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READ THE ENTIRE LABEL BEFORE USING THIS PRODUCT.

USE ONLY IN ACCORDANCE WITH INSTRUCTIONS.

KEEP OUT OF REACH OF CHILDREN

RETROZIN 480 EC



INGREDIENTS

Metribuzin: 4-Amino-6-(1,1-dimethylethyl)-3-(methylthio)-1,2,4-triazin-5(4H)-one.....48%
Inert ingredients.....52%

RETROZIN 480 EC is an effective herbicide against annual grasses and has as its active ingredient, metribuzin.

RETROZIN 480 EC is a selective triazine herbicide, which inhibits photosynthesis of susceptible plant species. It is used for control of annual grasses and numerous broadleaf weeds in field and vegetable crops, in turfgrass, and on fallow lands. Metribuzin is available as liquid suspension, water dispersible granular, and dry flowable formulations.

Trade Names Of Other Firms: Trade names for products containing Metribuzin include Bay 94337, Bay DIC 1468, Lexone, Sencor, Sencoral, and Sencorex.

What is RETROZIN 480 EC and how does it work?

Metribuzin is a selective triazine herbicide, which inhibits photosynthesis of susceptible plant species. It is used for control of annual grasses and numerous broadleaf weeds in field and vegetable crops, in turfgrass, and on fallow lands.

Key Benefits of RETROZIN 480 EC:

1. Highly effective against broadleaf weeds
2. Versatility of application method

PRECAUTIONS

Harmful if swallowed, inhaled or absorbed through skin. Causes moderate eye irritation. Avoid contact with skin, eyes or clothing. Avoid breathing spray mist. Wash thoroughly with soap and water after handling and before eating, drinking or using tobacco. Remove contaminated clothing and wash before reuse. Keep children or pets away from treated area until dry.

SYMPTOMS OF POISONING

Irritation on skin or eyes.

MEDICAL TREATMENT

No specific antidote is available. Treatment is symptomatic.

FIRST AID

If on skin, remove contaminated clothes. Rinse and then rinse skin immediately with plenty of water and soap for 15-20 minutes. Call a poison control center or doctor for treatment advice. If inhaled, move person for fresh air. If person is not breathing, call for an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or doctor for further treatment advice. If in eyes, first hold eye open and rinse with plenty of water for 15-20 minutes (remove contact lenses if easily possible). Call poison control center or doctor for treatment advice. If ingested, call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do NOT induce vomiting unless told to do so by poison control center or doctor. Do not give anything to an unconscious person.

DIRECTIONS OF USE

GENERAL INFORMATION

RETROZIN 480 EC cannot be applied with low-pressure or high-volume hand-wand equipment.

MIXING

When using RETROZIN 480 EC, make sure the sprayer is completely clean, free of rust or corrosion which occurs from Winter storage. Examine strainers and screens to be sure the sprayer is clean from previously used pesticides. Any tank mix containing RETROZIN 480 EC should be kept agitated and sprayed out immediately. Do not allow tank mixes to stand for prolonged periods of time. The proper mixing procedure for RETROZIN 480 EC alone or in tank mix combinations with other herbicides is:

1. Fill the spray tank 1/4 to 1/3 full with clean water.

2. Add recommended rate of RETROZIN 480 EC while recirculating and with agitator running.
3. Follow the triple rinse procedure described under "STORAGE AND DISPOSAL" to insure that all product is removed from the container.
4. Mix thoroughly and add clean water to fill spray tank to desired level.
5. Add the other herbicide to tank last and agitate thoroughly.
6. Continue agitation during application and until sprayer tank is empty.

SOIL TEXTURE: As used on this label, "Coarse soils" are loamy sand or sandy loam soils. "Medium soils" are loam, silt loam, silt, sandy clay, or sandy clay loam. "Fine soils" are silty clay, silty clay loam, clay, or clay loam. Silty clay loam soils are transitional soils and may be classified as medium textured soils in some regions of the U.S.

GENERAL PRECAUTIONS AND RESTRICTIONS

Do not use on other crops grown for food or forage. Apply this product only as specified on this label.

Do not allow sprays to drift on to adjacent desirable plants.

Observe all cautions and limitations on labeling of all products used in mixtures.

For all uses:

- Low-pressure and high volume hand-wand equipment is prohibited.

CHEMIGATION

RETROZIN 480 EC is recommended for application through sprinkler irrigation equipment to potatoes, tomatoes, and asparagus as directed on this label. Refer to the crop sections of this label for recommended rates, weeds controlled or suppressed, restrictions, and special precautions. Apply this product only through sprinkler (including center pivot, lateral move, or solid set) irrigation systems. 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.

Calibration: (Center Pivot and Self-Propelled Lateral Move Systems): Sprinkler irrigation systems must be accurately calibrated for application of RETROZIN 480 EC. Greater accuracy in calibration (and distribution) will be achieved by injecting a larger volume of a more dilute mixture of product and water per hour. Follow the steps below to calibrate center pivot and lateral move systems:

1. Determine number of minutes required to make one complete revolution while

applying 1/4 to 3/4 inch of water per acre.

2. With the system at operating pressure determine the exact number of minutes required to inject one gallon of water.
3. Divide the time required for one revolution (step 1) by the time required to inject one gallon (step 2). This gives total gallons of product-water mixture to be added to nurse tank.
4. Add required amount of water to nurse tank and start the agitation system. Then add sufficient RETROZIN 480 EC at the recommended rate (See RECOMMENDED BROADCAST APPLICATIONS) to the nurse tank.

EXAMPLE: If 20 hours (1200 minutes) were required for one revolution and if 2 minutes were required to inject one gallon, then a total of 600 gallons of productwater mixture are required ($1200/2 = 600$); to treat 135 acres at 1 pint/acre, 135 pints (16 gallons and 7 pints) of RETROZIN 480 EC are required.

If you have questions about calibration, you should contact State Extension Service 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 should the need arise.

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 pipelinemust 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) 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.

Maintain continuous agitation in the injection nurse tanks during the herbicide application, sufficient to keep herbicide in suspension. Apply specified dosage in 1/4 to 3/4 inch of water (1/4- to 1/2-inch of water on sandy soils) per acre as a continuous injection in center pivot and lateral move systems or in the last 15 to 30 minutes of set in permanent solid set sprinkler systems. Application of more than the quantity of irrigation water recommended on this label may result in decreased product performance by removing the chemical from the zone of effectiveness. Where sprinkler distribution patterns do not overlap sufficiently unacceptable weed control may result. Where sprinkler distribution patterns overlap excessively crop injury may result. Allow sufficient time for pesticide to be flushed through all lines and all nozzles before turning off irrigation water. To insure that lines are flushed and free of remaining pesticide, an indicator dye may be injected into the lines to mark the end of the application period. Use a minimum of 1 part water to 1 part herbicide for injection. The use of a larger volume of water will insure greater accuracy and more uniform distribution.

AERIAL DRIFT REDUCTION ADVISORY INFORMATION

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment-and-weather-related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

The following drift management requirements must be followed to avoid off-target drift movement from aerial applications to agricultural field crops. These requirements do not apply to forestry applications, public health uses or to applications using dry formulations.

1. The distance of the outer most nozzles on the boom must not exceed 3/4 the length of the wingspan or rotor.
2. Nozzles must always point backward parallel with the air stream and never be pointed downwards more than 45 degrees.
3. Where states have more stringent regulations, they should be observed.
4. The applicator should be familiar with and take into account the information

covered in the Aerial Drift Reduction Advisory Information.

INFORMATION ON DROPLET SIZE: The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see Wind, Temperature and Humidity, and Temperature Inversions).

CONTROLLING DROPLET SIZE:

- Volume—Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- Pressure—Do not exceed the nozzle manufacturer's recommended pressures. For many nozzle types lower pressure produces larger droplets. When higher flow rates are needed, use higher flowrate nozzles instead of increasing pressure.
- Number of nozzles—Use the minimum number of nozzles that provide uniform coverage.
- Nozzle Orientation—Orienting nozzles so that the spray is released parallel to the airstream produces larger droplets than other orientations and is the recommended practice. Significant deflection from horizontal will reduce droplet size and increase drift potential.
- Nozzle Type—use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift.

BOOM LENGTH: For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.

APPLICATION HEIGHT: Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

SWATH ADJUSTMENT: When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must

compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase, with increasing drift potential (higher wind, smaller drops, etc.).

WIND: Drift potential is lowest between wind speeds of 2 to 10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given speed. Application should be avoided below 2 mph due to variable wind direction and high inversion potential.

NOTE: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

TEMPERATURE AND HUMIDITY: When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

TEMPERATURE INVERSIONS: Applications should not occur during a temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

SENSITIVE AREAS: RETROZIN 480 EC should only be applied when the potential for drift to adjacent sensitive areas (e.g. residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops) is minimal (e.g. when wind is blowing away from the sensitive areas).

APPLICATION OF RETROZIN 480 EC WITH HERBICIDE SPRAY EQUIPMENT

Use a standard low pressure (20 to 40 psi.) herbicide boom sprayer equipped with suitable nozzles and screens no finer than 50-mesh in nozzle and in-line strainers. Agitate thoroughly before and during application with bypass agitation.

GROUND APPLICATION: Apply the proper rate of RETROZIN 480 EC in a minimum of 10 to 40 gallons of spray mixture per acre broadcast.

Banded Application: Use proportionally less RETROZIN 480 EC per acre in a band versus a broadcast application. For band application use 1/4 to 1 gallon of spray mix per inch of band width regardless of row spacing.

EXAMPLES: (1) To treat a 15-inch band on rows 30 inches apart, use one-half of the broadcast rate of RETROZIN 480 EC. (2) To treat a 14-inch band on rows 42 inches apart, use one-third of the broadcast rate of RETROZIN 480 EC.

AERIAL APPLICATION: Where permitted, apply specified rate in a minimum of 2 to 10 gallons of spray mixture per acre. Do not apply aerially when wind speed is greater than 10 mph.

NOTE: Do not apply aerially when RETROZIN 480 EC is tank mixed with Lasso.

For All Applications of RETROZIN 480 EC: Sprayer must be accurately calibrated before applying RETROZIN 480 EC. Check sprayer during application to be sure it is working properly and delivering a uniform spray pattern. As the volume of spray mixture decreases per acre, the importance of accurate calibration and uniform application increases. Avoid over application, misapplication, and boom and spray swath overlapping that will increase spray dosage. (Crop injury may occur as a result.) Avoid spray skips and gaps which allow weeds to grow in untreated soil. Do not apply when weather conditions favor spray drift and/or when sensitive or cool season crops, such as cole crops, onions, peas, or strawberries are present in adjacent fields or in areas where wheat is growing in coarse textured soils.

SPRAYER CLEANUP: Spray equipment must be thoroughly cleaned to remove remaining traces of herbicide that might injure other crops to be sprayed. Drain any remaining spray solution of RETROZIN 480 EC from the spray tank and dispose of according to label disposal instructions. Rinse the spray tank and refill with water, adding a heavy-duty detergent at the rate of one cup per 20 gallons of water. Recycle this mixture through the equipment for 5 minutes and spray out. Repeat this procedure twice. Fill the spray tank with clean water, recycle for 5 minutes, and spray out. Clean pump and nozzle screens thoroughly. Wash away any spray mixture from the outside of spray tank, nozzles or spray rig. All rinse water must be disposed of in compliance with local, state, and Federal guidelines.

APPLICATION OF RETROZIN 480 EC IN FLUID FERTILIZERS

RETROZIN 480 EC may be applied in fluid fertilizer solutions to alfalfa by following the appropriate mixing procedures and compatibility check. When using tank mix combinations, be sure all components are compatible. Compatibility checks of RETROZIN 480 EC and tank mix combinations which include RETROZIN 480 EC should be made for each batch of fluid fertilizer because of the variability of these fertilizers.

Compatibility Check:

1. Pre-mix 2 teaspoonsful of RETROZIN 480 EC with 8 teaspoonsful of water (1:4 ratio) in a quart jar by adding the water first and followed with RETROZIN 480 EC. Mix thoroughly. If a second herbicide is to be used, double the amount of water (1:8 ratio) and add the second herbicide after mixing RETROZIN 480 EC first.
2. Then pour 1 pint of fluid fertilizer into the quart jar and shake well.
3. Allow to stand for 5 minutes.

THIS COMPATIBILITY CHECK SHOULD ONLY BE USED WHEN MIXING WITH FLUID FERTILIZERS.

Interpretation of Results: If the solution in the jar appears to be uniform, without signs of agglomeration, or without a separation of an oily film on top of the fertilizer, the mixture may be used. If not, repeat the compatibility check using twice the amount of water or add a compatibility agent to the water. If separation occurs, but the mixture can be re-suspended by shaking, then application is possible with good agitation in the spray tank.

Tank Mixing Guidelines:

1. Add the required amount of water and compatibility agent (if required) to the tank. Start agitation system while adding RETROZIN 480 EC and follow by adding the fluid fertilizer and agitate.
2. If a second herbicide is to be used, follow as above in 1, but use twice the amount of water. Start agitation and add RETROZIN 480 EC and follow by adding the second herbicide, and then continue filling the tank with fluid fertilizer.
3. Maintain continuous agitation to assure uniform spray mixture until the tank is emptied.

COMMERCIAL IMPREGNATION AND APPLICATION OF RETROZIN 480 EC ON DRY BULK FERTILIZER

Dry bulk fertilizer may be impregnated or coated

with RETROZIN 480 EC for application to established alfalfa. All recommendations, cautions, and special precautions on this label must be followed along with state regulations relating to dry bulk fertilizer blending, impregnating and labeling.

Impregnation: To impregnate, use a system consisting of a belt, conveyor, or closed drum which is used for dry bulk fertilizer blending. Any commonly used fertilizer can be impregnated with RETROZIN 480 EC except ammonium nitrate, or fertilizers containing ammonium nitrate, potassium nitrate, or sodium nitrate. Do not use on powder limestone.

Apply using a minimum of 200 lbs dry bulk fertilizer per acre and up to a maximum of 450 lbs per acre. To impregnate or coat dry bulk fertilizer, mix RETROZIN 480 EC with sufficient water to form a sprayable slurry. The delivery nozzles must be directed to deliver a fine spray toward the fertilizer for thorough coverage while avoiding spray contact with mixing equipment. Uniform impregnation of RETROZIN 480 EC to dry bulk fertilizer will vary and if the absorptivity is not adequate, an adsorptive powder may be added to produce a dry, free-flowing mixture. Micro-Cel E (Johns-Manville Product Corporation) is the recommended absorbent powder. When another herbicide is used with RETROZIN 480 EC, mix and impregnate immediately. Apply immediately after impregnation unless experience has shown that impregnated fertilizer can be stored without becoming lumpy and difficult to spread.

Rates: Select the recommended rate of RETROZIN 480 EC per acre from the appropriate section of this label and refer to the formula below to determine the amount of RETROZIN 480 EC, which is to be impregnated on a ton of dry bulk fertilizer based on the amount of fertilizer, which will be distributed on one acre.

$$\begin{array}{r} \text{Pt} \\ \text{RETROZIN} \\ \text{480 EC} \\ \hline \text{Per Acre} \end{array} \times \begin{array}{r} 2000 \text{ lb} \\ \text{Fertilizer} \\ \hline \text{Acre} \end{array} = \begin{array}{r} \text{Pt} \\ \text{RETROZIN} \\ \text{480 EC} \\ \hline \text{Ton of} \\ \text{Fertilizer} \end{array}$$

APPLICATION: Uniform application is essential for satisfactory weed control. Accurate calibration of fertilizer application equipment is essential for uniform distribution to the soil surface. The recommended method of application is to apply 1/2 the recommended rate and overlap 50 percent or to double apply by splitting the middles to obtain the best distribution pattern. If fertilizer materials are excessively dusty, use diesel oil or other suitable additive to reduce dust prior to impregnation as dusty fertilizer will result in poor distribution during application. Crop injury and/or poor weed control may occur where the impregnated fertilizer is not uniformly applied.

INCORPORATION AND COMBINATION USES:

When RETROZIN 480 EC is to be used in combination with another herbicide, follow directions on this label for combinations, rates, crops, incorporation, and special precautions.

POTATOES

RETROZIN 480 EC herbicide is recommended for use in ground, aircraft or specified chemigation equipment as a preemergence and/or postemergence application to potatoes. Early maturing smooth skinned white and all red skinned varieties may be injured with postemergence applications. The varieties Atlantic, Bellchip, Centennial, Chipbelle and Shepody are sensitive to RETROZIN 480 EC. Avoid postemergence applications on these varieties. Preemergence applications on these varieties may cause crop injury under adverse weather conditions, on coarse soils, under high soil pH, with higher rates per acre and with mechanical incorporation.

Ground Application: RETROZIN 480 EC is recommended for use with ground spray equipment applied as a preemergence and/or postemergence application for control of the listed grass and broadleaf weeds in potatoes. Apply as a uniform broadcast spray at 20 or more gallons per acre.

Aerial Application: RETROZIN 480 EC may be applied in aerial spray equipment as a preemergence and/or postemergence application at 5 or more gallons per acre.

Chemigation: RETROZIN 480 EC may be applied preemergence and/or early postemergence to potatoes using center pivot, solid set and lateral roll systems. Apply specified dosage in 1/4 to 3/4 inch of water per acre (1/4 to 1/2 inch on sandy soil) as a continuous injection in self-propelled systems or apply in the last 15 to 30 minutes of the set in other systems. Be sure all the RETROZIN 480 EC has been flushed from the lines before shutting down the system.

WEEDS CONTROLLED

RETROZIN 480 EC applied to potatoes according to directions, will provide economic control of the following weeds. For optimum control, applications should be made before weeds are 1 inch tall. (See **NOTE**)

BROADLEAVES	Mustard, tansy1	Shepherdspurse1
Carpetweed, common1	Mustard, tumble1	Sicklepod1
Cocklebur, common1,2	Mustard, wild1	Smartweed, Pennsylvani
Jimsonweed1	Pennycress, field1,2	a1,2
Kochia3	Pigweed, redroot1,2	Sunflower, common3
Lambsquarters, common1,2		Thistle, Russian2
Mustard, Indian1		

	Pigweed, smooth1,2	
	Ragweed, common1,2	
GRASSES	Foxtail, giant1	Johnsongrass, seedling1
Barnyardgrass3	Foxtail, green1	Panicum, fall1
Crabgrass, large1	Foxtail, yellow1	Signalgrass, broadleaf1
Crabgrass, smooth1		

- 1 Weeds controlled with preemergence applications.
- 2 Weeds controlled with postemergence applications.
- 3 Weeds requiring two applications for control.

HARD TO CONTROL WEEDS

Although RETROZIN 480 EC may not provide commercially acceptable control in every instance, it will suppress growth of the following weeds and reduce their competition with potato plants.

BROADLEAVES			
Kochia	Nightshade, hairy	Purslane, common	Sunflower, common
GRASSES			
Barnyard grass	Nutsedge, yellow		
NOTE: Where triazine-resistant weeds are present, RETROZIN 480 EC alone may not provide adequate control.			

CROP	RETROZIN 480 EC (Pt/acre)
Potatoes 1/2 to 2	Potatoes 1/2 to 2
PREEMERGENCE: Apply specified dosage as a broadcast spray. Do not mechanically incorporate into soil. Use the 1/2 to 1 pint/acre rate for control of wild mustard (<i>Brassica</i> sp.) only. On sand soils or sensitive varieties, do not exceed 1 pint/acre.	

CROP	RETROZIN 480 EC (Pt/acre)
Potatoes (Except early maturing smooth skinned, red skinned, and other specified varieties.)	1/2 to 1
POSTEMERGENCE: Apply specified dosage as a broadcast spray over the tops of potato plants.* Use rates of 1/2 to 1 pint/acre for control of redroot pigweed and common lambsquarters only. Apply the 1 pint/acre rate for control of other weeds listed on this label.	
SPLIT APPLICATIONS: This product may be applied once preemergence and once postemergence as directed above.* Do not exceed 2 pint total per acre	

per season.

IDAHO, OREGON AND WASHINGTON ONLY: Two postemergence applications can be made as broadcast sprays over the tops of potato plants if RETROZIN 480 EC is not applied preemergence. Use 1/2 to 1 pint/acre for control of redroot pigweed and lambsquarters only. On coarse (sandy) soils with low organic matter do not exceed 3/4 pint/acre per application. On medium and heavy soils only, use 1 pint/acre per application for control of other weeds listed on this label and for suppression of hairy nightshade. Make the first application early in the season while weeds are still small. Allow at least 14 days before the second application. Do not apply after June 30 if treated land is to be planted to crops other than potatoes.

*Refer to Special Precautions—Potatoes below.

TANK MIXES: RETROZIN 480 EC may be tankmixed with the following herbicides: Dual/Dual II, Eptam, Prowl 3.3 EC and Matrix. In addition, three-way tankmix combinations may be used for RETROZIN 480 EC plus Dual/Dual II, Eptam or Prowl 3.3 EC plus Matrix when applied preemergence. Refer to each product's label for precautionary statements, restrictions, application information and weeds controlled.

Dual/Dual II: RETROZIN 480 EC may be applied in a tankmix combination with Dual/Dual II as a preemergence broadcast application. Apply RETROZIN 480 EC at 3/4 to 2 pints per acre and Dual/Dual II at 1.5 to 3 pints per acre according to the respective labels for use of each product alone on potatoes.

Eptam: RETROZIN 480 EC may be tankmixed with Eptam at rates and uses permitted on each product's label.

Prowl 3.3 EC: RETROZIN 480 EC may be applied in tankmix combination with Prowl as a preemergence or early postemergence broadcast application. As a preemergence mix, apply RETROZIN 480 EC at 1 to 2 pints per acre and Prowl at 1.2 to 3.6 pints per acre. As an early postemergence spray, apply RETROZIN 480 EC at 1/2 to 1 pint per acre and Prowl at 1.2 to 3.6 pints per acre before the crop is in the 6-inch growth stage.

Matrix (except the following counties in Colorado: Alamosa, Conejos, Costilla, Rio Grande and Saguache): RETROZIN 480 EC may be applied in tankmix combination with Matrix as a preemergence and/or early postemergence application for improved control on weeds such as Russian thistle, kochia and common lambsquarters. As a preemergence mix, apply RETROZIN 480 EC at 1/2 to 1.125 pints per acre and Matrix at 1 to 1 1/2 oz. product per acre. As

an early postemergence spray, apply RETROZIN 480 EC at 1/2 to 1 pint per acre and Matrix at 1 to 1 1/2 oz. product per acre. Use a nonionic surfactant at a rate of 0.125% v/v (1 pt./100 gallon of water). Apply before the crop exceeds 14 inches in height. Postemergence applications of Matrix treatments should be made prior to June 30.

SPECIAL PRECAUTIONS (Potatoes):

Do not use RETROZIN 480 EC on potatoes in Kern County, California.

Do not apply more than a total of 2 pints RETROZIN 480 EC per acre in a single crop season regardless of the method of application. Do not make postemergence applications prior to rainfall or irrigation on recently cultivated potatoes, nor within 3 days after periods of cool, wet cloudy weather or injury may occur. Postemergence applications may cause some chlorosis or minor necrosis. These symptoms may be more severe if seed-piece decay is occurring or if growing conditions favor crop stress. Postemergence applications may be made only on russet or white skinned varieties that are not early maturing.

Potato varieties may vary in their response to herbicide application. When using RETROZIN 480 EC for the first time on a particular variety, always determine crop tolerance before using on a field scale.

Do not apply RETROZIN 480 EC within 60 days of harvest.

Do not use air blast sprayers.

Do not apply to sweet potatoes or yams.

Do not plant sensitive crops such as onions, lettuce, cole crops and cucurbits during the next growing season following RETROZIN 480 EC application.

Certain cereal varieties are sensitive to RETROZIN 480 EC (see cereal section of this label for sensitive varieties) and should not be planted during the next growing season unless the following cultural practices occur:

1. Potato vines left in rows as a result of harvest must be uniformly distributed over the soil surface prior to plowing and,
2. Plow with a moldboard plow to a depth sufficient to mix the upper 8 inches of soil.

ALFALFA AND SAINFOIN

RETROZIN 480 EC herbicide is recommended for use in alfalfa and sainfoin in the following areas:

1. Alfalfa and sainfoin (Including mixed stands with grasses) (all areas except California).
2. Alfalfa and sainfoin (Including mixed stands with grasses) (California only).
3. Alfalfa—Tank Mix Combination with

Gramoxone (Colorado, Idaho, Montana, Nevada, Oregon, Utah, Washington, Wyoming, and the following California counties: Del Norte, Lassen, Modoc, Nevada, Plumas, Shasta, Sierra, and Siskiyou).

- Alfalfa—Post Dormant Application of RETROZIN 480 EC Impregnated on Dry Fertilizer Only (Connecticut, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Nebraska, New Mexico, New York, Ohio, Oklahoma, Pennsylvania, South Dakota, Tennessee, Texas and Wisconsin). RETROZIN 480 EC is recommended for use in aerial or ground spray equipment as a broadcast surface application to established crops of alfalfa and sainfoin for the control of certain grass and broadleaf weeds.

APPLICATION: Refer to “General Information” in the front of this label for detailed information on the application of RETROZIN 480 EC. For information on applying RETROZIN 480 EC in fluid or on dry fertilizer refer to the “Application Of RETROZIN 480 EC In Fluid Fertilizers” or “Commercial Impregnation And Application Of RETROZIN 480 EC On Dry Bulk Fertilizer” under the “General Information” section of this label.

SPECIAL PRECAUTIONS: Use RETROZIN 480 EC only on established alfalfa and sainfoin. Do not apply RETROZIN 480 EC after growth begins in the spring or before growth ceases in the fall, except as specified on this label.

Do not graze or harvest within 28 days after application. For best weed control, apply RETROZIN 480 EC when weeds are less than 2 inches tall or before weed foliage is 2 inches in diameter. Reduced weed control may occur when extended dry conditions follow application of RETROZIN 480 EC.

Crop injury may occur when:

- Crop is under stress conditions such as diseases, insect infestations, poorly drained soils, drought or winter injury at time of application;
- Crop is treated within 12 months after seeding;
- There is excessive irrigation or rainfall immediately after application. Do not apply more than 1/2 inch of water in the first irrigation after RETROZIN 480 EC is applied.

ALFALFA and SAINFOIN (All Areas Except California)

RECOMMENDED BROADCAST APPLICATIONS

CROP	RETROZIN 480 EC Pt/Acre
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Alfalfa and Sainfoin (Except California)	1/2 to 2
Select the proper dosage according to weeds known to be and present in field to be treated. On loamy sand soils in Oregon and Washington, do not apply more than 1 pt of RETROZIN 480 EC per acre.	

FOR USE ON MIXED STANDS OF ALFALFA AND GRASSES:

Rates of 1 to 1 1/2 pt of RETROZIN 480 EC per acre will provide partial reduction of forage grass stands. These rates may be used to reduce forage grass stands to prevent crowding out of alfalfa. Higher rates will severely reduce forage grass stands. RETROZIN 480 EC should not be used on sand soils. In areas West of the Rocky Mountains, avoid using RETROZIN 480 EC on soils with calcareous surface area, high levels of lime or sodium, or a pH greater than 8.2.

ALFALFA and SAINFOIN

Weeds Controlled (Except California)

1/2 to 3/4 Pt RETROZIN 480 EC/Acre		
Chickweed, Common (<i>Stellaria media</i>)		
3/4 to 1 Pt RETROZIN 480 EC/Acre		
Cheat (<i>Bromus secalinus</i>) Deadnettle, Purple (<i>Lamium purpureum</i>) Downy brome (<i>Bromus tectorum</i>)	Japanese brome (<i>Bromus japonicus</i>) Pennycress (<i>Thlaspi arvense</i>)	Rescuegrass (<i>Bromus catharticus</i>) Shepherdspurse (<i>Capsella bursa pastoris</i>)
1 to 2 Pt RETROZIN 480 EC/Acre		
Broadleaves Fleabane, Rough (<i>Erigeron strigosus</i>) Flixweed (<i>Descurainia sophia</i>) Henbit (<i>Lamium amplexicaule</i>) Kochia (<i>Kochia scoparia</i>) Lambsquarters, Common (<i>Chenopodium album</i>)	Marestail (Horseweed) (<i>Hippuris vulgaris</i>) Meadow Salsify (<i>Tragopogon pratensis</i>) Mustard, Blue (<i>Chorispora tenella</i>) Mustard, Jim Hill (tumble) (<i>Sisymbrium altissimum</i>) Mustard, Tansy (<i>Descurainia pinnata</i>) Pepperweed (<i>Lepidium virginicum</i>)	Pigweed, Redroot (<i>Amaranthus retroflexus</i>) Prickly Lettuce (<i>Lactuca serriola</i>) White Cockle (<i>Melandrium album</i>) Wild Buckwheat (<i>Polygonum convolvulus</i>) Yellow Rocket (<i>Barbarea vulgaris</i>)
Grasses	Little Barley	Wild Oats

Foxtail, Green (<i>Setaria viridis</i>)	(<i>Hordeum pusillum</i>) Smooth Brome (<i>Bromus inermis</i>)	(<i>Avena fatua</i>)
2 Pt RETROZIN 480 EC/Acre		
Broadleaves Chickweed, Mouseear (<i>Cerastium vulgatum</i>)	Dandelion (<i>Taraxacum officinale</i>)	Ragweed, Common (<i>Ambrosia artemisiifolia</i>)
Grasses Barnyardgrass (<i>Echinochloa crus-galli</i>)	Bluegrass (<i>Poa annua</i>)	Foxtail Barley (<i>Hordeum jubatum</i>)

Weeds Partially Controlled: At the rate of 2 pt/acre RETROZIN 480 EC may be used to reduce the competition from curly dock (*Rumex crispus*). At 1 to 2 pt/acre, RETROZIN 480 EC may be used to reduce the competition of German Moss or knawel (*Scleanthus annus*).

**ALFALFA AND SAINFOIN (California Only)
(Including Mixed Stands With Grasses)**

RETROZIN 480 EC is recommended for use in aerial or ground spray equipment as a broadcast surface application to dormant established crops of alfalfa and sainfoin.

APPLICATION: RETROZIN 480 EC is recommended for use in aerial or ground spray equipment as a broadcast surface application to dormant established crops of alfalfa and sainfoin for control of certain grass and broadleaf weeds. Do not apply RETROZIN 480 EC after growth begins in the spring or before growth ceases in the fall. Do not apply to either alfalfa or sainfoin during the first growing season after seeding. For information on applying RETROZIN 480 EC in fluid fertilizer solutions to alfalfa, refer to the appropriate section of this label. For information on commercial impregnation and application of RETROZIN 480 EC on dry bulk fertilizer, refer to the appropriate section of this label.

Weeds Controlled

3/4 to 1 Pt RETROZIN 480 EC/acre		
Cheatgrass (downy brome) (<i>Bromus secalinus</i>)	Cheatgrass (downy brome) (<i>Bromus secalinus</i>)	Cheatgrass (downy brome) (<i>Bromus secalinus</i>)
1 to 2 Pt RETROZIN 480 EC/Acre		
Broadleaves Chickweed, Common (<i>Stellaria</i>)	Mustard, Blue (<i>Chlorispora tenella</i>) Mustard, Tansy	White Cockle (<i>Melandrium album</i>)

Grasses Smooth Brome (<i>Stellaria media</i>)		Wild Oats (<i>Avena fatua</i>)
2 Pt RETROZIN 480 EC/Acre		
Broadleaves Dandelion (<i>Taraxacum officinale</i>)		
Grasses Barnyardgrass (<i>Echinochloa crus-galli</i>)	Bluegrass (<i>Poa annua</i>)	Foxtail Barley (<i>Hordeum jubatum</i>)

RECOMMENDED BROADCAST APPLICATIONS

CROP	RETROZIN 480 EC Pt/Acre
Alfalfa and Sainfoin (California Only)	3/4 to 2
Select the proper dosage according to weeds known to be present in the field to be treated. Apply specified dosage in 20 to 40 gallons of water per acre with ground spray equipment or 3 to 10 gallons of water per acre with aerial spray equipment fitted with nozzles suitable for broadcast applications of herbicides. Treat only dormant established crops of alfalfa and sainfoin. Injury may occur to alfalfa if RETROZIN 480 EC is applied earlier than 12 months after seeding. Do not apply after Spring growth begins or before growth ceases in the Fall. Do not graze or harvest within 28 days after application. At the 2 pt/acre rate, RETROZIN 480 EC may be used for suppression of curly dock.	

FOR USE ON MIXED STANDS OF ALFALFA AND GRASSES: Rates of 1 to 1 1/2 pt of RETROZIN 480 EC per acre will provide partial reduction of forage grass stands. These rates may be used to reduce forage grass stands to prevent crowding out of alfalfa. Higher rates will severely reduce forage grass stands. Do not apply with aerial spray equipment when wind speed is greater than 10 mph. Do not apply when weather conditions favor spray drift and/or when sensitive cool season crops, such as cole crops,

onions, peas, or strawberries, are present in adjacent fields. Applications should not be made when weather conditions favor spray drift, especially in areas where wheat is growing on coarse textured soils in adjacent fields, or injury may occur.

ALFALFA

RETROZIN 480 EC

APPLICATION: RETROZIN 480 EC is recommended for use, during the dormant season, in aerial or ground spray equipment as a broadcast surface application to established alfalfa for the control of certain grass and broadleaf weeds. Do not apply RETROZIN 480 EC to growth that is more than 2 inches tall. Apply once per season. Do not apply following cuttings during growing season. Use a minimum of 10 gallons of water per acre with aerial spray equipment and a minimum of 20 gallons of water per acre with ground spray equipment. Add a non-ionic spreader at label rates to the spray solution.

Weeds Controlled: RETROZIN 480 EC will control established weeds.

1/2 to 3/4 pt of RETROZIN 480 EC per acre		
Common Chickweed		
3/4 to 1 1/2 pt of RETROZIN 480 EC per acre		
Bluegrass Cheat Downy brome	Field pennycress Henbit Japanese brome	Rescuegrass Shepherdspurse
Use RETROZIN 480 EC at 1 to 1 1/2 pt/acre for control of the following weeds:		
Blue mustard Common lambsquarters Flixweed Green foxtail Groundsel Jim Hill mustard Kochia Little barley	Marestail (Horseweed) Meadow salsify Pepperweed Prickly lettuce Redroot pigweed Rough fleabane Ryegrass Smooth brome	Sow thistle Tansy mustard White cockle Wild oats Wild buckwheat Yellow rocket

RECOMMENDED APPLICATIONS

DOSAGE/ACRE	
RETROZIN 480 EC 1/2 to 1 1/2 Pt Plus Gramoxone Extra 1 1/2 to 2 1/2 Pt	Apply specified dosages of RETROZIN 480 EC in at least 10 gallons of water per acre with aerial equipment or at least 20 gallons of water per acre with ground equipment. Do not apply this tank mix to alfalfa growth if

	more than 2 inches tall. For best weed control, apply when broadleaf weeds and grasses are 1-6 inches tall and are actively growing. Care should be taken to avoid overlaps. Do not apply more than 1 pt of RETROZIN 480 EC per acre on loamy sand soils. Reduced weed control may occur when extended dry conditions follow application of RETROZIN 480 EC. Crop injury may occur if alfalfa is under stress conditions such as diseases, insect infestations, drought or winter injury or if RETROZIN 480 EC is applied to alfalfa earlier than 12 months after seeding.
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FOR USE ON MIXED STANDS OF ALFALFA AND GRASSES:

Rates of 1 to 1 1/2 pt of RETROZIN 480 EC per acre will provide partial reduction of forage grass stands. These rates may be used to reduce forage grass stands to prevent crowding out of alfalfa.

Do not graze or harvest within 42 days after application.

Do not apply when weather conditions favor spray drift. Aerial application should not be made when wind speed is greater than 10 mph. Do not use on sand soil.

Post Dormant Application of RETROZIN 480 EC Impregnated on Dry Fertilizer Only

RETROZIN 480 EC may be applied after dormancy has broken, but prior to three inches of new alfalfa shoot growth, only when impregnated on dry fertilizer.

Apply at rates of 1 1/2 to 2 pt per acre as directed on this label for application during dormancy.

Apply only when alfalfa foliage is dry or crop injury may occur. When using this application method, do not harvest or graze treated alfalfa for 60 days after application.

ASPARAGUS (Established)

Aerial application is prohibited. RETROZIN 480 EC is recommended for use in ground spray equipment or sprinkler irrigation (center pivot, lateral move, or solid set) systems as a single preemergence broadcast application or as a split application consisting of a preemergence broadcast application followed by a post harvest broadcast application.

Weeds Controlled: RETROZIN 480 EC, applied to established asparagus according to directions, will effectively control:

Broadleaves (Amaranthus pensylvanicum)
Chickweed, retroflexus) Sorrel, Red

Common (Stellaria media) Jimsonweed (Datura stramonium) Lambsquarters (Chenopodium album) Pigweed, Redroot	Ragweed, Common (Ambrosia artemisiifolia) Smartweed, Pennsylvania (Polygonum	(Rumex acetosella) Velvetleaf (Abutilon theophrasti) Crabgrass (Digitaria spp.) Foxtails (Setaria spp.) Sandbur, Field (Cenchrus pauciflorus)
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plants during the first growing season after setting crowns. DO NOT APPLY POST HARVEST APPLICATIONS UNTIL AFTER THE LAST HARVEST OF SPEARS.

CARROTS

Apply RETROZIN 480 EC herbicide with ground equipment as specified below under "Recommended Applications". For effective control of broadleaf weeds with postemergence applications, apply RETROZIN 480 EC before weeds are 1 inch in height or diameter. Thorough spray coverage is essential for adequate weed control. Do not use air blast or other highpressure spray equipment to make postemergence applications of RETROZIN 480 EC. Refer to the appropriate section of this label for additional information regarding spray equipment, dilution rates, mixing, sprayer cleanup, restrictions, container disposal and cautions. Refer to "Mixing" under the "General Information" section on the front of this label. For specific application information see "General Information" and "Application" sections at the front of this label.

WEEDS CONTROLLED: RETROZIN 480 EC applied to carrots according to directions will effectively control:

Carpetweed (<i>Mullugo verticillata</i>) Galinsoga (<i>Galinsoga parviflora</i>) Horseweed (<i>Conyza canadensis</i>) Lambsquarters, Common (<i>Chenopodium album</i>)	Mustard, Wild (<i>Sinapis arvensis</i>) Pigweed, Redroot (<i>Amaranthus retroflexus</i>) Pigweed, Smooth (<i>Amaranthus hybridus</i>) Prickly Lettuce	(<i>Lactuca serriola</i>) Shepherdspurse (<i>Capsella bursa-pastoris</i>) Pineappleweed (<i>Matricaria matricarioides</i>)
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RECOMMENDED BROADCAST APPLICATIONS

CROP	RETROZIN 480 EC Pt/Acre
Asparagus	2 to 4
	PREEMERGENCE APPLICATION ONLY Make a single surface application in early Spring before asparagus spears or ferns emerge. If the field is to be disked, apply RETROZIN 480 EC after disking but before the crop emerges. Use the lower rate for control of the broadleaf weeds listed above. Use the higher rate in fields with a history of severe infestations of grasses and for maximum residual control. Do not apply within 14 days of harvest.
	1 to 2 preemergence plus 2 to 3 post harvest
	SPLIT APPLICATION PREEMERGENCE AND POST HARVEST Preemergence Application: Apply before asparagus spears or ferns emerge. If the field is to be disked, apply after disking but prior to crop emergence. Do not apply within 14 days of harvest. Post Harvest Application: Apply after last harvest of the season but prior to emergence. The lower combination rates may be used for control of common ragweed, lambsquarters, redroot pigweed, and red sorrel. Use the higher combination rates for other weeds listed or in fields with severe grass infestations or for maximum post harvest control of emerged weeds.
IMPORTANT: The total amount of RETROZIN 480 EC applied in one crop season may not exceed 4 pt per acre.	

SPECIAL PRECAUTIONS (Asparagus): Do not use on newly seeded asparagus nor on young

RECOMMENDED APPLICATIONS

CROP	RETROZIN 480 EC Pt/Acre
Carrots	1/2
	Apply specified dosage per acre as a broadcast spray over the tops of carrot plants. Application should be made after carrots have formed 5-6 true leaves but before weeds are 1 inch in height or diameter. If needed, a second application may be made after an interval of at least 3 weeks. Applications may be made up to 60 days of harvest.
IMPORTANT: The total amount of RETROZIN 480 EC applied in one crop season must not exceed 1 pt per acre.	

SPECIAL PRECAUTIONS: Do not apply to

carrots grown for seed. Do not apply within 3 days after periods of cool, wet or cloudy weather or crop injury will occur. Do not apply RETROZIN 480 EC within 3 days of any other chemical unless specified on this label. Do not apply on very hot days or excessive crop injury will result. Do not apply until carrots have at least 5-6 true leaves. Earlier applications will result in excessive crop damage. Crop injury or delayed maturity may result from applications of RETROZIN 480 EC if carrots are growing under stress conditions such as periods of drought or cool, wet and cloudy weather preceding application. Following an application of RETROZIN 480 EC, chlorosis (yellowing) and burning of the leaf tissue may occur. For newly introduced varieties of carrots with unknown tolerance to RETROZIN 480 EC, treat only a small area to determine if RETROZIN 480 EC can be used without injury to the crop.

GARBANZO BEANS (Chickpeas)

RETROZIN 480 EC herbicide is recommended as a preemergence application for the suppression of certain broadleaf weeds in garbanzo beans.

WEEDS SUPPRESSED*:

- Common Chickweed
- Dog Fennel (Mayweed)
- Field Pennycress
- Henbit
- Common Lambsquarters
- Shepherdspurse
- Wild Mustard
- Pigweed

*Suppression is a reduction in weed size and growth compared to a non-treated area in the same field. RETROZIN 480 EC used alone will not control triazine-resistant weed species.

RECOMMENDED APPLICATIONS

CROP	RETROZIN 480 EC Pt/Acre
Garbanzo beans	1/2 to 3/4 Apply specified dosage in a single preemergence application using 10 to 40 gallons of water per acre with ground spray equipment. Apply before or after planting but before crop emergence. Thorough incorporation, either by rainfall or by mechanical means, is essential for weed suppression. Under dry conditions, incorporate RETROZIN 480 EC into the top 1 to 2 inches of soil with spike harrows, or similar shallow incorporation equipment, then cross harrow to insure uniform soil incorporation. Where soil

	surface is moist at the time of application and rain follows before weed emergence, a broadcast application should provide adequate weed suppression. Use on coarse-textured soils, sandy soils or any soil with less than 1.5% organic matter will likely cause crop injury. Use the higher rate on fine textured soils (high in clay or organic matter) and in fields with a history of high weed populations.
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SPECIAL PRECAUTIONS: Crop injury may result if crop is under stress conditions caused by cold weather, poor soil fertility, disease or insect damage.

Crop injury may result if application is followed by heavy rain. Avoid application of more than 1/2 inch of irrigation within one month after application of RETROZIN 480 EC, or crop injury may occur.

Do not use on clay knobs or poorly covered subsoils.

Do not apply preemergence on shallow seedings less than 2 inches deep.

Do not graze or feed treated vines to livestock within 40 days after application.

Maintain continuous spray tank agitation to keep material in suspension. Avoid overlapping of spray swaths and shut off spray booms while turning, slowing or stopping, or crop injury will occur.

NOTE: This treatment may cause some chlorosis or minor necrosis. Because garbanzo bean varieties may vary in their susceptibility to RETROZIN 480 EC, determine crop tolerance prior to adoption as a field scale practice to prevent possible injury.

LENTILS AND PEAS

RETROZIN 480 EC herbicide is recommended as a preemergence and postemergence application for the suppression of certain broadleaf weeds in lentils and peas.

WEEDS SUPPRESSED*

- Common Chickweed**
- Corn Spurry
- Dog Fennel
- Field Pennycress
- Henbit**
- Lambsquarters
- Pennsylvania Smartweed
- Pineapple Weed
- Prostrate Knotweed
- Redroot Pigweed
- Shepherdspurse**

- Wild Mustard

*Suppression is a reduction in weed size and growth compared to a non-treated area in the same field.

**Preemergence application only.

PREEMERGENCE APPLICATION: Make a single preemergence application of RETROZIN 480 EC at 3/8 to 3/4 pint per acre per crop year. Apply in 10 or more gallons of water per acre with ground spray equipment or 5 or more gallons of water per acre with aerial spray equipment. Apply RETROZIN 480 EC before or after planting. Thorough incorporation, either by rainfall or by mechanical means, is essential for weed suppression. Under dry conditions, incorporate RETROZIN 480 EC into the top 1 to 2 inches of soil with spike harrows, or similar shallow incorporation equipment, then cross harrow to ensure uniform soil incorporation. Where soil surface is moist at the time of application and rain follows before weed emergence, a broadcast application should provide adequate weed suppression. Use the higher rate on fine-textured soils (high in clay or organic matter) and in fields with a history of high weed populations. RETROZIN 480 EC may be applied pre- or post plant incorporated as a tank mix combination with METRIBUZIN 4EC. Follow the Directions for Use statements on both product labels.

POSTEMERGENCE APPLICATION: One postemergence application may be made per season. Use 1/4 to 1/2 pint of RETROZIN 480 EC per acre on **lentils** and **spring peas**. On **winter peas**, use 3/8 to 1/2 pint of RETROZIN 480 EC per acre. For suppression of dog fennel, use 1/2 pint RETROZIN 480 EC per acre. Apply specified dosage in 20 or more gallons of water per acre with ground spray equipment or 5 or more gallons of water per acre with aerial spray equipment. Do not exceed 40 psi with ground spray equipment. Apply as a broadcast spray when weeds are small (less than 2 inches in height or diameter) and before crop is 6 inches tall. Temporary chlorosis of the crop may occur. There is an added risk of crop injury if a postemergence application is made following a previous preemergence or post plant incorporated RETROZIN 480 EC application. Do not apply over verymoist soils or wet crop foliage. Do not apply postemergence within 3 days after periods of cool, wet, or cloudy weather or crop injury may occur. Do not apply within 24 hours of treatment with other pesticides.

SPECIAL PRECAUTIONS (all applications): Do not apply more than 1 pint of RETROZIN 480 EC per acre per year. Crop injury may result if crop is

under stress conditions caused by cold weather, low fertility, disease or insect damage. Crop injury may also result if application is followed by heavy rain.

Do not use on coarse-textured soils, sandy soils or soils with less than 1.5% organic matter.

Do not apply to "Estin" lentils.

Do not use on clay knobs or poorly covered subsoils.

Do not apply on shallow seedlings less than 2 inches deep (preemergence only).

Do not apply within 50 days of harvest of peas, or within 75 days of harvest of lentils. Do not graze or feed treated vines to livestock within 40 days after application.

Maintain continuous spray tank agitation to keep material in suspension. Avoid overlapping and shut off spray booms while turning, slowing or stopping, or crop injury will occur.

NOTE: This treatment may cause some chlorosis or minor necrosis. Because lentil and pea varieties may vary in their susceptibility to RETROZIN 480 EC, determining crop tolerance prior to adoption as a field scale practice is suggested to prevent possible injury.

For additional precautions, restrictions, limitations, and sprayer clean-up information refer to the appropriate sections of this label.

TOMATOES

Aerial application is prohibited.

Apply RETROZIN 480 EC herbicide with ground equipment to seeded and transplanted tomatoes as specified below under "Recommended Applications". For effective control of grasses and broadleaf weeds with postemergence applications, apply RETROZIN 480 EC before weeds are 1-inch tall. Thorough spray coverage on weed foliage is essential for adequate control with postemergence applications. Do not use air blast or other high pressure spray equipment to make postemergence applications of RETROZIN 480 EC. Refer to the appropriate section of this label for additional information regarding spray equipment, dilution rates, mixing, sprayer cleanup, restrictions, container disposal and cautions. For specific application information see the "General Information" section in the front of this label.

WEEDS CONTROLLED

PREPLANT INCORPORATED APPLICATIONS TRANSPLANT TOMATOES

ONLY

Broadcast Sprays—1/2 to 1 Pt RETROZIN 480 EC/Acre

Broadleaves

- Galinsoga (*Galinsoga* spp.)
- Lambsquarters (*Chenopodium album*)
- *Pigweed, Redroot (*Amaranthus retroflexus*)
- *Purslane, Common (*Portulaca*)

oleracea)

Grasses

- *Goosegrass (*Eleusine indica*)

Preplant incorporated applications applied as directed will suppress foxtails, panicums and barnyardgrass.

RETROZIN 480 EC/Trifluralin Tank Mix: This tank mix combination applied preplant incorporated as directed on this label will control the weeds listed above plus those weeds listed on the Trifluralin label.

*For optimum control of these weeds, use the highest rate recommended on the label for the type of application to be made. Repeat postemergence applications may be needed for best control.

**WEEDS CONTROLLED
POSTEMERGENCE APPLICATIONS
ESTABLISHED TOMATOES**

For effective control of weeds with postemergence applications, apply RETROZIN 480 EC before weeds are 1-inch tall.

Broadcast Sprays—1/2 to 1 Pt RETROZIN 480 EC/Acre

Broadleaves

- Carpetweed (*Mollugo verticillata*)
- Fumitory (*Fumaria officinalis*)
- Galinsoga (*Galinsoga* spp)
- *Jimsonweed (*Datura stramonium*)
- *Ladysthumb (*Polygonum persicaria*)
- Lambsquarters (*Chenopodium album*)
- Mustard, Wild (*Brassica kaber*)
- Pigweeds (*Amaranthus* spp.)
- Purslane (*Portulaca oleracea*)
- *Ragweed, Common (*Ambrosia artemisiifolia*)
- *Smartweed, Pennsylvania (*Polygonum pensylvanicum*)
- Toadflax (*Linaria* spp.)
- *Velvetleaf (*Abutilon theophrasti*)

Directed Sprays—1 to 2 Pt RETROZIN 480 EC/Acre

Grasses

- *Foxtail, Yellow (*Setaria glauca*)
- Goosegrass (*Eleusine indica*)

Plus Weeds Listed Under Broadcast Sprays

*For optimum control of these weeds, use the highest rate recommended on the label for the type of application to be made. Repeat postemergence applications may be needed for best control.

Postemergence applications as directed on this label will suppress barnyardgrass and crabgrass when these weeds are less than 1-inch tall.

RECOMMENDED BROADCAST APPLICATIONS FOR TOMATOES

RETROZIN 480 EC *Pt/Acre	REMARKS
1/2 to 1	<p>PREPLANT INCORPORATED—TRANSPLANT TOMATOES ONLY: Apply specified dosage in 10 or more gallons of water per acre as a broadcast spray to the soil surface immediately before transplanting. Incorporate to a depth of 2 to 4 inches with equipment capable of uniformly mixing the chemical into the soil. This application may be made alone or in a tank mix combination with trifluralin e.c. When transplanting tomatoes, place the root system of the plants below the herbicide incorporation zone or injury may occur. Refer to the trifluralin label for specific rate of application and for additional precautions and restrictions for tomatoes.</p>
1/2 to 1	<p>POSTEMERGENCE BROADCAST SPRAY—ESTABLISHED TOMATOES: Apply specified dosage in 20 or more gallons of water per acre as a broadcast spray, or apply in 1/4 to 3/4 inch of water (use 1/4 to 1/2 inch of water on sandy soils) per acre as a continuous injection in center pivot and lateral move systems or apply in the last 15 to 30 minutes of set in permanent solid set sprinkler systems. One or more applications may be applied per use season. Allow at least 14 days between applications or severe crop injury may occur. For transplanted tomatoes, do not apply until transplants have recovered from transplant shock and new growth is evident. Do not apply to tomatoes within 24 hours of application of other pesticides. Do not tank mix with other pesticides. (See "Special Precautions" below.)</p>
1 to 2	<p>POSTEMERGENCE DIRECTED SPRAY—ESTABLISHED TOMATOES: Apply specified dosage in 20 or more gallons of water per acre as a directed spray. One or more applications may be applied per use season. Allow at least 14</p>

	<p>days between applications or severe crop injury may occur. Avoid contacting tomato foliage with spray. This method of treatment is recommended for use in fields with a history of severe weed pressure or in fields infested with hard-to-control weeds. For transplanted tomatoes, do not apply until transplants have recovered from transplant shock and new growth is evident. Do not apply to tomatoes within 24 hours of application of other pesticides. (See "Special Precautions" below.) When banding see the appropriate section in the front of this label.</p>
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*Use the higher rate in fields with a history of severe weed pressure and for maximum residual weed control.

SPECIAL PRECAUTIONS (Tomatoes): Do not apply more than a total of 2 pt RETROZIN 480 EC per crop season. Do not apply the total amount of 2 pt RETROZIN 480 EC within a time span of less than 35 days, except in the case of directed sprays.

Allow at least 14 days between applications, regardless of dosage or method of application or severe crop injury may occur. Do not apply within 7 days of harvest. Do not apply within 3 days after periods of cool, wet or cloudy weather, or crop injury will occur.

Do not use hot caps on tomatoes within 7 days before or at any time after application of RETROZIN 480 EC. Do not treat seeded tomatoes until plants have reached the 5 to 6 leaf stage or severe crop injury may occur.

Crop injury or delayed maturity may result from broadcast or directed spray applications if tomatoes are growing under stress conditions such as periods of drought or cool, wet and cloudy weather preceding application. For newly introduced tomato varieties with unknown tolerance to RETROZIN 480 EC, treat only a small area to determine if RETROZIN 480 EC can be used without injury to the crop.

DO NOT USE RETROZIN 480 EC ON TOMATOES IN KERN COUNTY, CALIFORNIA. CEREALS

(Spring and Winter Barley and Winter Wheat) RETROZIN 480 EC herbicide is recommended for control or suppression of certain grasses and broadleaf weeds when applied postemergence to spring and winter barley or winter wheat.

Mixing: See the "General Information" section of this label for specific mixing procedures. When tank mixing, carefully follow the instructions on

this label. Refer to the other product labels registered for use in barley and winter wheat for additional use directions, rates, weeds controlled and restrictions.

Application: RETROZIN 480 EC may be applied by aerial or ground application equipment. Use a minimum spray volume of 2 gpa by air and 10 gpa by ground. Uniform spray coverage is necessary to obtain optimum weed control and to minimize potential for crop injury. Do not exceed rates specified on this label. Do not apply RETROZIN 480 EC through any type of irrigation equipment. Apply RETROZIN 480 EC when the crop is healthy and actively growing. RETROZIN 480 EC may be applied more than once per crop season. Allow a minimum of 21 days between applications if wheat is actively growing or allow 45 days between applications if wheat is growing in adverse conditions, has entered dormancy or is stressed due to frost damage, disease, drought or excessive moisture. Do not use on soils containing less than 0.75% organic matter. Do not apply more than a total of 16 fluid ounces RETROZIN 480 EC (8 ounces active ingredient) per acre per year. On irrigated cereals, do not apply more than 0.5 inch of water for the first irrigation, the maximum amount for each additional irrigation should not exceed 1 inch. Allow a minimum of 14 days between the first irrigation and subsequent irrigations.

Performance Factors: Weed control may not be observed for 2 to 4 weeks under normal growth conditions and for 4 to 6 weeks under very dry conditions. Moisture (at least 1/2 inch) is required within 2 to 3 weeks after application to move RETROZIN 480 EC into the weed root zone. Lack of adequate moisture after application may result in poor or erratic weed control. Control or suppression of listed weeds is dependent on weed size at time of application. Control or suppression may be reduced if broadleaf weeds are taller than 1 inch or grasses have more than 2 leaves.

Tank Mixtures: RETROZIN 480 EC may be tank mixed with Ally, Amber, Finesse, Glean FC, Harmony Extra, 2,4-D, MCPA, Igran, Banvel/Banvel SGF, Bronate or Buctril herbicides. A nonionic surfactant containing at least 80% active ingredient may be used in RETROZIN 480 EC tank mixes with sulfonylurea herbicides (Ally, Amber, Finesse, Glean FC and Harmony Extra). Do **not** use a crop oil concentrate or any adjuvant containing vegetable or petroleum oils with any RETROZIN 480 EC mix as crop injury may result. Additional pesticides may also be tank mixed with RETROZIN 480 EC unless specifically prohibited on the mix products' label. In some instances, combinations with organophosphate insecticides

may cause temporary leaf yellowing and/or crop injury, especially when widely fluctuating day/night temperatures occur near application. Always refer to the other product labels registered for use on cereals for additional directions, rates and weed species controlled. Observe all precautions and limitations on labeling of all products used in mixtures.

Feeding Restrictions: Do not graze wheat within 14 days of RETROZIN 480 EC application or harvest grain within 21 days after last application. Do not graze or harvest barley before crop maturity. For tank mix combinations, follow the most restrictive label.

Special Precautions: Cereal Injury—Crop injury may occur if RETROZIN 480 EC is applied:

1. When the crop is under stress such as winter kill, frost damage, disease, drought or excessive moisture, severe grazing, or when these conditions follow the application.
1. In combination with fluid fertilizer especially with the addition of surfactant,
2. Prior to the growth stage specified on this label.
3. To soils high in lime or sodium, a pH greater than 7.7, calcareous, gravelly, thinly covered or exposed subsoil areas.
4. To fields where cereal seeds have been planted less than 1 inch deep.
5. To a non-winter hardy wheat or barley variety.
6. To a sensitive wheat or barley variety as listed below.
7. To frozen soil or crop still in winter dormancy.

Cereal Rotations Following Potatoes Treated with RETROZIN 480 EC: If planting a sensitive cereal variety (listed under the wheat and barley variety tolerance portion of this label), following potatoes treated with RETROZIN 480 EC or metribuzin containing products, refer to the potato section of the RETROZIN 480 EC label for special cultural practices to follow.

APPLICATION RECOMMENDATIONS

RETROZIN 480 EC alone or in a tank mix with labeled broadleaf herbicides may be applied by aerial or ground spray equipment as a broadcast postemergence spray.

RECOMMENDED POSTEMERGENCE BROADCAST APPLICATIONS OF RETROZIN 480 EC

CROP GROWTH STAGE	SOIL TEXTURE	RETROZIN 480 EC RATE (fl oz/A) % ORGANIC MATTER

		0.75 TO 2.0	VER 2.0
		2 Leaf To 2 Tiller	Coarse
	Medium	1.5 to 4.5	3 to 4.5
	Fine	3 to 4.5	3 to 6
	Use these rates on crops with secondary roots smaller than 1 inch. For dryland winter wheat (nonirrigated), apply the highest recommended rate to achieve maximum weed suppression/control		
3 Tiller To 4 Tiller	Coarse	4.5 to 6	6 to 7.5
	Medium	6 to 7.5	7.5 to 9
	Fine	7.5 to 9	7.5 to 9
Do not apply within 2 weeks after grazing or breaking of winter dormancy. Apply after the crop is at or beyond the 3 tiller growth stage but before jointing. Secondary roots should be developed and larger than 1 inch long. Do not apply before 75 days after planting. For dryland winter wheat (nonirrigated), apply the highest recommended rate to achieve maximum weed suppression/control. GEORGIA ONLY: Wheat must be planted before November 15 in the Piedmont area and Northern part of the state, and before December 1 in the Coastal Plain area.			
Over 4 Tillers	Coarse	6 to 9	7.5 to 12
	Medium	6 to 12	7.5 to 12
	Fine	7.5 to 12	12 to 16
Do not apply within 2 weeks after grazing or breaking of winter dormancy. Apply after the crop is at or beyond the 3 tiller growth stage but before jointing. Secondary roots should be developed and larger than 1 inch long. Do not apply before 75 days after planting. For dryland winter wheat (nonirrigated), apply the highest recommended rate to achieve maximum weed suppression/control. GEORGIA ONLY: Wheat must be planted before November 15 in the Piedmont area and Northern			

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DISPOSAL METHODS

Do not dispose of undiluted chemicals on site. If recycling, replace cap and return clean containers to recycler or designated collection point. If not recycling, break, crush, or puncture and bury empty containers in a local authority landfill. If no landfill is available, bury the containers below 500 mm in a disposal pit specifically marked and set up for this purpose clear of waterways, desirable vegetation and tree roots. Empty containers and product should not be burnt.

STORAGE CONDITION

Store in the closed, original container in a cool, well-ventilated area. Do not store for prolonged periods in direct sunlight. Store in a locked room or place away from children, animals, flood, feedstuffs, seed and fertilizers. Triple or preferably pressure rinse containers before disposal. Add rinsing to spray tank.

For More Details including effects on environment email contact@ivorychem.com with Subject "RETROZIN 480 EC DETAILS"

More Details:

TOXICOLOGICAL EFFECTS

- **Acute toxicity:** Metribuzin is slightly toxic via the oral route, with reported oral LD50 values of 1090 to 2300 mg/kg in rats, 700 mg/kg in mice and 245 to 274 mg/kg in guinea pigs [6,15]. It is practically nontoxic dermally, with a dermal LD50 of 20,000 mg/kg in rabbits [6,15]. The 4-hour inhalation LC50 for metribuzin in rats is greater than 0.65 mg/L, indicating moderate toxicity via the inhalation route [15]. Metribuzin has been shown not to irritate the skin or eyes of rats, rabbits, guinea pigs, or human volunteers [15,32]. Effects of high acute exposure in metribuzin poisoned rats included narcosis (stupor) and labored breathing. Deaths occurred within 24 hours, and survivors recovered slowly without permanent effects [33].
- **Chronic toxicity:** No ill effects were observed in dogs fed dietary doses of 12.5 mg/kg/day for 3 months [33]. No effects were apparent in rats receiving 2.5 mg/kg/day over 3 months, but doses of 25 and 75 mg/kg/day caused enlarged livers and thyroid glands [33].

In 2-year feeding studies with rats and dogs, results showed no observable effects at doses of 5 mg/kg/day in rats and 2.5 mg/kg/day in dogs. Reduced weight gain, an increase in the number of deaths, blood chemistry changes, and liver and kidney damage were observed in a 2-year study in which dogs were given 1500 ppm or 37.5 mg/kg/day of metribuzin [34].

- **Reproductive effects:** Doses of 15, 45, or 135 mg/kg/day of technical metribuzin were administered by gavage to rabbits on days 6 through 18 of pregnancy. No effects on the mothers were observed at a dose of 45 mg/kg, but 135 mg/kg lowered maternal weight gain [35]. No effects on the fetuses were observed at any of the doses tested [35]. A three-generation study in rats at doses of up to 15 mg/kg/day (the highest dose tested), showed no influence on reproduction [32,36]. Metribuzin does not cause reproductive effects.
- **Teratogenic effects:** In rats, reduced fetal body weights were seen at doses of 70 mg/kg/day, and developmental delays were observed at doses of 200 mg/kg/day [15]. Metribuzin did not show teratogenic activity in rabbits at doses of up to 85 mg/kg/day, but did decrease weight gain in offspring [15]. These data suggest that metribuzin is unlikely to cause teratogenic effects in humans under normal circumstances.
- **Mutagenic effects:** Tests on live animals and on tissue cultures have shown that metribuzin has no mutagenic activity [15,32].
- **Carcinogenic effects:** There were no indications of carcinogenic effects in rats receiving dietary doses of up to 15 mg/kg/day for 2 years, nor in mice fed up to about 380 mg/kg/day for 2 years [32]. These data suggest that metribuzin is not carcinogenic.
- **Organ toxicity:** In single high dose studies, metribuzin appears to depress the central nervous system. Other studies indicate that the target organs of metribuzin are the thyroid gland and the liver.
- **Fate in humans and animals:** After metribuzin is absorbed, it is rapidly distributed in the body and excreted unchanged in the urine [6]. In mammals, 90% elimination occurs within 96 hours, about equally distributed between the urine and feces [6].

ECOLOGICAL EFFECTS

- **Effects on birds:** Data indicate that metribuzin is moderately to slightly toxic to birds. The acute oral LD50 values are about 100 to 200 mg/kg in bobwhite quail, mallard ducks, and Japanese quail [6,15]. The reported 5- to 8-day dietary LC50 values for these species are all greater than 4000 ppm [6,15].
- **Effects on aquatic organisms:** Metribuzin is slightly toxic to fish. The 96-hour LC50 is 64 to 76 mg/L in rainbow trout, 80 mg/L in bluegill sunfish, and greater than 10 mg/L in goldfish [6,15]. The reported 48-hour LC50 in *Daphnia magna* is 4.5 mg/L, indicating similar toxicity [15]. The 96-hour LC50 in marine/estuarine shrimp is 48.3 mg/L [34].
- **Effects on other organisms:** It is nontoxic to bees [6]. Metribuzin may be phytotoxic to non-target plant species [6,15].

ENVIRONMENTAL FATE

- **Breakdown in soil and groundwater:** Metribuzin is of moderate persistence in the soil environment [20]. The half-life of metribuzin varies according to soil type and climatic conditions. Soil half-lives of 30 to 120 days have been reported; a representative value may be approximately 60 days [20]. Metribuzin is poorly bound to most soils and soluble in water, giving it a potential for leaching in many soil types [20]. Soil mobility is affected by many site-specific variables, including the amount of soil organic matter, particle size distribution, porosity, rainfall, and application rates. Metribuzin has been detected in Ohio rivers and Iowa wells and groundwater [35,34]. The major mechanism by which metribuzin is lost from soil is microbial degradation. Losses due to volatilization or photodegradation are not significant under field conditions [3,6].
- **Breakdown in water:** The half-life of metribuzin in pond water is approximately 7 days [6]. If present, metribuzin would most likely be found in the water column rather than the sediment, due to its low binding affinity and high water solubility.
- **Breakdown in vegetation:** Metribuzin is absorbed through the leaves when plants are given surface treatment, but the primary route for uptake is through the root system. From the roots, it is translocated upward, becoming concentrated in the roots, stems, and leaves of treated plants. In non-susceptible plants it is deaminized to

more water-soluble conjugates; in susceptible plants it is not metabolized and disrupts photosynthesis in the chloroplast [15].

PHYSICAL PROPERTIES

- **Appearance:** Metribuzin is a white, crystalline solid with a slightly sharp, sulfurous odor [6].
- **Chemical Name:** 4-amino-6-tert-butyl-4,5-dihydro-3-methylthio-1,2,4-triazin-5-one [6]
- **CAS Number:** 21087-64-9
- **Molecular Weight:** 214.29
- **Water Solubility:** 1050 mg/L [6]
- **Solubility in Other Solvents:** s. in aromatic and chlorinated hydrocarbon solvents, including dimethyl formamide, cyclohexane, methanol, benzene, ethanol, xylene, and kerosene [6]
- **Melting Point:** 125-126.5 C [6]
- **Vapor Pressure:** 0.058 mPa @ 20 C [6]
- **Partition Coefficient:** 1.6021 [6]
- **Adsorption Coefficient:** 60 (estimated) [20]

EXPOSURE GUIDELINES

- **ADI:** Not Available
- **MCL:** Not Available
- **RfD:** 0.025 mg/kg/day [26]
- **PEL:** Not Available
- **HA:** 0.2 mg/L (lifetime) [35]
- **TLV:** 5 mg/m³ (8-hour) [36]



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