

HORSERADISH

General Information

PRODUCT INFORMATION

Observe all precautions and limitations on the labels of each product used in tank mixtures. Tank mixtures are permitted only in those states where the tank mix partner is registered. Refer to and follow the label for each tank mix product used for precautionary statements, directions for use, geographic and other restrictions.

Dual Magnum is a selective herbicide that can be applied as a preplant surface-applied, preplant incorporated, preemergence, or postemergence treatment for control of most annual grasses and certain broadleaf weeds in corn (all types); cotton; grasses grown for seed; peanuts; beans, peas, and lentils; potatoes; safflowers; sugar beets; sunflowers; grain or forage sorghum; soybeans; soybean, immature seed; and tomatoes.

Use Site Restrictions: Do not use in nurseries, turf, or landscape plantings.

Do not apply under conditions which favor runoff or wind erosion of soil containing this product to nontarget areas.

To prevent off-site movement due to runoff or wind erosion:

- Avoid treating powdery dry or light sand soils when conditions are favorable for wind erosion. Under these conditions, settle the soil surface first by rainfall or irrigation.
- Do not apply to impervious substrates, such as paved or highly compacted surfaces.
- Do not use tailwater from the first flood or furrow irrigation of treated fields to treat nontarget crops, unless at least 1/2 inch of rainfall has occurred between application and the first irrigation.

Where directions specify a Dual Magnum tank mixture with AAtrex® formulations, other brands of atrazine may be used. Follow all use rates and other use restrictions on the AAtrex or respective atrazine product label if other brands of atrazine are used.

Note: Certain states may have established rate limitations for atrazine within specific geographical areas. Consult your state lead pesticide control agency for additional information. It is a violation of this label to deviate from state use regulations.

Precaution: Injury may occur following the use of Dual Magnum under abnormally high soil moisture conditions during early development of the crop.

SOIL TEXTURES AND HERBICIDE RATES

Within rate ranges in the rate tables and elsewhere on this label, use the lower rate on soils relatively coarse-textured or low in organic matter; use the higher rate on soils relatively fine-textured or high in organic matter.

Dual Magnum may be applied preemergence alone, or in combination with tank mix partners specified on this label, following preplant incorporated herbicides when used according to their label use directions and restrictions, provided that such use is not prohibited on the respective labels.

Thoroughly clean sprayer or other application device before using. Dispose of cleaning solution in a responsible manner.

Do not use a sprayer or applicator contaminated with any other materials, or crop damage or clogging of the application device may result.

DUAL MAGNUM APPLIED ALONE

WEEDS CONTROLLED

Dual Magnum is taken up by the shoots and/or roots of emerging weeds. This uptake results in the inhibition of shoot and root tissue growth soon after weed germination. Because of this, Dual Magnum will not control emerged weeds. Control weeds that are present by another means, e.g., mechanical means or by another herbicide.

If Dual Magnum is incorporated, do not exceed a 2-3 inch depth. Any tillage after the Dual Magnum incorporation and before planting may not exceed 2-3 inches, or the depth of incorporation.

Dry weather following application of Dual Magnum may reduce weed control.

Cultivate if weeds develop.

Where reference is made to weeds partially controlled, partial control can either mean erratic control from good to poor, or consistent control at a level below that generally considered acceptable for commercial weed control. Control of these weeds can be erratic, due partially to variable weather conditions. The following procedures may improve the control of weeds listed as partially controlled in Table 1:

- Thoroughly till soil to destroy germinating and emerged weeds.
- Plant crop into moist soil immediately after tillage. If Dual Magnum is to be used preemergence, apply at planting or immediately after planting.
- If available, sprinkler irrigate within 2 days after application. Apply 1/2-1 inch of water. Use lower water volume (1/2 inch) on coarse-textured soils and higher volume (1 inch) on fine-textured soils. Also, refer to the section on Center Pivot Irrigation Application for this method of applying Dual Magnum.
- 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, make a uniform, shallow cultivation as soon as weeds emerge.

Weed Resistance Management

S-metolachlor, the active ingredient in this product, is a Group 15 herbicide based on the mode of action classification system of the Weed Science Society of America. Any weed population may contain plants naturally resistant to Group 15 herbicides. Such resistant weed plants may not be effectively managed using Group 15 herbicides but may be effectively managed utilizing another herbicide alone or in mixtures from a different group and/or by using cultural or mechanical practices. However, a herbicide mode of action classification by itself may not adequately address specific weeds that are resistant to specific herbicides. Consult your local company representative, state cooperative extension service, professional consultants or other qualified authorities to determine appropriate actions for treating specific resistant weeds.

Best Management Practices

Proactively implementing diversified weed control strategies to minimize selection for weed populations resistant to one or more herbicides is recommended. A diversified weed management program may include the use of multiple herbicides

with different modes of action and overlapping weed spectrum with or without tillage operations and/or other cultural practices. Research has demonstrated that using the labeled rate and directions for use is important to delay the selection for resistance. Scouting after a herbicide application is important because it can facilitate the early identification of weed shifts and/or weed resistance and thus provide direction on future weed management practices. One of the best ways to contain resistant populations is to implement measures to avoid allowing weeds to reproduce by seed or to proliferate vegetatively. Cleaning equipment between sites and avoiding movement of plant material between sites will greatly aid in retarding the spread of resistant weed seed.

PREPLANT AND ROTATIONAL CROPS SECTION

Replanted Crop Directions:

This section covers replant crops that may be planted following a lost crop that has had an application of Dual Magnum.

If a crop treated with Dual Magnum is lost, any crop on this label, or on a supplemental Dual Magnum label, may be replanted immediately provided that the rate of Dual Magnum applied to the previous crop was not greater than the labeled rate for the crop to be replanted. If the first application was banded and the replant crop is planted in the center of the untreated bands, a second banded treatment may be applied at the rate for the use-pattern for the replant crop, provided the application does not overlap the first application band.

Rotational Crop Directions:

Do not rotate to food or feed crops other than those listed below. For all crops not listed, wait at least 12 months following the last application of Dual Magnum before planting.

Barley, oats, rye, or wheat may be planted 4 1/2 months following treatment.

Alfalfa may be planted 4 months following application. Clover may be seeded 9 months following application.

Restrictions: 1) do not apply more than 1.9 lb active ingredient per acre (2.0 pt of Dual Magnum) in the previous crop, and 2) do not make lay-by or other postemergence applications of Dual Magnum in the previous crop.

Tobacco, buckwheat, and rice, may be planted in the next spring following treatment.

Below in the rotational crop subsections A through C is a listing of rotational crop options that are made possible through S-metolachlor tolerances which were established by the EPA as crop groupings.

Precautions: 1) Rotating to crops within these crop groupings at less than 60 days may result in crop injury. 2) If the rate of Dual Magnum applied in the previous crops was greater than the rate listed here (Sections A-C below), these crops cannot be planted until the following spring.

A. If not more than 1.33 pt/A of Dual Magnum was applied to the field, the following crops (as well as any listed under subsections B or C below) may be planted 60 days after the last application. A second application of a S-metolachlor containing product to the following crops is prohibited within 60 days of the original application.

Crop Subgroup 1B Root Vegetables – garden beet, edible burdock, carrot, celeriac, turnip-rooted chervil, chicory, ginseng, horseradish, turnip-rooted parsley, parsnip, radish, oriental radish, rutabaga, salsify, black salsify, Spanish salsify, skirret, and turnip.

Crop Group 3 Bulb Vegetables (if to be harvested green) – garlic, great-headed garlic, leek, green onion, Welsh onion, shallot.

Winter squash (including pumpkins)

B. If not more than 1.67 pt/A of Dual Magnum was applied to the field, the following crops (as well as any listed under subsection C below) may be planted 60 days after the last application. A second application of a S-metolachlor containing product to the following crops is prohibited within 60 days of the original application.

Crop Group 8 Fruiting Vegetables, except Cucurbits – eggplant, groundcherry (*Physalis* spp.), pepino, peppers (bell, chili, cooking, pimento and sweet), tomatillo and tomato.

C. If not more than 2.0 pt/A of Dual Magnum was applied to the field, the following crops may be planted 60 days after the last application. A second application of a S-metolachlor containing product to the following crops is prohibited within 60 days of

the original application.

Crop Subgroup 1C Tuberos and Corm Vegetables - arracacha, arrowroot, Chinese artichoke, Jerusalem artichoke, edible canna, bitter and sweet cassava, chayote (root), chufa, dasheen (taro), ginger, leren, potato, sweet potato, tanier, tumeric, yam bean, yam, true.

Crop Group 3 Bulb Vegetables (if to be harvested dry) - garlic, great-headed garlic, leek, dry bulb and green onion, Welsh onion, shallot.

Crop Subgroup 4B Leaf Petiole Vegetables - cardoon, celery, Chinese celery, celtuce, Florence fennel, rhubarb, and Swiss chard.

Crop Subgroup 5A Head and Stem Brassica Vegetables - broccoli, Chinese broccoli, brussel sprouts, cabbage, Chinese (napa) cabbage, Chinese mustard, cauliflower, cavalo broccolo and kohlrabi.

APPLICATION PROCEDURES

Application Timing

Dual Magnum alone or in tank mixtures with other labeled herbicides may be applied for weed control in certain crops at various times. Refer to the crop-specific use directions section of the label to determine which of the following application timings listed below are allowed.

- Preplant Surface-Applied: For minimum-tillage or no-tillage systems only, Dual Magnum alone and some Dual Magnum tank mixtures may be applied up to 45 days before planting certain crops. Use only split applications for treatments made 30-45 days before planting, with 2/3 the listed broadcast rate for the crop and soil texture applied initially and the remaining 1/3 at planting. Treatments less than 30 days before planting may be made either as a split or a single application. Refer to individual crop-specific use directions section on this label to determine if early preplant surface application may be made for that crop. If weeds are present at the time of treatment, apply in a tank mixture combination with a contact herbicide (for example, Gramoxone brands, Touchdown brands, or Roundup brands). Observe directions for use, precautions, and restrictions on the label of the contact herbicide. To the extent possible, do not move treated soil out of the row or move untreated soil to the surface during planting, or weed control will be diminished.

- Preplant Incorporated: Apply Dual Magnum to the soil and incorporate into the top 2 inches of soil within 14 days before planting, using a finishing disk, harrow, rolling cultivator, or similar implement capable of providing uniform 2-inch incorporation. Use a preplant incorporated application if furrow irrigation is used or when a period of dry weather after application is expected. If crop will be planted on beds, apply and incorporate Dual Magnum after bed formation, unless specified otherwise.

- Preemergence: Apply Dual Magnum during planting (behind the planter) or after planting, but before weeds or crops emerge.

- Postemergence: Dual Magnum will not control emerged weeds. Control weeds that are present by another means, e.g., mechanical means or by another herbicide.

Special Application Procedures

- CA Only (Corn; Safflowers; Beans, Peas, and Lentils): Preplant Incorporated: Broadcast Dual Magnum alone or with tank mix partners listed on this label to the soil and thoroughly incorporate with a disk or similar implement set to till 4-6 inches deep. For more thorough incorporation, till the soil in 2 different directions (cross-till). Crops may be planted on flat surface or on beds. Use caution when forming the beds to ensure that only soil from the Dual Magnum treated zone is used (i.e., do not bring untreated soil to soil surface). If the application is made to preformed beds, incorporate Dual Magnum with a tillage implement set to till 2-4 inches deep. Use care during tilling to keep the tilled (Dual Magnum treated) soil on the beds.

Preemergence: Apply Dual Magnum after planting. Water with sprinkler or flood irrigation within 7-10 days.

- Fall Application for Spring Weed Control (Only in IA, MN, ND, SD, WI, and portions of NE and IL - See specific instructions in the Corn; Soybeans; and Beans, Peas, and Lentils sections of this label for timing of application and other information): Do not apply to frozen ground. Use on medium and fine soils with greater than 2.5% organic matter that will be planted to corn or soybeans the next spring. Ground may be tilled before or after application. Do not exceed a 2 to 3-inch incorporation depth if tilled after treatment. If a spring application is made, the total rate of the fall plus spring applications must not exceed the maximum total rate for the specific crop, or illegal residues may result.

- Fall Application for Italian Ryegrass Control (Corn, Cotton, Grain and Forage Sorghum, and Soybean Only - See specific instructions in the Corn, Cotton, Grain and Forage Sorghum, and Soybean sections of this label for timing of application and other information): Dual Magnum may be applied in the fall (September 1- December 1) for residual control of glyphosate-resistant Italian ryegrass (*Lolium multiflorum*). A tillage operation may precede the application. Do not incorporate to a depth greater than 2-3 inches if tillage follows the application of Dual Magnum. Restrictions: 1) Do not apply Dual Magnum to frozen ground. All crops on the Dual Magnum label may be planted the following spring after application. 2) If a spring application is made, the combined total amount of Dual Magnum applied in the fall plus the spring must not exceed the maximum seasonal S-metolachlor rate for the specific crop planted, or illegal residues may result. Refer to the crop sections on this label for specific directions.

Ground Application: Apply Dual Magnum alone or in tank mixtures by ground equipment in a minimum of 10 gal of spray mixture per acre, unless otherwise specified.

Use sprayers that provide accurate and uniform application. For Dual Magnum tank mixtures with wettable powder or dry flowable formulations, use screens and strainers no finer than 50-mesh. Rinse sprayer thoroughly with clean water immediately after use.

Calculate the amount of herbicide needed for band treatment by the formula given in the label.

For information on applying in lower volumes of carrier, see Low Carrier Application section.

For application by air or through center pivot systems, see Aerial Drift Management and Aerial Drift Reduction Advisory Information sections.

For information on impregnating dry fertilizer, see Dry Bulk Granular Fertilizers section.

For information on application using variable-rate technologies, see Variable-Rate Application section.

SPRAY EQUIPMENT

LOW CARRIER APPLICATION

For Broadcast Ground Application Only

Use sprayers, such as Ag-Chem RoGator, Hagie, John Deere Hi-Cycle, Melroe Sprague, Tyler Patriot, or Willmar Air Ride, that provide accurate and uniform application. Only water may be used as a carrier. Use screens in suction and in-line strainers that are 50-mesh. Manufacturers may require that tip screens as fine as 100-mesh be used with some nozzles. Use a pump with capacity to: (1) maintain up to 35-40 psi at the nozzles, and (2) provide sufficient agitation in tank to keep mixture in suspension. Use a minimum of 5.0 gal of spray mixture per acre. To achieve best results, apply at a maximum sprayer speed of 15 mph. Rinse sprayer thoroughly with clean water immediately after each use.

Note: Low pressure nozzles will reduce drift and increase application accuracy. Use care when using automatic rate controlling devices to spray the material within the rated working pressure and flow ranges of the nozzles selected. Use nozzle screens when instructed by the manufacturer. Place all nozzles on 20-inch centers, except flooding types. Place flooding type nozzles on 40-inch centers. When Flat Fan-type nozzles are used, use angles of 80° or 110°. Always read and follow the manufacturer's directions for optimum setup and performance of their nozzles or tips.

AERIAL APPLICATION

Apply Dual Magnum in water alone or in tank mixtures with AAtrex, Lorox, or TriCor in a minimum total volume of 2.0 gal/A by aircraft. Dual Magnum may also be applied by air in combination with Balan, Prowl, or Treflan. Avoid application under conditions where uniform coverage cannot be obtained or where excessive spray drift may occur. In order to assure that spray will be controllable within the target area when used according to label directions, make applications at a maximum height of 10 ft, using low-drift nozzles at a maximum pressure of 40 psi, and restrict application to periods when wind speed does not exceed 10 mph. To assure that spray will not adversely affect adjacent sensitive nontarget plants, apply Dual Magnum alone or Dual Magnum + AAtrex by aircraft at a minimum upwind distance of 400 ft from sensitive plants, or apply Dual Magnum, Lorox, or TriCor at a minimum upwind distance of 300 ft from sensitive plants.

CENTER PIVOT IRRIGATION APPLICATION

Dual Magnum alone or in tank mixture with other herbicides on this label, which are registered for center pivot application, may be applied in irrigation water preemergence (after planting, but before weeds or crop emerge) at rates listed on this label. Dual Magnum also may be applied postemergence to the crop and preemergence to weeds in crops where postemergence applications are allowed on this label. Follow all restrictions (height, timing, rate, etc.) to avoid illegal residues. Apply this product only through a center pivot irrigation system. Do not apply this product through any other type of irrigation system. Crop injury, lack of effectiveness, or illegal pesticide residues in the crop can result from nonuniform distribution of treated water. If you have questions about calibration, contact State Extension specialists, equipment manufacturers, or other experts. Do not connect

an irrigation system (including greenhouse systems) used for pesticide application to a public water system, unless the pesticide label-prescribed safety devices for public water systems are in place. A person knowledgeable of the chemigation system and responsible for its operation, or under the supervision of the responsible person, shall shut the system down and make necessary adjustments when needed.

Operating Instructions

- The system must contain a functional check-valve, vacuum relief valve, and low pressure drain appropriately located on the irrigation pipeline to prevent water-source contamination from backflow.
- The pesticide injection pipeline must contain a functional, automatic, quick-closing check-valve to prevent the flow of fluid back toward the injection pump.
- The pesticide injection pipeline must also contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
- The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops.
- The irrigation line or water pump must include a functional pressure switch which will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected.
- Systems must use a metering pump, such as a positive displacement injection pump (e.g., diaphragm pump or piston pump), effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.
- Do not apply when wind speed favors drift beyond the area intended for treatment.
- Prepare a mixture with a minimum of 1 part water to 1 part herbicide(s) and inject this mixture into the center pivot system. Injecting a larger volume of a more dilute mixture per hour will usually provide more accurate calibration of metering equipment. Maintain sufficient agitation to keep the herbicide in suspension.
- Meter into irrigation water during entire period of water application.
- Apply in 1/2-1 inch of water. Use the lower water volume (1/2 inch) on coarse-textured soils and the higher volume (1 inch) on fine-textured soils. More than 1 inch of water at application may reduce weed control by moving the herbicide below the effective zone in the soil.

Precaution for center pivot applications: Where sprinkler distribution patterns do not overlap sufficiently, unacceptable weed control may result. Where sprinkler distribution patterns overlap excessively, crop injury may result.

DRY BULK GRANULAR FERTILIZERS

Many dry bulk granular fertilizers may be impregnated or coated with Dual Magnum

alone or selected Dual Magnum tank mixtures which are registered for preplant incorporated or preplant surface applications which are used to control weeds in crops on the Dual Magnum label and are not prohibited from use on dry bulk granular fertilizers.

When applying Dual Magnum or Dual Magnum mixtures with dry bulk granular fertilizers, follow all directions for use and precautions on the respective product labels, regarding target crops, rates per acre, soil texture, application methods (including timing of application), and rotational crops.

All individual state regulations relating to dry bulk granular fertilizer blending, registration, labeling, and application are the responsibility of the individual and/or company selling the herbicide/fertilizer mixture.

Prepare the herbicide/fertilizer mixtures by using any closed drum, belt, ribbon, or other commonly used dry bulk fertilizer blender. Nozzles used to spray Dual Magnum and Dual Magnum mixtures onto the fertilizer must be placed to provide uniform spray coverage. Use care to aim the spray directly onto the fertilizer only and to avoid spraying the walls of the blender.

If the herbicide/fertilizer mixture is too wet, add a highly absorptive material, such as Agsorb or Celatom MP-79, or similar granular clay or diatomaceous earth materials, to obtain a dry, free-flowing mixture. Add absorptive materials only after the herbicide has been thoroughly blended into the fertilizer mixture. Best application results will be obtained by using a granule of 6/30 particle size or of a size similar to that of the fertilizer material being used. Generally, less than 2% by weight of absorptive material will be needed. Avoid using more than 5% absorptive material by weight.

Calculate amounts of Dual Magnum, AAtrex, AAtrex + Princep, Balance Pro, Princep, TriCor, or Sonalan by the following formula given in the label.

Pneumatic (Compressed Air) Application (Dual Magnum Alone): High humidity, high urea concentrations, low fertilizer use rates, and dusty fertilizer may cause fertilizer mixture to build up or plug the distributor head, air tubes, or nozzle deflector plates. To minimize buildup, premix Dual Magnum with Exxon Aromatic 200 at a rate of 1.0-4.0 pt/gal of Dual Magnum. Aromatic 200 is a noncombustible/nonflammable petroleum product. Aromatic 200 may be used in either a fertilizer blender or through direct injection systems. Avoid drying agents when using Aromatic 200.

Precautions: (1) Mixtures of Dual Magnum and Aromatic 200 must be used on dry fertilizer only. Poor results or crop injury may result if these mixtures are used in water or liquid fertilizer solutions for spraying applications. (2) When impregnating Dual Magnum in a blender before application, a drier mixture can be attained by substituting a drying agent for Aromatic 200. Agsorb FG or drying agents of 6/30 particle size will provide best results. (3) When possible, avoid drying agents when using On-The-Go impregnation equipment.

Precautions: To avoid potential for explosion, (1) Do not impregnate Dual Magnum or Dual Magnum mixtures on ammonium nitrate, potassium nitrate, or sodium nitrate, either alone or in blends with other fertilizers. (2) Do not use Dual Magnum or Dual Magnum mixtures on straight limestone, since absorption will not be achieved. Fertilizer blends containing limestone can be impregnated.

Application

Apply 200-700 lb of the herbicide/fertilizer mixture per acre. For best results, apply the mixture uniformly to the soil with properly calibrated equipment immediately after blending. Uniform application of the herbicide/fertilizer mixture is essential to prevent possible crop injury. Nonuniform application may also result in unsatisfactory weed control. In areas where conventional tillage is practiced, a shallow incorporation of the mixture into the soil may improve weed control. On fine- or medium-textured soils in areas where soil incorporation is not planned, i.e., reduced tillage situations or in some conventional till situations, make applications approximately 30 days before planting to allow moisture to move the herbicide/fertilizer mixture into the soil. On coarse-textured soils, make applications approximately 14 days prior to planting. Precaution: To avoid crop injury, do not use the herbicide/fertilizer mixture on crops where bedding occurs.

Refer to label for Tank Mixture Information of each crops.

Limitations, Restrictions, and Exceptions

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Apply a single application of Dual Magnum at a broadcast rate of 1.0-1.33 pt/A to the soil surface after planting, but before weeds or crop emergence (i.e., preemergence). Use lower rates on soils relatively coarse-textured and higher rates on fine-textured soils. A band application may also be used, applying proportionally less spray mixture on the area actually treated. Dual Magnum will not control emerged weeds. Control emerged weeds with an appropriate registered foliar herbicide or by mechanical means.

Restrictions: (1) Make only one application of Dual Magnum per crop. (2) Do not apply more than 1.33 pt/A of Dual Magnum per crop. (3) Harvest horseradish at normal timing.

Method

[Broadcast/Foliar Air](#)

[Broadcast/Foliar Ground](#)

[Band application](#)

[Broadcast/Foliar Air](#)

[Broadcast/Foliar Ground](#)

[Band application](#)

[Broadcast/Foliar Air](#)

[Broadcast/Foliar Ground](#)

[Band application](#)

Rates

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Restricted Entry Interval

24 hours

Exception: If the product is soil-injected or soil-incorporated, the Worker Protection Standard, under certain circumstances, allows workers to enter the treated area if there will be no contact with anything that has been treated.

Timings

[Preemergence \(Crop\)](#)

[Preemergence \(Weed\)](#)

[Postplant](#)