skinned, white-skinned, or red-skinned varieties of potato.

**Site of action** (rimsulfuron) Group 2: acetolactate synthase (ALS) inhibitor; (metribuzin) Group 5: photosystem II inhibitor; (EPTC) Group 8: lipid synthesis inhibitor but not an ACCase

inhibitor; (S-metolachlor) Group 15: inhibits very long chain fatty acid synthesis; (pendimethalin) Group 3: microtubule assembly inhibitor

**Chemical family** (rimsulfuron) sulfonylurea; (metribuzin) triazinone; (EPTC) thiocarbamate; (S-metolachlor) chloroacetamide; (pendimethalin) dinitroaniline

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**rimsulfuron (Matrix SG; Matrix FNV; Solida; or others, 25%) + S-metolachlor (Dual Magnum)**

**Rate** 1 to 1.5 oz/a Matrix + 1.5 to 2 pints/a Dual Magnum

**Time** Apply after planting as a delayed preemergence treatment (after dragoff or hilling but before crop and weeds emerge).

**Remarks** Tank-mix controls small-seed grasses, hairy and cutleaf nightshade, and common lambsquarters better than rimsulfuron alone. A three-way mixture of rimsulfuron + Dual Magnum + Eptam or Prowl 3.3EC or Prowl H2O may be used after planting but before potatoes and weeds emerge. See previous entries in this section for application and incorporation methods, remarks, cautions, and re-cropping and rotational cropping restriction information.

**Caution** Do not use on seed potatoes unless permitted by a supplemental label.

**Site of action** (rimsulfuron) Group 2: acetolactate synthase (ALS) inhibitor; (S-metolachlor) Group 15: inhibits very long chain fatty acid synthesis

**Chemical family** (rimsulfuron) Sulfonylurea; (S-metolachlor) Chloroacetamide

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**rimsulfuron (Matrix SG; Matrix FNV; Solida; or others, 25%) + pendimethalin (Prowl 3.3EC or Prowl H2O)**

**Rate** 1 to 1.5 oz/a rimsulfuron + 1.2 to 2.4 pints/a of Prowl 3.3EC or 1.5 to 3 pints/a Prowl H2O

**Time** Apply after planting or after dragoff but before potatoes and weeds emerge.

**Remarks** Tank-mix controls kochia (including rimsulfuron-resistant kochia), common lambsquarters, Russian thistle, and crabgrass better than rimsulfuron alone. Rimsulfuron + Prowl 3.3 EC or Prowl H2O controls hairy nightshade but does not control cutleaf nightshade. A mixture of rimsulfuron + Prowl 3.3 EC or Prowl H2O + Eptam or Dual Magnum may be used after planting but before potatoes and weeds emerge. Either three-way mixture controls hairy and cutleaf nightshade more effectively than rimsulfuron + Prowl 3.3 EC or Prowl H2O. See previous entries in this section for application and incorporation methods, remarks, cautions, and re-cropping and rotational cropping restriction information for these herbicides.

**Caution** Do not use on seed potatoes unless permitted by a supplemental label.

**Site of action** (rimsulfuron) Group 2: acetolactate synthase (ALS) inhibitor; (pendimethalin) Group 3: microtubule assembly inhibitor

**Chemical family** (rimsulfuron) Sulfonylurea; (pendimethalin) Dinitroaniline

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**sethoxydim (Poast or Poast Plus) + metribuzin (Metribuzin 4L or others, 4 lb ai/gal; or Metribuzin 75; TriCor DF or others, 75%)**

**Rate** 1 to 2.5 pints/a Poast; or 1.5 to 2.25 pints/a Poast Plus + 0.75 to 0.94 pint/a metribuzin 4 or 0.5 to 0.63 lb/a metribuzin 75%DF

**Time** Apply postemergence to actively growing weeds at growth stage recommended on product labels.

**Remarks** Always add a nonphytotoxic oil concentrate at 2 pints/a to the spray tank. Do not apply if target grasses include quackgrass, rhizome Johnsongrass, volunteer corn, wirestem muhly, shattercane, red rice, itchgrass, or bermudagrass. Do not cultivate within 5 days before or 7 days after applying the tank-mix. See the previous entries in this section for application and incorporation methods, remarks, cautions, and re-cropping and rotational cropping restriction information for these herbicides.

**Caution** Do not apply this tank-mix with other herbicides. Do not apply this tank-mix if grasses to be controlled include rhizome Johnsongrass, quackgrass, Bermudagrass, wirestem muhly, volunteer corn or cereal, shattercane, red rice, or itchgrass. Oil concentrate, required for sethoxydim efficacy, may reduce potato tolerance to metribuzin. Do not add nitrogen to this tank-mix. Do not apply to crop under stress or injured by previous herbicide treatment. Apply only if weather has been sunny at least 3 successive days before application. See previous entries in this section for potato variety sensitivity to metribuzin. In general, do not apply this tank-mixture postemergence to early-maturing, smooth-skinned, white-skinned, or red-skinned varieties of potato. Do not apply through any type of irrigation system.

**Site of action** (sethoxydim) Group 1: acetyl CoA carboxylase (ACCase) inhibitor; (metribuzin) Group 5: photosystem II inhibitor

**Chemical family** (sethoxydim) Cyclohexanedione; (metribuzin) Triazinone

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**S-metolachlor (Dual Magnum) + metribuzin (Metribuzin 4L or others, 4 lb ai/gal; or Metribuzin 75; TriCor DF or others, 75%)**

**Rate** 1 to 2 pints/a Dual Magnum + 0.75 to 2 pints/a metribuzin 4 or 0.5 to 0.67 lb/a 75%DF

**Time** Apply as a tank-mixture any time after planting until immediately after last hilling but before potatoes emerge. This combination may be applied as a tank-mix or sequentially.

**Remarks** Use lower rates on coarse soils or soils low in organic matter; use higher rate on fine-texture or high-organic-matter soils. When applied through a center pivot system, apply proper rates in 0.5 to 1 inch of water (depending on soil type). See the previous entries in this section for application and incorporation methods, remarks, cautions, and re-cropping and rotational cropping restriction information for these herbicides.

**Caution** Do not mechanically incorporate this tank-mix into soil. Mechanically cultivating metribuzin after treatment decreases weed control and may injure potatoes.

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

**Chemical family** (S-metolachlor) Chloroacetamide; (metribuzin) Triazinone

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**S-metolachlor (Dual Magnum) + pendimethalin (Prowl 3.3EC or Prowl H2O)**

**Rate** 1 to 1.67 pints/a Dual Magnum + 1.2 to 2.4 pints/a. Prowl 3.3EC or 1.5 to 3 pints/a Prowl H2O

**Time** Apply after planting but before potatoes and weeds emerge.

**Remarks** Use lower rates on coarse soils and higher rates on finer, heavier soils. The tank-mixture will not control emerged weeds. See the previous entries in this section for application and incorporation methods, remarks, cautions, and re-cropping and rotational cropping restriction information for these herbicides.

**Caution** Follow the Dual Magnum and Prowl labels' most restrictive directions, timing, limitations, precautions, and restrictions on use in potatoes.

**Site of action** (S-metolachlor) Group 15: inhibits very long chain fatty acid synthesis; (pendimethalin) Group 3: microtubule assembly inhibitor

**Chemical family** (S-metolachlor) Chloroacetamide; (pendimethalin) Dinitroaniline

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**S-metolachlor (Magnum) + pendimethalin (3.3EC or Prowl H2O) + EPTC (Eptam)**

**Rate** 1 to 1.67 pints/a Dual Magnum + 1.2 to 2.4 pints/a Prowl 3.3EC or 1.5 to 3 pints/a Prowl H2O + 3.5 to 7 pints/a Eptam

**Time** Apply after planting but before potatoes and weeds emerge.

**Remarks** Use lower rates on coarse soils and higher rates on finer, heavier soils. The tank-mixture will not control emerged weeds.

**Caution** Follow Dual Magnum, Prowl 3.3 EC or Prowl H2O, and Eptam labels' most restrictive directions, timing, limitations, precautions, and restrictions on use in potatoes. See the previous entries in this section for application and incorporation methods, remarks, cautions, and re-cropping and rotational cropping restriction information for these herbicides.

**Site of action** (S-metolachlor) Group 15: inhibits very long chain fatty acid synthesis; (pendimethalin) Group 3: microtubule assembly inhibitor; (EPTC) Group 8: lipid synthesis inhibitor but not an ACCase inhibitor

**Chemical family** (S-metolachlor) Chloroacetamide; (pendimethalin) Dinitroaniline; (EPTC) Thiocarbamate

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**trifluralin (HFP; or others) + EPTC (Eptam)**

**Rate** 1 to 1.5 pints/a Treflan HFP + 3.5 pints/a Eptam

**Time** Apply and immediately incorporate after planting but before potatoes and weeds emerge. Or, in areas where potatoes normally are dragged off, apply and incorporate up to or right after dragoff.

**Remarks** Incorporate with equipment that will not damage potato seed pieces or elongating sprouts. Set incorporation equipment so a layer of treated soil uniformly covers bed and furrow. See previous entries in this section for application and incorporation methods, remarks, cautions, and re-cropping and rotational cropping restriction information for these herbicides.

**Caution** To help prevent crop injury, carefully follow labels before applying. Potatoes may be injured severely if these herbicides are applied after potatoes emerge if subsequent mechanical incorporation covers potatoes with treated soil.

**Site of action** (trifluralin) Group 3: microtubule assembly inhibitor; (EPTC) Group 8: lipid synthesis inhibitor but not an ACCase inhibitor

**Chemical family** (trifluralin) Dinitroaniline; (EPTC) Thiocarbamate

## Chemical Potato Vine Kill (Desiccation)

### carfentrazone-ethyl (Aim EC40% WDG)

**Rate** 2 to 3.6 oz/a 3.2 to 5.8 fl oz/a (0.05 to 0.09 lb ai/a). Do not exceed 11.6 oz/a 7.2 oz/a (0.018 lb ai/a) per crop season as a desiccant.

**Time** For best results, apply when potato crop is in early stages of natural senescence. Desiccation generally is adequate within 14 days after initial treatment. If potato crop vegetation is actively growing when desiccation begins, two applications may be required to desiccate leaf and stem tissue. If a second application is necessary, wait 7 to 14 days after the first application.

**Application methods** Ground or aerial. It is essential to thoroughly cover the potato plant. Use enough water to thoroughly cover potato leaves and vines. Ground: Apply Aim EC in at least 20 gal/a of water using 80 or 110 flat-fan nozzles. Vary spray volume and spray pressure according to density of potato canopy and vines to assure thorough spray coverage. Increase spray volume and pressure if potato canopy is dense or if weather is cool, cloudy, or dry. Increased spray volumes enhance performance. Aerial: Apply Aim EC with aerial equipment 5 to 10 gal/a of water using higher volumes on dense potato canopies and vines. Apply 10 ft or less above potato canopy and use low drift nozzles. Apply Aim EC crop oil concentrate at 1% v/v or with a methylated seed oil at a minimum of 1 quart/a or 1% v/v when applied in volumes of more than 20 gal/a. Do not apply this product through any type of irrigation system.

**Remarks** Dense potato canopy, large plant size, and environmental conditions not conducive to product absorption or activity will reduce initial application efficacy and increase the need for a second application. Use higher rate during cool or cloudy weather or when vine growth is heavy. Do not use high rate if soil moisture is low or temperatures are high, or stem ends may discolor. When Aim is applied alone, grazing and hay operations may proceed with no restrictions.

**Caution** Do not exceed 0.181 lb ai/a (11.6 fl oz Aim EC) total product per crop season. This total allowable usage applies to all applications made to the field per calendar year including burndown treatments and harvest-aide. Do not exceed 0.018 lb ai/a of Aim per crop season as a desiccant. Preharvest interval is 7 days. Personal protective equipment must be worn for handling and application; see label.

**Tank-mixtures** Aim EC may be applied in a tank-mix or as a sequential application with other potato desiccants. Refer to the other product's label for restrictions on tank-mixtures, and observe all label precautions, instructions, and rotational cropping restrictions.

**Rotational cropping restrictions** Following an application of Aim EC, a treated field may be rotated only to a registered crop (registered crop may be planted at any time). All other crops may be planted after 12 months.

**Site of action** Group 14: protoporphyrinogen oxidase (Protox) inhibitor

**Chemical family** Triazolinone

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## diquat (Reglone Desiccant, 2 lb diquat cation/gal); or others

**Rate** 1 to 2 pints/a (0.25 lb ai/a to 0.5 lb ai/a) in a single application. May be applied sequentially, but do not exceed a total of 4 pints/a (1 lb ai/a) per season before harvest.

**Time** Preharvest interval is 7 days. Do not exceed 0.5 lb ai/a (2 pints/a) in a single application. A 5-day interval between sequential applications is recommended.

**Application methods** Ground or aerial. Apply with a nonionic surfactant at 0.5 to 4 pints/100 gal spray mix. Do not apply through any type of irrigation system.

**Remarks** Do not apply to drought-stressed potatoes. Reglone is rainfast 30 minutes after application. Cool, cloudy weather slows Reglone activity but will not affect performance.

**Caution** A moderately toxic herbicide that requires protective gear for handling and application. Follow all use restrictions and precautions on label. Make last application at least 7 days before harvest. Do not feed forage from treated potatoes to livestock. Avoid applications in extremely dusty conditions because dust coating the plant surface can reduce desiccant activity.

**Tank-mixtures** Reglone can be applied in a tank-mixture at time of potato desiccation with fungicides listed on the 2(ee) label and a nonionic surfactant to facilitate harvest. Otherwise, no tank-mixtures (or tank-mixture restrictions) are listed on label.

**Rotational cropping restrictions** None listed on label.

**Site of action** Group 22: photosystem I electron diversion

**Chemical family** Bipyridilium

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## glufosinate-ammonium (Rely 280, 2.34 lb ai/gal)

**Rate** 21 fl oz/a Rely 280 (0.38 lb ai/a) in a single application only; do not split application.

**Time** Beginning of natural senescence of potato vines.

**Application methods** Apply in 20 to 100 gal/a of water by ground or 5 to 10 gal/a by air. Use enough water to thoroughly cover potato vines. Spray coverage on dense crop canopy will be better with higher water volumes.

**Remarks** Potato varieties with heavy or dense vines may require an application of another desiccation product to complete desiccation. ID 2EE label available with additional restrictions on elevation and tank mixtures.

**Caution** Do not apply to potatoes grown for seed. Preharvest interval is 9 days.

**Tank-mixtures** No tank-mixtures or tank-mix restrictions on label.

**Rotational cropping restrictions** Wait at least 30 days (formerly, 70 days) after application to plant wheat, barley, buckwheat, millet, oats, rye, sorghum, and triticale. Wait at least 120 days after the last application to plant rotation crops other than those listed. Corn and soybeans may be planted any time after application.

**Site of action** Group 10: glutamine synthase inhibitor

**Chemical family** Phosphinic acid

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**paraquat (Firestorm, 3 lb paraquat cation/gal)**

**Rate** 0.7 to 1.3 pints/a (0.26 to 0.49 lb ai/a). Use two applications of 0.6 pint/a if vine growth is dense. Use 1.3 pints/a where quick vine kill is desired. Note: Gramoxone SL or Inteon is not labeled for use as a potato desiccant.

**Time** Begin application when leaves turn yellow. Immature potato foliage tolerates Gramoxone Max. Make split applications at least 5 days apart.

**Application methods** Ground application only, plus a nonionic surfactant with 75% or more surface-active agent at 0.125% v/v (1 pint/100 gal spray mix) or crop oil concentrate at 1% v/v (1 gal/100 gal spray mix).

**Remarks** For fresh-market potatoes only. Do not use in potatoes that will be stored or used for seed.

**Caution** Do not apply to drought-stressed potato vines. Potatoes must be harvested promptly after desiccation, and consumed or processed immediately. Do not pasture livestock in treated potato fields. Do not exceed 2.7 pints/a per season. Do not use on muck or peat soils.

**Tank-mixtures** No tank-mixtures or tank-mix restrictions are listed on the label.

**Rotational cropping restrictions** All rotational crops may be planted immediately after the last paraquat application.

**Site of action** Group 22: photosystem I electron diversion

**Chemical family** Bipyridilium

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**pyraflufen-ethyl (Vida, 0.208 lb ai/gal)**

**Rate** 2.0 to 5.5 fl oz/a (0.00325 to 0.00894 lb ai/a) in a single application. May be applied sequentially, but do not exceed two applications or a total of 11 fl oz/a (0.0179 lb ai/a) per season before harvest.

**Time** For best results, apply when potato crop is in early stages of natural senescence. A second application of this or another desiccation product may be needed under certain climatic conditions to ensure complete desiccation. Make one to two applications using ground equipment at a minimum 7-day interval.

**Application methods** Ground or aerial. Apply in at least 5 gal/a spray mix by air or 20 to 50 gal/a using ground equipment. Use an approved agricultural buffering agent buffering to less than pH 5 or less if using Vida in a water source of  $\geq$  pH 5. Always buffer the water source before adding Vida. High temperatures and sunlight following application generally will enhance performance and speed desiccation. Do not apply Vida through any type of irrigation system

**Remarks** A repeat application of Vida or another herbicide or desiccant may be needed under certain climatic conditions to ensure complete desiccation. Vida is rainfast within 1 hour after application. Do not apply within 7 days of harvest.

**Caution** A corrosive product that can cause irreversible eye damage; requires goggles or a face shield and other protective gear for handling and application. Follow all use restrictions and precautions on label. Do not exceed 2 applications or a total of 11 fl oz per acre per season for potato desiccation.

**Tank-mixtures** Vida may be applied in tank-mixtures or sequentially with other desiccant/harvest aides such as diquat for improved desiccation. Weather, crop conditions, or the presence of certain weeds, crop damaging insects, or diseases will indicate the inclusion of other products in desiccation

tank-mixtures. Read and follow label directions and restrictions for each tank-mix product.

**Rotational cropping restrictions** Do not plant any rotational crops except corn, soybean, or wheat for 30 days after the last Vida application.

**Site of action** Group 14: protoporphyrinogen oxidase (Protox) inhibitor

**Chemical family** Phenylpyrazole

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**sulfuric acid (93%)**

**Rate** 17 to 28 gal/a

**Time** Repeat application after 5 days if vines are not completely desiccated. Preharvest interval is 5 days.

**Application methods** For retail sale and use only by certified applicators or appropriately licensed persons directly under their direct supervision. Apply undiluted sulfuric acid product.

**Remarks** This material is not as dependent on temperature or other environmental conditions as most other desiccants.

**Caution** A restricted-use herbicide. Sulfuric acid is very caustic. Requires protective clothing, including dust/mist filtering respirator, chemical-resistant headgear, protective eyewear, chemical-resistant boots, and waterproof gloves. Applicators must use a closed system/enclosed cab meeting Worker Protection Standards for agricultural pesticides. Adequate supply of water should be immediately available for drenching.

**Tank-mixtures** None on label.

**Rotational cropping restrictions** None on label.

# Herbicide Effectiveness on Weeds in Potatoes

Weeds	dimethenamid-P (Outlook)	EPTC (Eptam)	flumioxazin (Chateau)	fomesafen (Reflex)	linuron (Linex)	metribuzin (Several brands)	S-metolachlor (Dual Magnum)	pendimethalin (Prowl 3.3 or H <sub>2</sub> O)	ethalfuralin (Sonalan HFP)	trifluralin (Treflan or others)	rimsulfuron (Matrix) preemergence	rimsulfuron (Matrix or others) postemergence	clethodim (Select)	sethoxydim (Poast Plus)
Barley, volunteer	F-G	F-G	N	S	S	P	—	—	P	P	G	G	G	G
Barnyardgrass	G	G	N	S	F	F	G	G	G	G	G	G	G	G
Bindweed, field	P	P	—	N	N	P	—	P	—	P	—	P	N	N
Buckwheat, wild	—	F	—	N	G	F	—	—	F-G	F	P	P	N	N
Cocklebur, common	—	P	—	P	S	F	—	—	P	P	F	F	N	N
Crabgrass	G	G	—	S	F	F	G	G	G	G	F	G	G	—
Foxtail spp.	G	G	N	S	F	F	G	G	G	G	G	G	G	G
Knotweed, prostrate	—	G	—	—	—	G	—	G	—	G	N	—	N	N
Kochia	P-F	P-F	S	—	G	G	F	F-G	F-G	F-G	G	G	N	N
Lambsquarters, common	P-F	G	S	P-F	G-E	G	F	F-G	F-G	F-G	F-G	P-F	N	N
Mallow, common	—	P	—	—	—	G	F	F	—	P	—	—	N	N
Mustard spp.	—	P	S	G-E	G-E	G	—	—	P	P	G	G	N	N
Nightshade, cutleaf	F-G	F-G	S	F	—	P	F-G	P-F	—	P	N	N	N	N
Nightshade, black	G	G	G	G	F-G	P-F	F	P-F	F	P	G	G	N	N
Nightshade, Eastern black	G	G	G	G	F-G	P-F	F	P-F	F	P	G	G	N	N
Nightshade, hairy	G	G	S	F-G	F-G	F	F	P-F	F	P	F-G	G	N	N
Nutsedge, yellow	F	F	—	S	—	P	F-G	P	—	P	—	F	N	N
Oat, volunteer	F-G	F-G	N	S	G	F-G	—	—	G	G	F-G	G	G	G
Oat, wild	F-G	F-G	N	S	G	F-G	P-F	P-F	F-G	F	F	G	G	G
Pigweed spp.	G	F-G	S	G	G-E	G	G	F-G	G	G	G	G	N	N
Purslane, common	G	G	—	G	G	G	G	G	G	G	—	F	N	N
Quackgrass	—	F-G	N	N	P	P-F	—	—	P	P	N	G	F-G	F
Sandbur, field	P-F	G	N	N	P	P	G	—	G	G	—	—	G	G
Smartweed spp. (annual)	—	P	—	P	G-E	F	P	F	—	P-F	—	F	N	N
Sowthistle, annual	—	F	—	—	P	G	—	P	—	P	—	—	N	N
Sunflower, wild	—	P	—	—	—	F	P	P	—	P	G	F-G	N	N
Thistle, Canada	—	P	N	N	P	F	—	—	—	P	—	F	N	N
Thistle, Russian	—	P	—	—	—	G	P	G	F-G	F-G	P	P	N	N
Wheat, volunteer	F-G	F-G	N	S	S	P	—	—	F	F	G	G	G	G

G = good    F = fair    P = poor    N = none    S = suppression only    — = no information available

Response of weeds to any of the listed herbicides may be altered by growing conditions, weed populations, type of irrigation, genetic variations, soil type, pH, organic matter, time of application, and application rate. Ratings may vary from season to season and from site to site. Weed control generally decreases as the season progresses.