

85678-9

07-20-2011

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

OFFICE OF CHEMICAL SAFETY  
AND POLLUTION PREVENTION

Redeagle International LLC  
c/o Catherine M. Byrd  
Wagner Regulatory Associates  
P.O. Box 640  
7217 Lancaster Pike, Suite A  
Hockessin, DE 19707

JUL 20 2011

Subject: Labeling Amendment  
Ethephon 2  
EPA Registration No. 85678-9  
Decision No. 450473  
Submission Date: May 6, 2011

Dear Ms Byrd:

The labeling referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended to add turfgrass (tee boxes, greens, fairways, roughs, and commercial turf), mistletoe, and ornamental trees is acceptable provided you make the following changes:

1. Pg 33 and 34 – The “\*\*\*” explanation referring to “Commercial Turfgrasses\*\*\*” should be changed from “Commercial turfgrasses include lawns and landscape areas... and sod farms. Not for residential use.” to simply state “Do not use for residential turf use.”

Submit one copy of your final printed labeling before you release the product for shipment. A copy of the labeling stamped “Accepted with Comments” is enclosed for your records. If you have any questions, please contact Dominic Schuler at (703) 347-0260 or via email at [schuler.dominic@epa.gov](mailto:schuler.dominic@epa.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Tony Kish".

(for)

Tony Kish  
Product Manager (22)  
Fungicides Branch  
Registration Division (7504P)

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# ETHEPHON 2

FOR COMMERCIAL USE OR AGRICULTURAL USE ONLY  
NOT INTENDED FOR RESIDENTIAL USE

For use on Apples, Blackberries, Blueberries, Cantaloupes, Cherries, Grapes, Peppers, Pineapple, Sugarcane, Tobacco, Tomatoes, Walnuts; for reducing lodging in Barley and Wheat.

For the removal of Dwarf Mistletoe in Ornamental Conifers and Leafy Mistletoe in Ornamental Deciduous Trees; for the elimination of undesirable fruit on Apple, Crabapple, Carob, and Olive trees; and for retarding the growth of Turfgrasses.

**ACTIVE INGREDIENT:**

Ethephon (2-chloroethyl) phosphonic acid\* ..... 21.7%

**OTHER INGREDIENTS:** ..... 78.3%

**TOTAL** ..... 100.0%

\*Contains 2 pounds ethephon per gallon

EPA Reg. No. 85678-9

EPA Est No. 69352-CHN-001

**KEEP OUT OF REACH OF CHILDREN**

**DANGER PELIGRO**

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand this label, find someone to explain it to you in detail.)

Refer to booklet for additional precautionary, handling and use statements.

NET CONTENTS: 2.5 gallons (9.46L)

Manufactured for:  
RedEagle International LLC  
1925 E. Edgewood Drive  
Lakeland, Florida 33803

ACCEPTED  
with COMMENTS  
In EPA Letter Dated

JUL 20 2011  
Under the Federal Insecticide,  
Fungicide, and Rodenticide Act  
as amended, for the pesticide  
registered under EPA Reg. No.

85678-9

<b>FIRST AID</b>	
<b>IF IN EYES:</b>	<ul style="list-style-type: none"> <li>• Hold eye open and rinse slowly and gently with water for 15-20 minutes.</li> <li>• Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
<b>IF ON SKIN OR CLOTHING:</b>	<ul style="list-style-type: none"> <li>• Take off contaminated clothing.</li> <li>• Rinse skin immediately with plenty of water for 15-20 minutes.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
<b>IF SWALLOWED:</b>	<ul style="list-style-type: none"> <li>• Immediately call a poison control center or doctor for treatment advice.</li> <li>• Do not induce vomiting unless told to do so by a poison control center or doctor.</li> <li>• Have person sip a glass of water if able to swallow.</li> <li>• Do not give anything by mouth to an unconscious person.</li> </ul>
<b>IF INHALED:</b>	<ul style="list-style-type: none"> <li>• Move person to fresh air.</li> <li>• If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible.</li> <li>• Call a poison control center or doctor for further treatment advice.</li> </ul>
<p>Have the product container or label with you when calling a poison control center or doctor or going for treatment.            You may also contact:  <b>EMERGENCY NUMBERS:</b> (800) 424-9300 CHEMTREC (transportation and spills)            (800) 222-1222 Poison Control Center (human health)            (800) 345-4735 ASPCA (animal health)</p>	
<p><b>NOTE TO PHYSICIAN:</b> Probable mucosal damage may contraindicate the use of gastric lavage. No specific antidote is available. All treatments should be based on observed signs and symptoms of distress in the patient overexposure to materials other than this product may have occurred. Victims of severe overexposure by inhalation should be kept under medical observation for up to 72 hours for delayed onset of pulmonary edema. In a victim of overexposure by ingestion, careful gastric lavage is required due to the possibility of stomach or esophageal perforation. This material is an acid, but the use of alkaline substances to neutralize it is contraindicated.</p>	

**DANGER****HAZARDS TO HUMANS AND DOMESTIC ANIMALS**

**Corrosive:** Causes irreversible eye damage. Wear safety goggles when handling. Harmful if swallowed or absorbed through skin. Do not get in eyes or on clothing. Avoid contact with skin. Do not inhale vapors, as this product will irritate mucous membranes.

**PERSONAL PROTECTIVE EQUIPMENT (PPE)****Applicators and other handlers must wear:**

- Coveralls over short-sleeved shirts and short pants OR long-sleeved shirts and long pants.
- Chemical-resistant gloves made of any waterproof material such as nitrile, butyl, neoprene and/or barrier laminate.
- Chemical-resistant footwear plus socks.
- Protective eyewear such as, goggles, face shield, or safety glasses.
- Chemical-resistant headgear for overhead exposure.
- Chemical-resistant apron when mixing, loading or cleaning equipment.

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them. Follow manufacturer's instructions for cleaning and maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

**USER SAFETY RECOMMENDATIONS****Users should:**

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Wash contaminated clothing before reuse.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

**ENVIRONMENTAL HAZARDS**

Do not contaminate water used for irrigation or domestic purposes. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

Avoid spray drift to nearby crops as this product will cause modifications in plant growth. Plant injury or reduced yields may result.

Do not plant another crop within 30 days after treatment

### SPRAY DRIFT

Avoid spray drift. Do not apply when weather conditions may cause drift. Do not allow this product to drift on to non-target areas. Drift may result in illegal residues or injury to adjacent crops and vegetation, in the form of leaf yellowing and defoliation. To avoid spray drift, do not apply aerially when wind speed is greater than 10 mph or during periods of temperature inversions. Use of larger droplet size will also reduce spray drift.

### 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 is responsible for considering all these factors when making decisions.

The following drift management requirements must be followed to avoid off-target 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  $\frac{3}{4}$  the length of the wingspan or rotor.
2. Nozzles must always point backward parallel with air stream and never be pointed downwards more than 45 degrees.

Where states have more stringent regulations, they should be observed.

The applicator should be familiar with and take into account the information covered in the Aerial Drift Reduction Advisory below:

### AERIAL DRIFT REDUCTION ADVISORY

This section is advisory in nature and does not supersede the mandatory label requirements.

#### 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 flow rate 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.

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### **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 target 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 should 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 -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**

The pesticide 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).

**DIRECTIONS FOR USE**

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulations. Read the entire label before using this product.

Do not apply *Ethephon 2* through any type of irrigation system.

Do not use this product for purposes other than those listed on the label.

Do not exceed the rate of *Ethephon 2* per acre per year recommended on this label.

**AGRICULTURAL USE REQUIREMENTS**

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), notification to workers, and restricted-entry intervals. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

**Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 48 hours.** The REI is 72 hours in areas where average rainfall is less than 25 inches per year.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated such as plants, soil or water is coveralls over short-sleeved shirts and short pants or long-sleeved shirts and long pants, chemical-resistant gloves made of any waterproof material such as nitrile, butyl, neoprene and/or barrier laminate, chemical-resistant footwear plus socks, and protective eyewear such as goggles, face shield, or safety glasses. For overhead exposure, chemical-resistant headgear is also required. When mixing, loading, or cleaning equipment, a chemical-resistant apron is required.

Notify workers of the application by warning them orally and by posting warning signs at entrance to treated areas.

**INFORMATION**

*Ethephon 2* promotes earlier fruit coloration and maturation when used on APPLES, BLACKBERRIES, BLUEBERRIES, CANTALOUPEs, CHERRIES, GRAPES, PEPPERS, PINEAPPLE, SUGARCANE, TOBACCO and TOMATOES. It also aids in barrenberry control on BLUEBERRIES. *Ethephon 2* loosens APPLES, BLACKBERRIES, CHERRIES and WALNUTS for earlier, more efficient harvest. When applied as directed to CANTALOUPEs, it also promotes fruit abscission (slipping). *Ethephon 2* increases dormant fruit bud hardiness and delayed spring bloom of SWEET CHERRIES in the Pacific Northwest. *Ethephon 2* reduces lodging in WHEAT and BARLEY.

For local recommendations on rates, spray volumes (gallons of water per acre), and spray equipment under varying temperature and rainfall conditions consult your Extension Pomologist, Horticultural

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When an adjuvant is to be used with this product, RedEagle suggests the use of a Chemical Producers Distributors Association certified adjuvant.

### APPLICATION VOLUMES AND SPRAY COVERAGE

Thorough spray coverage is essential to achieve maximum product effectiveness. Spray coverage is affected by choice of equipment, nozzle selection and spray boom setup as well as spray pressure, plant size and canopy density. For both air and ground applications, it is important to choose an equipment setup that will assure thorough coverage of plant canopy (foliage and fruit). The actual spray volume required will vary with the size and density of the plant canopy and the equipment used. In California and Arizona use a volume of no less than 5 gallons per acre for aerial applications.

### USE PRECAUTIONS

DO NOT MIX *ETHEPHON 2* WITH AMMONIUM THIOSULFATE. SUCH TANK MIXTURES MAY RESULT IN FORMATION OF TOXIC FUMES.

Mix only the amount of spray you expect to use each day. Do not allow mixed solution to stand overnight.

Observe the most restrictive of the labeling limitations and precautions of all products used in mixtures.

Avoid spray drift to nearby crops as this product will cause modification in plant growth. Plant injury or reduced yields will result. Do not plant another crop within 30 days after treatment

Do not use *Ethephon 2* with additives other than recommended on this label.

Avoid spills of concentrated product on spray equipment or airplane parts.

IMMEDIATELY RINSE ANY SPILLS WITH PLENTY OF WATER AS *ETHEPHON 2* IS CORROSIVE.

### EQUIPMENT CLEANING

Because of the acidic nature of this product, prolonged exposure to spray deposits will damage acrylic plastics, certain paints, and metals. Rinse thoroughly all exposed acrylic-plastic materials and painted surfaces with a detergent and water within one hour after exposure to spray deposits.



**CROP USE INSTRUCTIONS****APPLES**

*Ethephon 2* promotes fruit maturity and loosens apples, making harvest by hand or machine easier and more efficient. *Ethephon 2* applied in combination with FRUITONE® N to control pre-harvest drop stimulates early development of red color and ripening without loosening fruit. When applied to young trees (less than two years old), *Ethephon 2* will suppress vegetative growth and promote flower bud formation.

For best results, apply a thorough uniform spray. Use sufficient water for thorough uniform spray coverage, based on type of sprayer and size of trees. A wetting agent may improve spray coverage.

**Precautions:**

- Use of *Ethephon 2* can result in over thinning and reduced fruit size, especially on young trees just starting to bear.
- Environmental factors can affect thinning and return bloom. It is advisable to obtain experience under your conditions by initially testing only a small percent of your trees each year with any one program.
- Treat only vigorous trees since excessive growth reduction will result in weak trees.
- Avoid double coverage.
- Fruit size reduction may occur when used to obtain early maturity, especially if fruit is small at time of treatment
- If applied earlier than 3 weeks before normal anticipated harvest may result in reduced fruit quality and size.

**APPLES**

Crop & Desired Effect	Rate Pints/Acre	Specific Directions	Remarks
Promoting Fruit Loosening; 1. Early and mid-season maturing varieties (i.e., maturing with McIntosh or earlier)	2.5	Apply a dilute foliar spray of <i>Ethephon 2</i> at 7 to 14 days before normal anticipated harvest. Monitor fruit maturation daily, since treated fruit will mature sooner than untreated fruit.	Treat when air temperatures are between 60°F and 90°F. However, application may be made at 50°F under rising temperature conditions. If daytime temperatures are warm, color response from <i>Ethephon 2</i> treatment will be reduced, but ripening and loosening effects will be accelerated. Cool weather may extend the interval between treatment and harvest. Do not allow fruit to become overripe on trees. Fruit intended for fresh market must be checked for quality and maturity, since fruit color alone is not an accurate indicator of fruit maturity. Use a pressure gauge or other suitable methods to determine maturity. When stored, overmatured fruit may soften sooner than untreated fruit.
2. Late Maturing Varieties in the Eastern United States (i.e., maturing later than McIntosh)	5.0		
Promoting Uniform Opening and Coloring of red Varieties Without Fruit Loosening; 1. Early and mid-season maturing varieties (i.e., maturing with McIntosh or earlier)	1.0-4.0	Apply a dilute foliar spray of <i>Ethephon 2</i> and a pre-harvest drop control chemical registered for use on apples such as the product FRUITONE® N. Use the preharvest drop control product according to label directions. Begin spraying 2 to 3 weeks before normal harvest period and about 1 to 2 weeks before desired harvest date. Use the lower rate for apples intended for storage.	Do not apply <i>Ethephon 2</i> to more acreage than can be harvested in 1 to 2 days. Treated fruit can be satisfactorily held in cold air storage provided fruit is in good condition.

## APPLES (continued)

Crop & Desired Effect	Rate Pints/Acre	Specific Directions	Remarks
2. Late Maturing Varieties (i.e., maturing later than McIntosh)	2.0-4.0	Monitor fruit maturation daily, since treated fruit will mature sooner than untreated fruit.	Since recommendations for chemical control of pre-harvest drop vary according to location and variety, follow directions on the FRUITONE® N label. In addition, you may consult your local extension Pomologist or Horticulturist for his recommendations.
<p>Thinning and Return Bloom</p> <p>(1) Most Varieties</p> <p>(2) Difficult to Thin Varieties Such as Golden Delicious</p>	<p>(1) 1.5-4.0</p> <p>(2) 3.0-6.0</p>	<p>Treat with <i>Ethephon 2</i> at 10 to 20 days after full bloom. For greater thinning, apply <i>Ethephon 2</i> in combination with AMID-THIN® W or with a Carbaryl-containing insecticide registered for use on apples at 7 to 21 days after full bloom. Use tank mix partners in accordance with their respective directions for use, limitations and precautions. Do not tank mix <i>Ethephon 2</i> with any product prohibiting such mixing. Consult local extension recommendations. Addition of a non-ionic surfactant can enhance treatment performance. Buffering spray solution to a pH 3-5 can improve performance where water is alkaline. Use a spray volume sufficient to cover trees thoroughly and uniformly.</p>	<p>Whenever a high percent of the spurs and lateral buds bloom in a single season, severe alternate bearing can develop the following year.</p> <p>To overcome this problem, use <i>Ethephon 2</i> or a combination of <i>Ethephon 2</i> plus AMID-THIN® W or a Carbaryl-containing insecticide, depending on the amount of thinning required and the biennial bearing history of your orchard.</p> <p>Expect Red Delicious to show a reduction of "typiness" and fruit size, particularly on trees under stress.</p> <p>Use of higher label rates may reduce fruit size.</p>

(continued on next page)

**APPLES (continued)**12  
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Crop & Desired Effect	Rate Pints/Acre	Specific Directions	Remarks
Increasing Flower Bud Development		Treat 2 to 4 weeks after full bloom.	<i>Ethephon 2</i> should reduce vegetative growth and increase flowering the following spring. Trees should be large enough to support a crop of apples before treatment to initiate flower buds.
(1) Non-bearing Trees	(1) 2.0-8.0	Use the higher rate on more vigorous trees. Spray trees thoroughly and uniformly to the point of runoff.	
(2) Bearing Trees	(2) 0.5-3.0	To minimize fruit thinning, reduced fruit size and yield reduction in the year of usage, delay application to bearing trees until 6 weeks after full bloom and after June drop.	

**USE LIMITATIONS**

- Do not harvest treated apples sooner than 7 days after last application.
- Do not graze or feed cover crops grown in treated apple orchards.
- Do not apply more than 8.0 pints of *Ethephon 2* per acre per year.

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(For Use Only in Oregon and Washington)

*Ethephon 2* will concentrate maturity and loosen fruit, thereby improving harvest efficiency while reducing cane injury from mechanical harvest.

Crop Situation	Rate Pints/Acre	Specific Directions	Remarks
Promoting Fruit Loosening and Uniform Ripening (Cultivars - Chehalem Thomless and Evergreen)	5.0-8.0	To loosen fruit and concentrate maturity, apply a foliar spray of <i>Ethephon 2</i> at least 3 days before expected harvest when air temperatures are between 60°F and 90°F and rain is not predicted within 24 hours. Use sufficient volume to insure thorough and uniform wetting of foliage and fruit.	Use <i>Ethephon 2</i> either 1) early in the harvest season to reduce the number of pickings or 2) later in the harvest season for a onceover final picking. Do not treat more acreage than can be harvested on the third day following treatment as considerable fruit may drop.

**USE LIMITATIONS**

- Do not use on damaged or diseased plants. Use only at recommended times and rates on healthy, vigorous plants, as a reduction in berry size may occur.
- Do not harvest treated blackberries sooner than 3 days after last application.
- Do not apply more than 8.0 pints of *Ethephon 2* per acre per year.

**BLUEBERRIES**

(Except in California)

*Ethephon 2* concentrates maturity of blueberries for easier and more efficient harvest *Ethephon 2* will abort black barrenberry (*Aronia me/anocarpaj* flowers and/or fruit) growing in Maine lowbush blueberry fields, thereby reducing the number of undesirable barrenberry fruit harvested with blueberries.

**Precautions:**

- Applications to cultivars other than those listed above may cause excessive steminess and/or premature crops.

Desired Effect	Rate Pints/Acre	Specific Directions	Remarks
Concentrating Maturity and Earlier Fruit Coloring (Cultivars - Bluecrop, Weymouth, Jersey, Rancocas, Rubel, Bluetta, Erliblue, Wolcott, Croatan, Murphy, Angola, Morrow, Garden Blue, Trifblue and NC901)	4.0-8.0	To concentrate first harvest, apply a foliar spray of <i>Ethephon 2</i> when 15% to 20% of the berries are blue. To concentrate final harvest, treat after the first or second picking. Apply <i>Ethephon 2</i> in 150-200 gallons per acre. Use the higher spray volume and rate on large dense foliage bushes or when temperatures are cool. Treat when air temperatures are 60°F to 90°F. Thorough uniform spray coverage of foliage and fruit is essential for maximum fruit maturation and coloration. To aid uniform wetting of plants, use a wetting agent such as Triton B-1956 at 0.5 pint per 100 gallons or X-77 at 2.0 pints per 100 gallons.	Harvest blueberries at proper maturity when colored, generally one to two weeks after treatment. Observe fruit daily as the proper picking period for optimum internal and external quality is shorter with <i>Ethephon 2</i> treated fruit than with untreated fruit. High temperatures (90°F) accelerate fruit ripening. <i>Ethephon 2</i> treatments may increase fruit with stems, slightly decrease fruit size, soluble solids and acidity. <i>Ethephon 2</i> may not induce internal ripening as rapidly as fruit color.
Control of Black Barrenberry in Lowbush Blueberries in Maine	4.0-8.0	Apply <i>Ethephon 2</i> in approximately 100-200 gallons per acre for ground sprayers and approximately 10 gallons per acre for aerial application. Thorough uniform spray coverage is essential. To aid in uniform wetting of plants, use a wetting agent such as X-77 at 0.1% of the spray volume.	Use the lower rates of <i>Ethephon 2</i> when black barrenberries are between 90% to 100% petal fall and use the higher rates of <i>Ethephon 2</i> when black barrenberry fruit is 1/8 to 3/16 inch in diameter. This is generally 7 to 10 days after blueberries are in the same stages of development. Harvest blueberry fruit when ripe, generally 6 to 8 weeks after application.

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**USE LIMITATIONS**

- Not for use in California.
- Do not make more than one application per season.
- Do not make a second application for blueberry concentration of maturity or coloring if used for barrenberry control in Maine.
- Do not treat blueberry plants under drought stress or excessively high temperatures as defoliation and reduced yield may result.
- Do not apply more than 8 pints of *Ethephon 2* per acre per year.

**CANTALOUPE**

(For Use Only in Arizona, California and Texas)

*Ethephon 2* promotes abscission (slipping) of fruit allowing more efficient and economical harvesting.**Precautions:**

- Some yellowing or rapid aging of vines will be seen following treatment.
- *Ethephon 2* promotes abscission of immature fruit as well as marketable fruit.

Desired Effect	Rate Pints/Acre	Specific Directions	Remarks
Promoting Fruit Abscission	3.0	Apply <i>Ethephon 2</i> as a foliar spray when fruit has developed marketable levels of soluble solids and flesh color. Using <i>Ethephon 2</i> too soon will result in poorly colored fruit with substandard soluble solids. For adequate spray coverage, use at least 40 gallons/acre for ground and at least 10 gallons/acre for aerial application. (Aerial applications are only permitted in Texas.) Be prepared to harvest abscised fruit 2 to 5 days after treatment. The exact pre-harvest interval will vary with temperature. Be sure to coordinate your harvesting schedule with your packer/shipper.	The effect will be faster at higher temperatures. Proper timing of <i>Ethephon 2</i> treatment is critical, but may vary from season to season. Fruit quality, in terms of soluble solids and flesh color, does not improve following treatment. Therefore, <i>Ethephon 2</i> should not be used until after fruit has developed marketable levels of soluble solids and flesh color. Observe treated fields frequently and pick fruit when market quality is reached. Fruit allowed to remain in the field too long will lose quality. Plants with low vigor will not respond properly.

**USE LIMITATIONS**

- Do not apply *Ethephon 2* when night temperatures are below 60°F.
- Do not treat fields where soluble solids are running less than 10%. Treat only those fruit that have a fairly uniform fruit set, have vines in good condition, and have fruit with marketable soluble solids and internal flesh color.
- Do not harvest treated cantaloupes sooner than 2 days after last application.
- Do not apply more than 3.0 pints of *Ethephon 2* per acre per year.
- Do not plant another crop within 30 days after treatment

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(Except in California)

*Ethephon 2* loosens fruit and promotes early uniform ripening, which reduces the shaker force needed for mechanical fruit harvest. These effects improve harvest efficiency, recoverable yields, maintain fruit quality and reduce tree injury. A fall application of *Ethephon 2* to sweet cherries in the Pacific Northwest will increase dormant bud hardiness and delay bloom the following spring.

**Precautions:**

- Uniform coverage is important. Overdosing from overlapping swaths or spray nozzle patterns or erratic application can result in gummosis and tip dieback.
- Some early leaf yellowing and drop may be noted following application.
- Some gummosis of cherry trees is associated with *Ethephon 2* treatment.
- High temperatures during and after application may cause severe gummosis.
- If possible, irrigate orchards to prevent drought stress resulting in gummosis.

Crop & Desired Effect	Rate Pints/Acre	Specific Directions	Remarks
TART CHERRIES -Promoting Fruit Loosening and Uniform Ripening	Dilute Spray 1.0	Apply a dilute spray with sufficient water for thorough, uniform coverage. The optimum spray volume will depend on tree size, planting density and equipment used.	At the time of application, all fruit including those inside the tree canopy should be in stage 3 as indicated by rapid size increase and the presence of ground color (change from bright green to yellow background color). Expect a longer treatment to harvest interval with lower rates.
	Concentrate Spray 0.66-1.0	Concentrate sprays, generally less than 100 gallons per acre, require uniform coverage for optimum response.	

Crop & Desired Effect	Rate Pints/Acre	Specific Directions	Remarks
SWEET CHERRIES (varieties such as Windsor, Napoleon-Royal Anne, Emperor Francis) - Promoting Fruit Loosening and Uniform Ripening	Dilute Spray 3.0-4.0	Apply a dilute spray with sufficient water for thorough uniform coverage. Actual volume will depend on the type of delivery, sprayer used and size of trees. Use low rates on the light or yellow-colored varieties.	Some gummosis of cherry trees is associated with <i>Ethephon 2</i> treatment.  If possible, irrigate orchards to prevent drought stress resulting in gummosis.
	Concentrate Spray 2.0-3.0	Concentrate sprays, generally less than 100 gallons per acre, require uniform coverage for optimum response.	
SWEET CHERRIES in the Pacific Northwest — Increasing Dormant Fruit Bud Hardiness and Delaying Spring Bloom	3.0	Treat in first two weeks of September.	A fall application of <i>Ethephon 2</i> will increase fruit bud hardiness by decreasing the chance for winter injury and delaying bloom by 3 to 5 days which may help avoid frost injury. Treatment of early flowering varieties may delay bloom to better coincide with pollination from other varieties.  Some gummosis of cherry trees is associated with <i>Ethephon 2</i> treatment.  If possible, irrigate orchards to prevent drought stress resulting in gummosis.

## USE LIMITATIONS

- Not for use in California.
- Do not treat too early (more than 14 days before anticipated harvest) as this can cause early fruit drop with stems attached.
- Do not treat trees that had severe gummosis the previous year as tree damage will result.
- Do not apply to trees that are of low vigor or have experienced severe stress (such as winter injury, drought, or disease), since gummosis will be excessive, particularly when high temperatures and/or drought follow treatment.
- Do not treat when air temperatures exceed 85°F. Treat when air temperatures are between 60°F and 85°F.
- Do not harvest treated cherries sooner than 7 days after last application.
- Do not apply more than 4.0 pints of *Ethephon 2* per acre per year.

**GRAPES**

(For Use Only in California and Arizona)

**TABLE GRAPES:** *Ethephon 2* promotes early uniform color development on table grape varieties such as Cardinal, Emperor, Flame seedless, Red Malaga, Queen and Tokay, thereby allowing more efficient harvests of quality fruit.

**Precautions:**

- Rates higher than 1 pint/A may increase the incidence of cracked fruit and should be used only in areas or during weather conditions where grapes have been especially hard-to-color in past seasons.
- *Ethephon 2* treatment of certain varieties may cause some berry softening, which may limit or influence storage considerations.
- **GRAPES FOR RAISIN PRODUCTION:** *Ethephon 2* will hasten maturity of Thompson seedless grapes resulting in reduced acids, increased sugars and increased raisin quality.

Crop & Desired Effect	Rate Pints/Acre	Specific Directions	Remarks
TABLE GRAPES (varieties such as Cardinal, Flame Seedless, Red Malaga, and Queen}	0.5 - 2.0	Apply a foliar spray of <i>Ethephon 2</i> when 5% - 30% of berries show color. For high temperature conditions (above 85°F) use lower rates of 0.5 to 1.0 pint per acre. For low temperature conditions (but above 65°F), use higher rates. Apply in sufficient water to wet vines and fruit clusters uniformly, using conventional ground sprayers.	Harvest fruit at desired maturity and quality as indicated by sugar content, acidity and color. This is generally two weeks or more after treatment Monitor treated crop closely and harvest before berries become too dark. For more information regarding local experiences with this product on grapes, consult your Farm Advisor or Extension Viticulturist.
TOKAY GRAPES	1.0-2.0	Treat when 5% - 15% berries show color. Apply in sufficient water to wet vines and fruit clusters uniformly, using conventional ground sprayers.	

GRAPES FOR RAISIN PRODUCTION, (Thompson Seedless)	1.0-2.0	Apply a foliar spray at 5% berry softening. Treat when 5% - 30% of berries show color. Apply in sufficient water to wet vines and fruit clusters uniformly, using conventional ground sprayers.	<i>Ethephon 2</i> will hasten maturity of Thompson Seedless grapes resulting in reduced acids, increased sugars and increased raisin quality. For more information regarding local experience with this product on grapes consult your Farm Advisor or Extension Viticulturist.
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**USE LIMITATIONS:****Table Grapes**

- Do not store treated Tokays.
- Do not harvest treated grapes sooner than 14 days after last application.
- Do not apply more than 2.0 pints of *Ethephon 2* per acre per year.

**Raisin Production (Thompson Seedless)**

- Do not apply to grapes under stress from insect damage or moisture stress. Observe treated vineyards closely and harvest at proper maturity as determined by sugar acid levels.
- Do not harvest treated grapes sooner than 14 days after last application.
- Do not apply more than 2.0 pints of *Ethephon 2* per acre per year.

**PEPPERS**

*Ethephon 2* promotes early, uniform ripening and coloring for more efficient packing and handling of fruit.

Thorough coverage is essential. For ground or air application, choose equipment and spray volumes that will insure uniform coverage of foliage and fruit

**Precautions:**

- Some yellowing and general aging of leaves will be noted after treatment.
- Under certain conditions, tank mixtures of *Ethephon 2* with desiccants containing sodium chlorate could result in the formation of hypochlorous acids which on heating will emit toxic chloride fumes.

Desired Effect	Rate Pints/Acre	Specific Directions	Remarks
Promoting Earlier, Uniform Ripening and Coloring	1.25-4.0	Apply <i>Ethephon 2</i> as a foliar spray to bell peppers when 10% of fruit are red and chocolate and to chili and pimento pepper varieties when 10% to 30% of fruit are red and chocolate and there is sufficient mature green fruit to produce desired tonnage. <i>Ethephon 2</i> will not ripen immature, green fruit. Use the higher rate when cool temperatures are anticipated (less than 65°F), when plants are growing vigorously or when foliage is dense to assure thorough wetting of all leaves and fruit. Use the lower rates with lower spray volumes (1.25 to 2.0 pint rate in 20 gal/A) and higher rates with higher volumes (3.0-4.0 pints/40 gal/A). The 3.0-4.0 pint rate in less than 40 GPA may cause foliage burn under hot dry	Check several field locations to determine crop stage and degree of maturity. <i>Ethephon 2</i> treatments may reduce total yields if applied too early or there is a lack of uniform, mature, green fruit resulting from split fruit set or variable soil cultural practices. Harvest fruit after desired color and maturity, generally 14 or more days after treatment.

**USE LIMITATIONS**

- Do not apply when prolonged average high temperatures of 95°F after treatment are expected.
- Do not treat when temperatures exceed 100°F. Applications made under high temperatures will accentuate fruit ripening, yellowing of foliage, defoliation and immature fruit abscission.
- Do not treat when average temperatures are below 60°F. Low temperatures after treatment may reduce or negate the effects of *Ethephon 2*.
- Do not harvest treated peppers sooner than 5 days after last application.
- Do not apply more than 4.0 pints of *Ethephon 2* per acre per year.

**PINEAPPLE**22  
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*Ethephon 2* induces uniform flower initiation and stimulates uniform shell color of pineapple plants.

Desired Effect	Rate Pints/Acre	Specific Directions	Remarks
Flower Induction to Stimulate Uniform Initiation of Flowering	4.0 — 8.0	Apply a foliar spray of <i>Ethephon 2</i> when foliage is dry and plants are at "bearing age," approximately 12 months after planting, usually about 6 months before desired harvest Use higher rate when earlier harvest is desired.	Proper rate varies with local growing conditions, varieties, plantation management practices and the time of year.
Maturity Concentration to Stimulate Uniform Shell Color Development	2.0 — 8.0	Apply a broadcast spray and thoroughly cover both fruit and foliage when the first fruits begin to change color. Use higher rate during periods of cloudy or cool weather when normal ripening has slowed.	

**USE LIMITATIONS**

- Do not harvest treated pineapples sooner than 2 days after the last application.
- Do not graze treated pineapple forage.
- Do not apply more than 12 pints of *Ethephon 2* per acre per year.

**SUGARCANE**

(For Use Only in Hawaii)

*Ethephon 2* reduces or prevents flowering of sugarcane to increase biomass accumulation and recoverable sugars.

Desired Effect	Rate Pints/Acre	Specific Directions	Remarks
Flower Prevention and Increase in Biomass Accumulation and Recoverable Sugar Yield	2.0	Apply <i>Ethephon 2</i> just before flower initiation. Use helicopter or fixed-wing aircraft to apply a uniform foliar spray in at least 7 gallons of finished spray per acre.	Actual biomass increase is affected by the time between treatment and harvest. To determine optimum harvest date, consider anticipated recoverable sugars as well as biomass.

**USE LIMITATIONS**

- Do not harvest treated sugarcane sooner than 2 months after the last application.
- Do not graze treated sugarcane.
- Do not apply more than 2 pints of *Ethephon 2* per acre per year.

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38**TOBACCO**  
(Flue-Cured Only)

*Ethephon 2* promotes early, uniform "yellowing" of mature tobacco. *Ethephon 2* shortens curing time, allows more efficient use of curing barn space and increases control over harvest scheduling.

*Ethephon 2* may be applied as a directed spray to the bottom or middle portion of the tobacco plant or as an over-the-top spray.

*Ethephon 2* is most efficacious when applied to mature leaves; that is, not overly rank green leaves. *Ethephon 2* will not color immature leaves.

To determine leaf maturity for proper treatment timing, test spray several plants in more than one location in each field and observe the response. Mature leaves will begin to yellow in 24 to 72 hours. If test leaves fail to yellow within 72 hours, they are not mature and are not ready for *Ethephon 2* treatment. Wait a few days to permit further maturation, then make another test spray to assess leaf maturity.

To prepare a test spray, mix 4 teaspoonfuls of *Ethephon 2* in 1 quart of water. Apply about 1 ounce to each test plant covering all leaves with a fine mist.

To determine amount of crop to treat, first estimate the number of leaves per plant that will color, then use barn capacity to calculate the number of acres to treat.

To avoid quality loss and or possible leaf drop, harvest any already-yellowed leaves before application.

**When to Harvest:** Mature treated leaves will begin to color within 24 to 72 hours after *Ethephon 2* application. The yellowing process is weather dependent; cool weather will delay, while hot, sunny weather can speed up the process. To determine harvest timing and avoid quality loss or leaf drop, closely monitor treated crop and weather conditions.

Harvest treated tobacco when leaves have reached the desired color intensity. Harvest can begin within 48 hours after *Ethephon 2* application.

**Curing Treated Tobacco:** Curing procedures must be judged on the basis of tobacco condition, interval between treatment and harvest, weather and type of curing facility before prescription temperature and ventilation schedules can be established. To obtain maximum quality, care must be taken to closely observe and control the curing process, especially during the late "coloring" and early "drying" stages of the leaf.

*Ethephon 2* treated tobacco will have started the coloring process when harvested, which will reduce the time required for the leaf coloring phase of curing. Treated tobacco should be dried faster. If tobacco leaves are green or contain some green when harvested, it may be necessary to color them for a few hours. If the leaves are completely yellow, temperature and ventilation must be adjusted in a manner to dry the tobacco as fast as possible without scalding. Once the leaf is dried (3/4 dry), follow standard procedures for curing. Since *Ethephon 2* treated leaves cure faster, treated and untreated leaves should not be cured together in the same barn.



**TOBACCO (continued)**

Application Method	Rate Pints/Acre	Specific Directions
Directed Spray	4.0	Use drop nozzles with TG or OC spray tips designed to apply 50-60 GPA at 35-40 psi when tractor speed is 2-3 mph. Use 2 nozzles per row (one nozzle on each side of the row and positioned to direct the spray to the target leaves to be ripened for harvest Thorough spray coverage is essential. For directed sprays, harvest all leaves with 20% or more yellowing.
Over-the-Top Spray	4.0-8.0	Treat only when all leaves remaining on the plant are mature. To ensure remaining leaves are mature, test spray several tobacco plants as described under the section "Application Timing". Use the lower rate on a typically mature crop when experience indicates that minimum ripening inducement is required. Use the higher rate when the crop is heavy and has a tendency to be more rank. Use higher rates only during cool, slow ripening conditions when temperatures are below 65°F at the time of treatment Always test spray to determine if the tobacco is mature enough to respond to treatment with <i>Ethephon 2</i> Apply over-the-top spray as a fine mist at 40-60 psi, using three nozzles per row (one nozzle over the center of the plant and one on each side) to assure thorough coverage (e.g., similar to that for applications of systemic sucker control agents).

**USE LIMITATIONS**

- Do not apply *Ethephon 2* to immature tobacco leaves as this can result in unsatisfactory coloring, weight loss and reduced leaf quality.
- Do not allow the crop to over ripen in the field after using *Ethephon 2*, since this may cause some reduction in yield and quality.
- Do not apply higher rates when temperatures are above 65°F at the time of treatment
- Do not treat before anticipated major storm which could prevent harvest and result in crop loss.
- Do not apply *Ethephon 2* if rain is expected within 6 hours.
- Do not harvest treated tobacco sooner than 2 days after application.
- Do not apply more than 8.0 pints of *Ethephon 2* per acre per year.

**TOMATOES**

*Ethephon 2* accelerates tomato ripening when applied with thorough, uniform coverage of foliage and fruit. For ground or air application choose equipment and spray volumes that will assure adequate spray coverage. Overdosing from overlapping swaths or spray nozzle patterns can cause severe foliage injury. If application is banded over the row, reduce the amount of *Ethephon 2* in proportion to the area actually treated.

**TOMATOES (PROCESSED):** *Ethephon 2* accelerates and concentrates the ripening of mature green fruit, thereby increasing recoverable fruit yield from once-over harvest and allowing growers to schedule harvest and handling more effectively.

**Precautions:**

- Some yellowing and general aging of foliage may be observed following treatment

**TOMATOES (FRESH MARKET IN CALIFORNIA):** *Ethephon 2* accelerates tomato ripening and increases early yields of marketable ripe fruit.

**Precautions:**

- Some yellowing and general aging of foliage may be observed following treatment.

Crop & Situation	Rate Pints/Acre	Specific Directions	Remarks
PROCESS TOMATOES Early and Midseason Crops or Warm Conditions	1.25-3.25	<p>Apply as a foliar spray when 5% to 15% of the fruit in the field are red and pink (including breakers) and there is sufficient mature green fruit to produce the desired tonnage.</p> <p>Under high temperatures (above 85°F), rates as low as 1.25 pints/acre can be effective.</p> <p>Observe treated fields closely and harvest fruit at proper maturity.</p>	<p>Apply <i>Ethephon 2</i> when desired tonnage of fruit has reached marketable size and maturity. Monitor fields frequently for stage and degree of uniform maturity before application. Sample plants throughout the field to determine proper application timing. Sort, weigh and calculate the percent fruit which is red and pink, including breakers, to determine maturity stage. Fruit size alone is not an adequate indicator. Walk treated fields frequently to monitor crop condition. Maintain normal cultural practices between treatment and harvest. Timely harvest is essential for maximum return of high quality fruit. Consult processor representatives concerning delivery schedules and quotas prior to application of <i>Ethephon 2</i>.</p> <p>Consult your local Extension Horticultural Specialist or Farm Advisor for suggestions on the proper use of <i>Ethephon 2</i> when fields have variable plant vigor due to differences in soil conditions or cultural practices and for rates of fruit ripening as affected by temperature, within the rate and timing limitations shown on the label.</p>

**TOMATOES (continued)**

Crop & Situation	Rate Pints/Acre	Specific Directions	Remarks
PROCESS TOMATOES Late Season or Coastal Crops or Cool Conditions	3.25-6.5	Apply foliarly when 5% to 30% of fruit in the field are red and pink (including breakers) and there is sufficient mature green fruit to produce the desired tonnage. Maximum response is achieved when fruit to be treated is 5% to 15% pink and red. Use the higher rate of <i>Ethephon</i> 2 when nighttime temperatures are cool (below 65°F) or vegetative growth is dense.	Harvest at proper maturity. Temperatures above 90°F may cause fruit to ripen sooner whereas temperatures below 65°F retard natural color development and may extend the time between treatment and harvest.
FRESH MARKET TOMATOES California	1.25-5.0	Apply <i>Ethephon</i> 2 as a foliar spray when desired tonnage of fruit has attained marketable size and maturity, generally 3 to 6 days before desired harvest date. Expect only one harvest from treated areas. Use the higher rate and longer pre-harvest interval on late season crops, when temperatures are cool (generally below 85°F) and foliage is dense. Under high temperatures, rates as low as 1.25 pints per acre have been effective while reducing foliage damage particularly on more sensitive varieties - see above.	Monitor treated fruit frequently and harvest at desired maturity. When programming harvest, spray a different block each day and harvest blocks daily in the same sequence.

**USE LIMITATIONS**

- Do not apply before there is sufficient mature green fruit to produce the desired tonnage. *Ethephon* 2 will not ripen immature green fruit.
- Do not treat plants with poor root systems or that are stressed due to poor soil conditions, drought, or severe disease or insect damage. Treating weak plants will result in rapid defoliation and increase sunburn and sun scald potential, especially when temperatures are high.
- Do not treat when sustained temperatures above 105°F are anticipated.
- Do not treat sensitive varieties during period when temperatures exceed 100°F. Foliar damage is more severe on certain varieties such as VF10, VF315, VF145, 21-4, and 13L During periods of

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high temperatures use the lower rates on sensitive varieties.

- Do not tank mix with sun protection products, sun protection whiteners, spray adjuvants or other additives.
- Do not apply *Ethephon 2* to more acreage than can be harvested in 2 to 3 days.
- Do not apply *Ethephon 2* to varieties known to soften rapidly or shatter when ripe.
- Do not use on greenhouse tomatoes.
- Do not harvest treated tomatoes sooner than 3 days after last application.
- Do not apply more than 6.5 pints of *Ethephon 2* per acre per year.

**WALNUTS**

(For Use Only In California)

*Ethephon 2* will loosen walnuts for increased efficiency of mechanical harvest, promote earlier harvest, improve hull removal, and increase recoverable yields from an once-over harvest.

Thorough uniform coverage of walnut hulls is essential for maximum hull split and nut loosening response. Choose equipment for maximum spray penetration of the tree canopy. Use large air carrier sprayers where tree size jeopardizes coverage. Volute sprayer attachments may help.

## Precautions:

- Treatment prior to packing tissue brown (mature) stage may reduce nut quality.
- Some leaf drop is associated with treatment.
- Accurately measure dosage rates, since rates higher than recommended may result in tree injury (such as excessive defoliation, reduced catkin formation and twig dieback).

Desired Effect	Rate Pints/Acre	Specific Directions	Remarks
Promoting Earlier Harvest	3.0-5.0	<p>For best results, use a foliar spray with concentrations of 300 to 900 ppm. Refer to spray <i>Ethephon 2</i> preparation chart below.</p> <p>Under low temperatures and/or low humidity conditions use the higher label rates. Expect less time between application and harvest with higher label rates.</p> <p>For best results treat when air temperatures are between 60°F and 95°F. Expect reduced effectiveness if above 90°F with low humidity due to spray evaporation.</p> <p><u>Advancing Harvest:</u> Apply when 95%-100% of the nuts have reached maturity. Inspect frequently and harvest as soon as adequate hullability occurs generally 10-16 days after treatment depending on variety and weather conditions. Plan second shake 10-12 days after first shake.</p> <p><u>Once Over Harvest:</u> Apply to mature walnuts 10 days prior to expected harvest date. Expect actual harvest to range from 7-12 days after treatment.</p>	Walnuts are mature when the packing tissue between kernel halves completes browning. Collect nut samples from throughout the tree canopy when determining percent nut maturity.

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- Do not treat diseased, low vigor or moisture stressed trees as excessive leaf drop may occur.
- Do not harvest treated walnuts sooner than 5 days after last application.
- Do not apply more than 5 pints of *Ethephon 2* per acre per year.

Spray Preparation Chart

<i>Ethephon 2</i> Rate		Spray Volume (gallons/acre)				
Pints/A	Lbs/A	100	200	300	400	500
		Concentration of <i>Ethephon 2</i> (ppm)				
3.0	0.75	900	450	300	-	-
4.0	1.00	-	600	400	300	-
5.0	1.25	-	750	500	375	300

**WHEAT AND BARLEY**

(Except in California)

To reduce lodging of wheat and barley, apply *Ethephon 2* as a preventative measure when the flag leaf is just visible to the boot stage, but before awns have emerged or the sheath has split — Feekes Large Scale 8 to 10 or Zadok's Code 37 to 45, as described in the following table.

Do not allow spray to contact exposed heads as reduced yield and damage may result. Carefully inspect fields to determine that application is possible at the proper stage.

Allow 7 days after applying this product for lodging reduction activity to begin.

Growth Description	2nd Node Detectable	Flag Leaf Just Visible	Flag Leaf Ligule Visible	Boot Swollen	First Spikelet Visible	3/4 of Inflorescence Completed
Feekes— Large	7	8	9	10	10.1	10.4
Zadok's Code	32	37	39	45	50	57
Recommended Treatment Time	Too Early				Too Late	

**NON-IRRIGATED WHEAT AND BARLEY**

Do not apply *Ethephon 2* to non-irrigated wheat and barley in those states west of the Mississippi River.

**EXCEPTION:** West of the Cascade Range in Oregon and Washington.

*Ethephon 2* is recommended in the non-irrigated areas in those states east of the Mississippi River and west of the Cascade Range in Oregon and Washington.

**IRRIGATED WHEAT AND BARLEY**

Irrigation before treatment is recommended to avoid stress and may be resumed 24 hours after application. If conditions are dry and hot, continue irrigation through the grain head filling period.

Significant yield loss may result from moisture and heat stress during anthesis and grain fill. When using *Ethephon 2*, it is important to avoid plant stress during these growth periods to obtain optimum yield and quality.

**Precautions:**

- *Ethephon 2* is not effective on crops that have already lodged.
- Decreased yields or product quality may result if *Ethephon 2* is not properly used.
- Using *Ethephon 2* on non-lodging varieties may result in yield loss.
- Moisture, temperature, or disease stress at or after application of *Ethephon 2* can result in yield loss.
- Avoid spray overlap which may result in excess rate and yield loss.
- For *Ethephon 2* to be effective, observe temperature limitations at application as described below. Also, the temperature after application should be at least 60° F.
- *Ethephon 2* may affect disease infestation (septoria, rust, mildew, etc.). Use a fungicide control program where needed.
- Use of *Ethephon 2* may delay heading 1 to 2 days and delay harvest maturity 1 to 4 days. Extreme temperatures—below 35° F or above 85° F in non-irrigated crops, or 90° in irrigated crops—within 5 days after application may cause further delay in maturity.
- Use of *Ethephon 2* may increase secondary tillers in some spring barleys, especially under temperature or moisture stress.

**Ground Application:** Apply with at least of 7 gallons of water per acre when using conventional ground equipment. Flat fan nozzles are recommended. Use at least of 5 gallons of water per acre with controlled droplet application (CDA) or air foil type equipment. Adjust spray boom to plant canopy height and operate at a moderate speed to prevent uneven application.

**Aerial Application:** Use at least 3 gallons of water per acre.

**Tank Mixtures:** *Ethephon 2* can be tank mixed with approved cereal fungicides and insecticides if timing of fungicide or insecticide application coincides with *Ethephon 2* application timing. Do not apply tank mixtures of *Ethephon 2* to crops that are stressed by adverse weather conditions, low moisture, cold, heat or by disease or insect damage, since crop yield loss or injury may result. Tank mixtures of *Ethephon 2* plus a fungicide containing propiconazole applied by air under stress conditions may result in flag leaf burn and yield loss.

Do not mix *Ethephon 2* with herbicides or nitrogen solutions.

Do not add surfactants, adjuvants or wetting agents to *Ethephon 2*

**Treatment Decision Guide:** IMPORTANT—Just prior to application, inspect fields to determine the probability of lodging. Apply *Ethephon 2* only under the following conditions:

1. If the crop is expected to lodge and significant reduction of recoverable yield, grain quality, and/or harvest efficiency is expected.
2. If the crop is free of stress from insect damage or disease.
3. If soil irrigation or moisture is adequate to prevent crop stress after application.
4. If temperature fluctuations (below 35° F or above 85° F non-irrigated and 90° irrigated) are not expected for 5 days after application.
5. If application can be made at the correct stage — Feekes 8 to 10 (see growth stage chart).

**Use Rates:** Lodging pressure and environmental conditions will affect the rate of *Ethephon 2* as noted in the Table below.

Use only a 1 pint per acre rate on more responsive varieties. If more information is needed, consult with your state extension specialist

Expected Lodging Pressure/Rates (Pints/Acre)				
Situation	Moderate	Heavy	Severe	Comments*
Barley (Spring and Winter)	1.0	1.0-1.5	1.5-2	Some tall varieties having vigorous growth may require 2.0 pints per acre.
Winter Wheat	1.0	1.0-1.5	1.5-2	In severe lodging situations, these rates may not be sufficient to control lodging in some tall straw varieties such as "Agassiz" and "Roughrider."
Most Spring Wheats	1.0	1.0	1.5	In severe lodging situations, these rates may not be sufficient to control lodging in some tall durum wheats such as "Vic."
Sensitive or High Temperature Varieties**	1.0	1.0	1.0	

**RESTRICTIONS AND LIMITATIONS:**  
 \* Limit use of the 2 pint rate to those situations when lodging is expected to result in a high loss of yield potential, such as 1) An irrigated crop with unusually severe lodging pressure; 2) Very tall varieties that are prone to lodging; or 3) A cereal type such as durum that is known to be subject to severe lodging.  
 \*\* If daytime temperatures for the period of 5 days after application are expected to exceed 85° F in non-irrigated or 90° F in irrigated wheat or barley crops, DO NOT APPLY THIS PRODUCT.

**USE LIMITATIONS**

- Not for use in California.
- Do not apply this product through any type of irrigation system.
- Do not use this product on late-seeded crops in short season growing areas because possible maturity delay may cause harvest difficulties.
- Do not use *Ethephon 2* on Tyler Wheat or Azure Barley.
- Do not use *Ethephon 2* if rain is expected within 6 hours.
- Do not harvest wheat or barley within 40 days of the last application of *Ethephon 2*
- Do not exceed a total of 2.0 pints of *Ethephon 2* per acre per year.
- Do not allow livestock to forage or graze treated crops or fields OR cut for hay or silage. Mature straw harvested in normal conditions may be fed to animals.
- Do not plant another crop before 30 days after treatment.



### Turf and Ornamental Instructions

*Ethephon 2* is a plant growth regulator that may be used to suppress the formation of seedheads of various plants including *Poa annua* and white clover and also to suppress the growth of cool season grasses. *Ethephon 2* is foliarly absorbed and is most effective on actively growing healthy turf. For best results, apply in sufficient volume of water to provide uniform coverage. Use of a spreader/sticker with an application of *Ethephon 2* is not necessary. *Ethephon 2* is rainfast within 2 hours. Do not allow entry into treated area until *Ethephon 2* has dried. For maximum performance, delay mowing until the day after application.

### PRECAUTIONS AND RESTRICTIONS

Do not use this product for purposes other than those listed on the label.

Do not treat turfgrass with poor root systems or growing under stress due to poor soil conditions, drought, disease, or insect damage.

Do not use this product in areas where excessive thatch has accumulated.

Do not contaminate water used for irrigation or domestic purposes.

Do not apply this product through any type of irrigation system.

Avoid spray drift to nearby crops, as this product will cause modifications in plant growth. Plant injury may result.

Scalping may occur on creeping bentgrass cultivars after more than 2 application of this product for *Poa* seedhead suppression.

This product has been used successfully on many bentgrass cultivars. Tolerance testing should be done on new cultivars before extensive use.

Mix only the amount of spray you expect to use each day. Do not allow mixed solution to stand overnight.

Do not buffer spray solutions.

Test tank mixes with other products on a small area before using widely.

IMMEDIATELY RINSE ANY SPILLS WITH PLENTY OF WATER AS THIS PRODUCT IS CORROSIVE.

DO NOT MIX THIS PRODUCT WITH AMMONIUM THIOSULFATE. SUCH TANK MIXTURES MAY RESULT IN FORMATION OF TOXIC FUMES.

DO NOT EXCEED A MAXIMUM OF 30 OZ OF THIS PRODUCT PER 1,000 SQ FT PER YEAR.

### EQUIPMENT CLEANING

Because of the acidic nature of this product, prolonged exposure to spray deposits will damage acrylic plastics, certain paints, and metals. Rinse thoroughly all exposed acrylic-plastic materials and painted surfaces with a detergent and water within one hour after exposure to spray deposits.

### TURF

Seedhead Suppression: Foliar application of *Ethephon 2* will provide suppression of *Poa annua* and white clover seedheads. Make the initial application prior to the emergence of new seedheads. A period of 2-3 weeks after application is required for maximum performance. Repeat applications may be made to predominately *Poa annua* or white clover sites as needed, but not less than two weeks after the previous application.

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APPLICATION	SITES	RATE	SPRAY MIX VOLUME
<b>Poa annua and White Clover Seedhead Suppression</b>  <b>Reapplication Interval:</b> 2 weeks or greater for all labeled grasses	Golf course turf including Greens*, Tees*, Fairways, and Roughs Commercial Turfgrasses** including Bentgrass, Kentucky Bluegrass, Perennial Ryegrass, Tall and Fine Fescue, and Bermudagrass*	5 fl. oz./ 1000 ft. <sup>2</sup>	1.0-2.0 gal./ 1000 ft. <sup>2</sup>

\*Do not use in California on greens, tees, or Bermudagrass unless accompanied by supplemental labeling.

\*\* Commercial turfgrasses include lawns and landscape areas around institutional, public, commercial and industrial buildings, parks, recreational areas, athletic fields and sod farms. Not for residential use.

Tank Mixture with Products containing the active Ingredient Trinexapac-Ethyl: Tank mixtures of *Ethephon 2* at 5 oz./1000 sq. ft. and trinexapac-ethyl-containing products, at 0.125 or 0.25 oz./1000 sq. ft. can be used to promote seedhead suppression as well as turfgrass quality. Multiple applications of the tank mix combination may be needed. The number of applications must not exceed recommendations for rates or timings for either product applied once. Follow the recommendation on each product label for the most restrictive application interval for each turfgrass. Application of this tank mixture during frost periods may cause temporary turf discoloration.

Growth Suppression: An application of *Ethephon 2* slows the growth of turfgrasses, thus reducing the required frequency of mowing and the volume of clippings collected. For best turfgrass growth regulation, apply *Ethephon 2* when daytime air temperatures are 65°F and rising. *Ethephon 2* should only be applied once turfgrass mowing heights have been established for the season. Avoid multiple applications of *Ethephon 2* in areas where excessive thatch has accumulated.

APPLICATION	SITES	RATE	SPRAY MIX VOLUME
Turfgrass Growth Regulations Reapplication Intervals:  • Kentucky Bluegrass – 7 weeks • Perennial Ryegrass – 7 weeks • Tall/Fine Fescue – 4 weeks • Bentgrass – 4 weeks	Golf course turf including Greens*. Tees*, Fairways, and Roughs Commercial Turfgrasses** Including Bentgrass, Kentucky Bluegrass, Perennial Ryegrass, Tall and Fine Fescue	5 fl. OZ./ 1000 ft. <sup>2</sup>	1.0-2.0 gal./ 1000 ft. <sup>2</sup>

\*Do not use in California on greens or tees unless accompanied by supplemental labeling.

\*\* Commercial turfgrasses include lawns and landscape areas around institutional, public, commercial and industrial buildings, parks, recreational areas, athletic fields and sod farms. Not for residential use.

**NOTE:** Since *Ethephon 2* is an acidic product, prolonged exposure to spray deposits will damage acrylic plastics, certain paints and metals. Thoroughly rinse all exposed acrylic-plastic materials and painted surfaces with a detergent and water within one hour after exposure to spray deposits.

### MISTLETOE REMOVAL

Ethephon 2 will remove dwarf mistletoe shoots in ornamental conifers and leafy mistletoe from ornamental deciduous trees.

Sites	Amount	Specific Directions	Remarks
DWARF MISTLETOE On Ornamental Conifers	2.0 pints Ethephon 2 / 20 gallons water	Apply as a foliar spray to dwarf mistletoe shoots before mistletoe seed dispersal. If mistletoe regrowth occurs, re-treat before seed dispersal. For effective removal, all mistletoe shoots must be sprayed until wet. Use a non-ionic surfactant as recommended rates may increase effectiveness.	Applications made in conjunction with silvicultural mistletoe management will prevent spread of the mistletoe parasite to other parts of the tree and other trees. Mature needle drop, which normally occurs in the fall, may be hastened by the use of Ethephon 2.
On Ornamental Douglas Firs	1.0 pint Ethephon 2 / 20 gallons water		
LEAFY MISTLETOE On Ornamental Deciduous Trees	2.0 quarts Ethephon 2 / 20 gallons water	Make foliar applications after fall leaf drop through mid-winter. If mistletoe regrowth appears, retreat before mid-winter. For effective removal, all mistletoe shoots must be sprayed until wet. Use of a nonionic surfactant at recommended rates may increase effectiveness.	Large mistletoe infections and mistletoe found in mesquite may be difficult to control with a single application and re-treatment may be necessary.

**UNDESIRABLE FRUIT ELIMINATION (For Use Only on Ornamentals)**

Ethephon 2 will reduce or eliminate undesirable fruit development on apple, crabapple, carob, and olive trees.

Sites	Amount	Specific Directions	Remarks
APPLES, CRABAPPLES	8.0-12.0 fl. oz. Ethephon 2 per 20 gallons of water	Apply as a foliar spray at the flower bud to full bloom stage prior to fruit set. Wet foliage thoroughly. Excess application of Ethephon 2 can result in excessive leaf drop and/or tree defoliation. Use higher rates when temperatures are cool.	Application must be made before fruit set for best results. Some leaf drop or temporary leaf yellowing may occur after treatment.
CAROB ( <i>Ceratonia siliqua</i> )	6.0 fl. oz. Ethephon 2 per 20 gallons of water		
OLIVE* ( <i>Olea europaea</i> )	12.0 fl. oz. Ethephon 2 per 20 gallons of water	Apply as a foliar spray. Wet all foliage thoroughly. Amount of spray will depend on tree size.	

\*This recommendation is not intended to be used on commercial fruit production as a thinning agent.

**USE LIMITATIONS**

- Do not treat weak trees or trees under stress (drought, insect, or disease damaged trees), as excessive leaf drop or twig drop can result.
- Do not use on small red fruited varieties of crabapple, as fruit elimination will not be satisfactory.

**STORAGE AND DISPOSAL**

Do not contaminate water, food, or feed by storage or disposal.

**PESTICIDE STORAGE:**

Store in a cool, dry place and away from food, feed and other pesticides. IF SPILLED: If container is broken or contents have spilled, follow all precautions indicated above and clean up immediately. Before cleaning up, put on full-length trousers, long-sleeved shirt, protective gloves and goggles or face shield. Soak up spill with absorbent media such as sand, earth or other suitable material and dispose of waste at an approved waste disposal facility.

**PESTICIDE DISPOSAL**

Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

**CONTAINER DISPOSAL**

**Nonrefillable Container (five gallons or less):** Nonrefillable container. Do not reuse or refill this container. Offer for recycling, if available. Clean container promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill or by incineration or, if allowed by state and local authorities, by burning. If container is burned, stay out of smoke.

**Nonrefillable Container (greater than five gallons):** Nonrefillable container. Do not reuse or refill this container. Offer for recycling, if available. Clean container promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill or by incineration or, if allowed by state and local authorities, by burning. If container is burned, stay out of smoke.

**Refillable Container:** Refill this container with ethephon only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10 percent full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

**LIMITATION OF WARRANTY AND LIABILITY**

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Read the entire directions for use, conditions of warranties and limitations of liability before using this product. If terms are not acceptable, return the unopened product container at once.

By using this product, user or buyer accepts the following CONDITIONS, DISCLAIMER OF WARRANTIES and LIMITATIONS OF LIABILITY.

**CONDITIONS:** The directions for use of this product are believed to be adequate and must be followed carefully. However, it is impossible to eliminate all risks associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the manner of use or application, all of which are beyond the control of RedEagle International LLC. All such risks shall be assumed by the user or buyer.

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