



FOR USE IN SELECTED CROPS
 FOR USE IN ALFALFA GROWN FOR SEED PRODUCTION, CORN (FIELD, POP, SEED, SWEET), COTTON, EDIBLE BEANS, FORAGE LEGUMES, GARLIC, GRAIN SORGHUM, LENTILS AND PEAS, NONBEARING FRUIT TREE AND NUT TREE CROPS, NONBEARING VINEYARDS, ONIONS AND SHALLOTS (DRY BULB), PEANUTS, POTATOES, RICE, SOYBEANS, SUGARCANE, SUNFLOWERS, AND TOBACCO.

ACTIVE INGREDIENT:	
Pendimethalin (N-(1-ethylpropyl)-3,4-dimethyl-2, 6-dinitrobenzenamine)	37.4%
OTHER INGREDIENTS:	62.6%
TOTAL	100.0%

1 gallon contains 3.3 pounds of pendimethalin

*Contains aromatic naphtha.

KEEP OUT OF REACH OF CHILDREN
CAUTION / PRECAUCION

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

See inside for complete First Aid, Precautionary Statements, Directions For Use, Conditions of Sale and Warranty, and state-specific crop and/or use site restrictions.

In case of an emergency endangering life or property involving this product, call CHEMTREC 1-800-424-9300.

FIRST AID

IF SWALLOWED:	<ul style="list-style-type: none"> • Call a poison control center or doctor immediately for treatment advice. • DO NOT give any liquid to person. • DO NOT induce vomiting unless told to do so by a poison control center or doctor. • DO NOT give anything by mouth to an unconscious person.
IF IN EYES:	<ul style="list-style-type: none"> • Hold eyes open and rinse slowly and gently with water for 15 to 20 minutes. • Remove contact lenses, if present, after the first 5 minutes; then continue rinsing eyes. • Call a poison control center or doctor for treatment advice.
IF ON SKIN:	<ul style="list-style-type: none"> • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15 to 20 minutes. • Call a poison control center or doctor for treatment advice.

NOTE TO PHYSICIAN: Because of increased risk of chemical pneumonia or pulmonary edema caused by aspiration of the hydrocarbon solvent, vomiting should be induced only under professional supervision.

HOTLINE NUMBER: Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact Helena Chemical Company for emergency medical treatment information: CHEMTREC 1-800-424-9300.

EPA REG. NO. 241-337-5905

EPA Est. No. is indicated by the fifth letter of the code printed on this container:

N = 5905-IA-001 • H = 241-MO-001

AD 040309

NET CONTENTS: □ 2.5 Gallon (9.46 Liters)

□ 30 Gallons (113.55 Liters)

□ 110 Gallons (416.35 Liters)

Product of U.S. and India. Formulated in the U.S. with imported and domestic ingredients.

MANUFACTURED FOR
 HELENA CHEMICAL COMPANY
 225 SCHILLING BOULEAVRD, SUITE 300
 COLLIERVILLE, TENNESSEE 38017

**PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS**

CAUTION

Causes moderate eye irritation. Harmful if swallowed or absorbed through the skin. Avoid contact with skin, eyes or clothing.

Personal Protective Equipment (PPE):

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for Category F on an EPA chemical resistance category selection chart.

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves made of waterproof materials, such as barrier laminate, butyl rubber ≥ 14 mils, nitrile rubber ≥ 14 mils, neoprene rubber ≥ 14 mils, or viton ≥ 14 mils
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering Controls:

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. Wash thoroughly and put on clean clothing.
- 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

This product is toxic to fish. DO NOT apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Drift and runoff from treated areas may be hazardous to aquatic organisms in adjacent aquatic sites. DO NOT contaminate water when disposing of equipment washwaters or rinsate.

Endangered Species Protection

If endangered plant species occur in proximity to the application site, the following mitigation measures are required:

- If applied by ground, leave an untreated buffer zone of 200 feet. The product must be applied using a low boom (20 inches above the ground) and ASAE fine to medium/coarse nozzles.
- If applied by air, leave an untreated buffer zone of 170 feet. Must use straight-stream nozzles (D-6 or larger); wind can be no more than 8 mph; and release height must be 15 feet or less.

To determine whether your county has an endangered species, consult the website <http://www.epa.gov/espp/usa-map.htm>.

Endangered Species Bulletins may also be obtained from extension offices or state pesticide agencies. If the bulletin is not available for your specific area, check with the appropriate local state agency to determine if known populations of endangered species occur in the area to be treated.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. This label must be in the possession of the user at the time of pesticide application.

Observe all cautions and limitations in this label and the labels of products used in combination with HELENA® PENDIMETHALIN herbicide. The use of HELENA® PENDIMETHALIN not consistent with this label can result in injury to crops, animals, or persons. Keep containers closed to avoid spills and contamination.

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 protection.

DO NOT allow spray to drift from the application site and contact people, structures people occupy at any time and the associated property, parks and recreation areas, nontarget crops, aquatic and wetland areas, woodlands, pastures, rangelands, or animals.

Disclaimer: Always refer to the label on the product before using Helena or any other product.

DO NOT enter or allow other people (or pets) to enter the treated area until sprays have dried. Helena Chemical Company intends that this product may not be used for manufacturing products for application to turf and ornamentals. Helena Chemical Company does not recommend or authorize the use of this product in manufacturing, processing or preparing custom blends with other products for application to field and row crops or to orchard, grove, and vineyard crops.

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) and restricted-entry interval. 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 24 hours.

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

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
- Chemical-resistant gloves made of waterproof materials, such as barrier laminate, butyl rubber \geq 14 mils, nitrile rubber \geq 14 mils, neoprene rubber \geq 14 mils, or viton \geq 14 mils
- Shoes plus socks

STORAGE AND DISPOSAL

DO NOT contaminate water, food, or feed by storage or disposal.

PESTICIDE STORAGE: DO NOT STORE BELOW 40°F. Extended storage at temperatures below 40°F can result in the formation of crystals on the bottom of the container. If crystallization does occur, store the container on its side at room temperature (70°F) and rock occasionally until crystals redissolve.

PESTICIDE DISPOSAL: Pesticide wastes are toxic. 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 directions, 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. DO NOT reuse or refill this container. Triple rinse or pressure rinse container (or equivalent) promptly after emptying; then offer for recycling, if available, or reconditioning, if appropriate, or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures approved by state and local authorities.

Triple rinse containers small enough to shake (capacity \leq 5 gallons) 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.

Triple rinse containers too large to shake (capacity $>$ 5 gallons) 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.

Pressure rinse as follows: Empty the remaining content into application equipment or mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank, or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container and rinse at about 40 PSI for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Refillable Container. Refill this container with pesticide only. DO NOT reuse this container for any other purpose. Triple rinsing the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller.

Triple rinse as follows: 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% 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.

When this container is empty, replace the cap and seal all openings that have been opened during use; return the container to the point of purchase or to a designated location. This container must only be refilled with a pesticide product. DO NOT reuse the container for any other purpose. Prior to refilling, inspect carefully for damage such as cracks, punctures, abrasions, worn-out threads and closure devices. Check for leaks after refilling and before transport. DO NOT transport if this container is damaged or leaking. If the container is damaged, or leaking, or obsolete and not returned to the point of purchase or to a designated location, triple rinse emptied container and offer for recycling, if available, or dispose of container in compliance with state and local regulations.

Disclaimer: Always refer to the label on the product before using Helena or any other product.

GENERAL INFORMATION

HELENA® PENDIMETHALIN herbicide is a selective herbicide for controlling most annual grasses and certain broadleaf weeds as they germinate. Refer to Table 1 for a complete list of controlled weeds. HELENA® PENDIMETHALIN will not control established weeds.

Unusually cold, excessively wet, or hot and dry conditions that delay germination or extend germination over a long period of time can reduce weed control.

Overapplication can result in crop-stand loss, crop injury, or soil residues.

Uneven application or improper soil incorporation can decrease weed control or cause crop injury. Soil incorporation deeper than recommended can reduce weed control.

Seedling diseases, cold weather, excessive moisture, shallow or deep planting, low or high soil pH, high soil salt concentration, or drought can weaken seedlings and plants and increase the possibility of crop damage from HELENA® PENDIMETHALIN. Under these conditions, crop yields can be reduced.

Table 1. Weeds Controlled
(see crop sections for additional weeds controlled)

Weeds controlled with HELENA® PENDIMETHALIN applied up to 4.8 pts/A	
Grasses	
Barnyardgrass	Japanese brome*, a
Canarygrass*, b	Johnsongrass (seedling)
Cheat*, b	Jointed goatgrass*, a
Crabgrass	Oat, wild*
Crowfootgrass	Panicum, fall
Downy brome* (Cheatgrass)	Panicum, Texas
Foxtail, giant	Sandbur, field
Foxtail, green	Shattercane*
Foxtail, yellow	Signalgrass*
Goosegrass	Wild proso millet*
Hairy chess*, a	Witchgrass
Itchgrass*	Woolly cupgrass*
Italian ryegrass*	
Broadleaves	
Amaranth, Palmer	Mustard, black b
Bugloss, small a	Pigweed species
Carpetweed	Purslane
Chickweed, common*	Pusley, Florida
Henbit	Shepherdspurse*
Kochia	Smartweed, Pennsylvania*
Lady's thumb	Spurge, annual
Lambsquarters, common	Velvetleaf*
Lambsquarters, slimleaf	Waterhemp species
London rocket*	
* Suppression, but controlled when HELENA® PENDIMETHALIN use rate exceeds 4.8 pts/A.	
a Neither suppressed nor controlled in California.	
b Not controlled in California.	
Weeds controlled with HELENA® PENDIMETHALIN applied at 4.8 pts/A or greater	
Grasses	
Annual bluegrass	Lovegrass
Browntop panicum	Sprangletop, Mexican
Grass, Guinea b	Sprangletop, red
Junglerice	Swollen fingergrass
Broadleaves	
Dodder†	Prostrate, knotweed

Fiddleneck	Puncturevine
Morningglory**	
† For optimum dodder control, use the highest labeled rate of HELENA® PENDIMETHALIN specified in the specific crop.	
** Suppression	
b Not controlled in California.	

Mode of Action

HELENA® PENDIMETHALIN herbicide is a meristematic inhibitor that interferes with the plant's cellular division or mitosis. This and/or other products with the meristematic inhibiting mode of action may not effectively control naturally occurring biotypes of some of the weeds listed on this label. A weed biotype is a naturally occurring plant within a given species that has a slightly different, but distinct, genetic makeup from other plants. Other herbicides with the meristematic inhibiting mode of action include other dinitroaniline herbicides, such as trifluralin. If naturally occurring meristematic inhibiting resistant biotypes are present in a field, HELENA® PENDIMETHALIN and/or any other meristematic inhibiting mode of action herbicide should be tank mixed or applied sequentially with an appropriate registered herbicide having a different mode of action to ensure control.

Application Rate

Use rates for HELENA® PENDIMETHALIN when used alone, in tank mix, or sequential applications are given in Crop-Specific Information. Use rates of this product vary by soil texture and organic matter. See Table 2 for soil texture groupings used in this label.

Table 2. Soil Texture Groups

COARSE	MEDIUM	FINE
sands loamy sands sandy loams	sandy clay loams* sandy clays loams silt loams silts	silty clay loams* silty clays clay loams clays
*Sometimes considered transitional soils and may be classified as either medium- or fine-textured soils.		
Peat and Muck soils: HELENA® PENDIMETHALIN may be used on peat and muck soils, but weed control may be inconsistent and/or reduced. Use maximum labeled use rate allowed in the specific crop.		

Application Timings

HELENA® PENDIMETHALIN will provide most effective weed control when applied by ground or aerial equipment and subsequently incorporated into soil within 7 days after application by rainfall, sprinkler irrigation, or mechanical tillage prior to weed seedling emergence from soil. HELENA® PENDIMETHALIN can also be applied through chemigation, including flooded basin irrigation systems. HELENA® PENDIMETHALIN is recommended for preplant surface, preplant incorporated, surface incorporated, preemergence, early postemergence, postemergence incorporated (CULTI-SPRAY) or layby treatment. See Crop-Specific Information for specific application directions by crop.

Preplant Surface Applications: For use in minimum tillage or no-tillage production systems, apply HELENA® PENDIMETHALIN alone or in tank mixes up to 45 days before planting. When making early preplant surface applications (15 to 45 days prior to planting), HELENA® PENDIMETHALIN should be tank mixed or followed by a postemergence herbicide application. Rainfall or sprinkler irrigation within 7 days after application is required to move this product into the upper soil surface where weed seeds germinate.

Preplant Incorporated Applications: Apply HELENA® PENDIMETHALIN and incorporate into the upper (1" to 2") soil surface up to 60 days before planting. Use an implement capable of giving uniform incorporation; two-pass incorporation usually results in a more consistent result.

Surface Incorporated Applications: Uniformly apply HELENA® PENDIMETHALIN as broadcast or banded treatment to soil surface underneath established trees and/or in ground areas between trees rows. Within 7 days after application, incorporate into upper (1" to 2") soil surface using either rainfall, sprinkler irrigation, or shallow mechanical incorporation using an implement capable of giving uniform incorporation; two-pass mechanical incorporation usually results in a more consistent result.

Preemergence Surface Applications: Broadcast treatment uniformly to the soil surface at planting and up to 2 days after planting. Rainfall, sprinkler irrigation, or shallow mechanical incorporation within 7 days after application is required to move this product into the upper soil surface where weed seeds germinate. If adequate rainfall or irrigation does not occur and weed seedling emergence begins, a shallow cultivation or rotary hoeing will improve performance.

Early Postemergence Applications: HELENA® PENDIMETHALIN must be applied prior to weed seedling emergence or in a tank mix with products that control the emerged weeds. Refer to Crop-Specific Information for specific postemergence application recommendations by crop.

Postemergence Incorporated Applications (CULTI-SPRAY): Prior to application, crop must be cultivated in such a manner as to throw at least one inch of soil over the base of the crop plants. This will prevent direct contact of HELENA® PENDIMETHALIN and the zone of brace root formation. HELENA® PENDIMETHALIN must be applied broadcast with a ground sprayer when crop is at least 4 inches tall up to layby. Use drop

nozzles if crop foliage will prevent uniform coverage of the soil surface within the rows. Thoroughly and uniformly incorporate HELENA® PENDIMETHALIN treatments into the soil with:

- (1) a sweep-type or rolling cultivator set to provide thorough incorporation in the top 1 inch of soil, or
- (2) adequate overhead irrigation water or rainfall. See Crop-Specific Information (Corn and Grain Sorghum) for more details on (CULTI-SPRAY) application.

Layby Application: Apply HELENA® PENDIMETHALIN directly to the soil between rows as a directed spray following the last normal cultivation (layby). See Crop-Specific Information for more details on layby application.

Split Applications: HELENA® PENDIMETHALIN may be applied preplant incorporated up to 60 days prior to planting and followed by a preemergence application at planting or up to 2 days after planting. The total amount of HELENA® PENDIMETHALIN herbicide applied per acre per season cannot exceed the highest labeled rate for any given soil type. See Crop-Specific Information for more details on split applications.

Fall Applications: HELENA® PENDIMETHALIN may be used in fall application programs in certain crops. See Crop-Specific Information for details on fall application timing.

Spraying Instructions

HELENA® PENDIMETHALIN may be applied using either water or sprayable fluid fertilizer (such as straight 32-0-0 or 28-0-0) as the spray carrier. Additionally, HELENA® PENDIMETHALIN may be impregnated on dry bulk fertilizer. Sprayable fluid fertilizer as a carrier is NOT recommended for use after crop emergence unless the typical fertilizer burn symptoms on the crop are acceptable.

Aerial Applications

Uniformly apply in 5 or more gallons of water per acre. Exercise caution to minimize drift. **DO NOT** apply during periods of gusty winds or when wind conditions favor drifting. Spray drift can cause injury to sensitive crops. It is recommended that a flagman or an automatic mechanical flagging unit on the aircraft be used to avoid overlapping and possible crop injury.

Ground Applications (Broadcast)

Uniformly apply with properly calibrated ground equipment in 10 or more gallons of water per acre or 20 or more gallons of liquid fertilizer per acre. Use sprayers equipped with appropriate nozzles that provide uniform and accurate spray distribution and minimize drift. Keep the bypass line on or near the bottom of the tank to minimize foaming. Nozzle and in-line screens must be no finer than 50 mesh. Application of HELENA® PENDIMETHALIN during periods of gusty winds may result in uneven applications. **DO NOT** apply HELENA® PENDIMETHALIN postemergence in liquid fertilizers.

If liquid fertilizer/herbicide(s) mixture separates in the spray tank, clogged equipment and uneven application can result. Always predetermine the compatibility of HELENA® PENDIMETHALIN alone or with other herbicides based on the following compatibility "jar test":

1. Add 1 pint of fertilizer to a quart jar.
2. Add 1 to 4 teaspoon(s) of the Dry Flowable (DF), Wettable Powder (WP), Aqueous Solution (AS), Flowable (F) or Liquid (L) formulation (depending on mixing ratio required) to the liquid fertilizer. The number of teaspoons of the formulation to add can be determined by the following formula:
$$\frac{\text{lbs or pts of product/acre}}{\text{gallons of fertilizer/acre}} \times 11.4 = \text{number of teaspoons of herbicide to add to 1 pint of fertilizer}$$
3. Close the jar and agitate until the herbicide(s) are evenly dispersed in the liquid fertilizer. If the materials **DO NOT** disperse well, it may be necessary to slurry the chemicals in water before adding to the fertilizer.
4. After dispersing the materials, add appropriate number of teaspoons of HELENA® PENDIMETHALIN to the jar and shake well. Add water soluble concentrate herbicides to the mixture last and agitate. Let the mixture stand for 30 minutes and then observe the results. Look for signs of separation: an oily layer or globules, sludge, flakes or other precipitates.
5. Evaluate compatibility.
 - (a) If the herbicide(s) and liquid fertilizer mixture does not separate, use this mixture in your spray tank.
 - (b) If the mixture separates but mixes readily with shaking, the mixture can be used provided that good agitation is maintained in the spray tank.
 - (c) If separation of the mixture occurs and agitation does not correct this problem, a compatibility agent is needed.
6. If the need for a compatibility agent is demonstrated, the following procedure is recommended: Using a clean quart jar, repeat step 1 above and add ½ teaspoon of the compatibility agent to the liquid fertilizer. Mix well and repeat steps 2, 3 and 4. If separation or precipitation occurs with the compatibility agent, **DO NOT** use HELENA® PENDIMETHALIN with that specific liquid fertilizer.

Ground Applications (Band)

Uniformly apply the broadcast equivalent rate and volume per acre. To determine these:

$$\frac{\text{Band Width in Inches}}{\text{Row Width in Inches}} \times \text{Broadcast Rate per Acre} = \text{Band Rate per Acre}$$

$$\frac{\text{Band Width in Inches}}{\text{Row Width in Inches}} \times \text{Broadcast Volume per Acre} = \text{Band Volume per Acre}$$

Ground Applications (Dry Bulk Fertilizer)

Apply HELENA® PENDIMETHALIN/dry bulk fertilizer mixtures only with ground equipment. DO NOT impregnate HELENA® PENDIMETHALIN onto coated ammonium nitrate or limestone because these materials will not absorb the herbicide. Dry fertilizer blends containing mixtures of ammonium nitrate or limestone may be impregnated with HELENA® PENDIMETHALIN. A minimum of 200 pounds of impregnated dry bulk fertilizer, excluding the weight of ammonium nitrate or limestone, must be applied per acre.

Use the following formula to determine the amount (in pints) of HELENA® PENDIMETHALIN to be impregnated on a ton of dry bulk fertilizer based on the rate of fertilizer to be applied per acre:

$$\frac{2000}{\text{Pounds of Dry Fertilizer per Acre}} \times \text{Pints of HELENA® PENDIMETHALIN (Recommended Rate per Acre)} = \text{Pints of HELENA® PENDIMETHALIN Ton of Fertilizer}$$

To impregnate HELENA® PENDIMETHALIN on bulk fertilizer, use a closed rotary-drum mixer or other commonly used dry bulk fertilizer blender equipped with suitable spray equipment. Spray nozzles must be placed to provide uniform coverage of HELENA® PENDIMETHALIN onto the fertilizer during mixing.

Apply the HELENA® PENDIMETHALIN/dry bulk fertilizer mixture with an accurately calibrated dry fertilizer spreader. The HELENA® PENDIMETHALIN/dry bulk fertilizer mixture must be spread uniformly on the soil surface.

Chemigation Applications via Sprinkler Irrigation Systems

HELENA® PENDIMETHALIN herbicide may be applied as a chemigation treatment through sprinkler irrigation systems. Refer to Crop-Specific Information sections for individual crops. DO NOT apply HELENA® PENDIMETHALIN via chemigation to crops unless specified in Crop-Specific Information section.

Apply this product ONLY through a sprinkler irrigation system of the following type: center pivot, lateral move, end tow, side (wheel) roll, traveler, big gun, solid set, or hand move.

DO NOT apply this product through any other type of sprinkler irrigation system.

Uniform distribution of HELENA® PENDIMETHALIN-treated irrigation water is the sole responsibility of the applicator and is required to avoid crop injury, lack of herbicide effectiveness or illegal pesticide residues in the crop. If you have any questions about calibration, you should contact state extension service specialists, equipment manufacturers, or other experts.

The system must be properly calibrated (with water only) to ensure that the amount of HELENA® PENDIMETHALIN applied corresponds to the recommended rate. Apply HELENA® PENDIMETHALIN in ½ to ¾ inches of water during the first sprinkler set (use at least 1 inch of water in the states of Texas, New Mexico and Oklahoma). Maintain agitation in the injection nurse tank to keep a uniform herbicide suspension during application. When application is complete, flush the system with water.

Chemigation Instructions (for low volume micro sprinklers)

Output of low volume sprinkler = 4 to 50 gallons per hour (gph) per emitter. Point of application MUST be above ground.

Irrigation system should run a sufficient amount of time prior to HELENA® PENDIMETHALIN injection to have all emitters functioning properly. After system is operating properly, length of injection should be such that at one period of time during the injection, the first and last emitters in the system contain HELENA® PENDIMETHALIN-treated water. Add HELENA® PENDIMETHALIN to the supply tank already filled with the volume of water required for the injection period. Maintain proper agitation in HELENA® PENDIMETHALIN injection tank. HELENA® PENDIMETHALIN should be mixed in clean water and injected down-line from filters. Following HELENA® PENDIMETHALIN injection, system should be flushed for a period of time sufficient to clear the line of HELENA® PENDIMETHALIN. (If HELENA® PENDIMETHALIN application is made during a normal irrigation cycle, injection should be made during the last stage.)

Chemigation Calibration (for low volume micro sprinklers)

Calculation of use rate is based on wetted area around emitters - NOT on tree acres. To determine correct amount of HELENA® PENDIMETHALIN, use the following formula:

1. Treated area per each emitter = A
 $A = 3.14 \times (\text{radius} \times \text{radius})$
2. The area in square feet wet in each acre = B $B = \frac{A \times \text{emitters/acre}}{144}$
3. The total area (in square feet) wet by your system = C
 $C = B \times \text{acres covered by system.}$
4. Rate per treated acre of HELENA® PENDIMETHALIN herbicide (based on length of control desired) = R
Amount of
HELENA® PENDIMETHALIN to inject = S $S = \frac{C}{43,560} \times R = \text{qts of HELENA® PENDIMETHALIN}$

Example:

If the average distance from emitter to perimeter of wetted area measured one inch below soil surface is 13 inches, then

$$A = 3.14 \times (13'' \times 13''), \text{ and } A = 530.7 \text{ square inches.}$$

If there are 300 emitters per acre, then

$$B = \frac{530.7 \times 300}{144} \text{ and } B = 1105.6 \text{ square feet wetted per acre}$$

If the system covers 20 acres, then

$$C = 1105.6 \text{ square feet per acre} \times 20 \text{ acres and}$$
$$C = 22,112 \text{ square feet wetted by system.}$$

If the desired application rate per treated acre is 2.4 qts of HELENA®

$$S = \frac{22,112}{43,560} \times 2.4 \text{ and } S = 1.2 \text{ qts of HELENA® PENDIMETHALIN should be injected into the system.}$$

Special Precautions for Chemigation

1. DO NOT apply when wind speed favors drift beyond the area intended for treatment.
2. DO NOT connect an irrigation system used for pesticide application to a public water system unless the pesticide label-prescribed safety devices for public water systems are in place.
3. 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.
4. The pesticide injection pipeline must contain a functional, automatic quick-closing check valve to prevent the flow of fluid back toward the injection pump. It 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.
5. The sprinkler chemigation 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. In addition, 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.
6. The sprinkler chemigation system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops, or in cases where there is no water pump, when the water pressure decreases to the point where pesticide distribution is adversely affected.
7. The irrigation line or water pump must include a functional pressure switch that will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected.

Chemigation Systems Connected to Public Water Systems

1. Public water system means a system for the provision to the public of piped water for human consumption if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year.
2. Chemigation systems connected to public water systems must contain a functional, reduced-pressure zone backflow preventer (RPZ) or the functional equivalent in the water supply line upstream from the point of pesticide introduction. As an option to the RPZ, the water from the public water system should be discharged into a reservoir tank prior to pesticide introduction. There shall be a complete physical break (air gap) between the outlet end of the fill pipe and the top or overflow rim of the reservoir tank of at least twice the inside diameter of the fill pipe.
3. All chemigation systems connected to public water systems must also follow restrictions listed in the preceding section titled Chemigation.

Applications via Flooded Basin Irrigation Systems

HELENA® PENDIMETHALIN herbicide may be applied via flooded basin irrigation systems, but only to the following crops: nonbearing fruit and nut trees, nonbearing vineyards, and alfalfa grown for seed production.

Use Instructions and Precautions for Flooded Basin

Irrigation

1. HELENA® PENDIMETHALIN may be applied through flooded basin irrigation systems designed to uniformly distribute irrigation water along the soil surface. Solid set systems utilizing tall riser for overhead application are excluded.
2. Follow all label recommendations for HELENA® PENDIMETHALIN regarding rates per acre, timing of application, and crop-specific restrictions and limitations.
3. DO NOT connect an irrigation system used for pesticide application to a public water system unless the pesticide label-prescribed safety devices for public water systems are in place.
4. 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.
5. Helena Chemical Company recommends that HELENA® PENDIMETHALIN is mixed with water at a 1:1 ratio in the injection nurse tank to assist with product flowability. Maintain agitation in the injection nurse tank to keep a uniform herbicide suspension during application. When application is complete, flush the system with water.
6. Tail water (runoff water) from flood irrigation that contains HELENA® PENDIMETHALIN should be re-circulated and contained in the field of initial application or used only on adjacent tree or vine crops or alfalfa for which HELENA® PENDIMETHALIN is registered for this type of application.
7. Systems using a gravity-flow pesticide dispensing system must meter the pesticide in the water at the head of the field downstream of a hydraulic discontinuity, such as a drop structure or weir box, to decrease potential for water source contamination from backflow water.
8. Systems utilizing a pressurized water and pesticide injection system must meet the following requirements:
 - The system must contain a functional check valve, vacuum-relief valve, and low-pressure drain appropriately located in the irrigation pipe to prevent water source contamination from backflow.
 - The pesticide injection pipeline must contain a functional automatic quick closing check valve to prevent flow of fluids back towards 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 a functional interlocking control to automatically shut off the pesticide injection pump when the water pump stops.
 - The irrigation pipe or water pump must include a functional pressure switch, which will stop the 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), of effective design and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.
 - Any alternative to the above safety devices must conform to the list of EPA-approved alternative devices.
9. Be sure to regularly measure the flow in the field to ensure the correct amount of HELENA® PENDIMETHALIN is being metered into the irrigation water and also regularly monitor to ensure that treated water is being uniformly distributed across the field. Flow rates through metering devices and distribution of HELENA® PENDIMETHALIN can vary with water temperature and speed of water flow across the field.
10. Uniform distribution of HELENA® PENDIMETHALIN-treated irrigation water is the sole responsibility of the applicator and is required to avoid crop injury, lack of herbicide effectiveness, or illegal pesticide residues in the crop.
11. If you have questions about calibration, you should contact state extension service specialists, equipment manufacturers or other experts.

Managing Off-Target Movement

SPRAY DRIFT

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

The following drift management requirements must be followed to avoid off-target drift movement from aerial applications to agricultural field crops:

1. The distance of the outermost 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.

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 Spray Drift Reduction Advisory Information presented below.

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 high 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 recommended practice. Significant deflection from the 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- or straight-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 droplets, 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

This 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, or nontarget crops or plants) is minimal (e.g., when wind is blowing away from the sensitive areas).

Additives

Spray adjuvants have little or no influence on performance of HELENA® PENDIMETHALIN herbicide when applications are made prior to weed emergence. However, several tank mixes with HELENA® PENDIMETHALIN require adjuvants to improve burndown of emerged weeds. Therefore, surfactants, liquid fertilizer (28%, 30%, or 32% UAN (urea ammonium nitrate) or ammonium sulfate), or crop oil concentrate may be used with

HELENA® PENDIMETHALIN tank mixes applied preplant, preemergence, or early postemergence to the crop. Follow the adjuvant recommendations on the tank mix partner's label.

When an adjuvant (or a specific adjuvant product, such as a drift control agent) is to be used with this product, the use of a Chemical Producers and Distributors Association (CPDA) certified adjuvant is recommended. The recommended adjuvants must contain ingredients accepted by the EPA.

General Tank Mixing Information

HELENA® PENDIMETHALIN may be applied in a tank mix or a sequential application with other herbicides registered for use in a given crop. Refer to the companion label for weeds controlled in addition to HELENA® PENDIMETHALIN alone.

When using tank mixtures or sequential applications with HELENA® PENDIMETHALIN, always read the companion product label(s) to determine the specific use rates by soil types, weed species, and weed or crop growth stage. In addition, follow all precautions and restrictions including state and local use restrictions that may apply to specific products. Always follow the most restrictive label.

Uses with Other Products (Tank Mixes)

If this product is used in combination with any other product except as specifically recommended in writing by Helena Chemical Company, then Helena Chemical Company shall have no liability for any loss, damage, or injury arising out of its use in any such combination not so specifically recommended. If used in combination recommended by Helena Chemical Company, the liability of Helena Chemical Company shall in no manner extend to any damage, loss, or injury not directly caused by the inclusion of the Helena Chemical Company product in such combination use, and in any event shall be limited to return of the amount of the purchase price of the product. Always perform a mixing test to check the compatibility of HELENA® PENDIMETHALIN with all potential tank mix partners.

Mixing Instructions

1. Fill tank one-half to three-quarters full with clean water or liquid fertilizer and agitate. Prior to mixing HELENA® PENDIMETHALIN or HELENA® PENDIMETHALIN tank mixtures in liquid fertilizer, refer to appropriate label sections for recommended uses in liquid fertilizer, application instructions, and compatibility determinations.
NOTE: HELENA® PENDIMETHALIN will NOT mix in high salt formulation fertilizers, such as 10-34-0. When utilizing high salt formulation fertilizers as the spray carrier, use one of the following:
 - (a) Pre-slurry HELENA® PENDIMETHALIN in water prior to adding to tank; use 1:1 ratio of water to HELENA® PENDIMETHALIN.
 - (b) Add water to fertilizer solution prior to adding HELENA® PENDIMETHALIN. The amount of water should be equal to or greater than the amount of HELENA® PENDIMETHALIN to be used.
2. HELENA® PENDIMETHALIN Alone
When using HELENA® PENDIMETHALIN alone, add HELENA® PENDIMETHALIN to the partially filled tank while agitating and then fill the remainder of the tank with water or liquid fertilizer.
3. HELENA® PENDIMETHALIN Tank Mixes
Add the tank mixture ingredients in the order listed below prior to adding HELENA® PENDIMETHALIN. (for tank mixtures with Butyrac® 200, Gramoxone® Extra or glyphosate, see mixing instructions at the end of this section):
 - (a) Wettable Powder (WP) formulations - Make a slurry of the WP in water (1:2 ratio). Add the slurry slowly into the partially filled tank while agitating.
 - (b) Dry Flowable (DF)/Water Dispersible Granule (WDG) formulations – Add the granules to the partially filled tank while agitating. Make a slurry of the granules in water before adding to liquid fertilizer.
 - (c) Flowable (F) formulations - Add the F formulation to the partially filled tank while agitating.
 - (d) Water Soluble Concentrate (WSC) formulations – Add the WSC formulation to the partially filled tank while agitating.
 - (e) Emulsifiable Concentrate (EC) formulations – Add the EC formulation to the partially filled tank while agitating.
After complete mixing, add HELENA® PENDIMETHALIN to the tank.
 - (f) NOTE: For tank mixes including Butyrac, Gramoxone Extra or glyphosate: After complete mixing of HELENA® PENDIMETHALIN, continue filling the sprayer with water and add Butyrac or Gramoxone Extra or glyphosate near the end of the filling process. If Gramoxone Extra is included in the tank mixture, add 8 ozs of non-ionic surfactant per 100 gallons of total spray mixture as the last ingredient in the tank. Fill the remainder of the tank with water or liquid fertilizer while agitating.
4. Thorough and continuous sprayer-tank agitation MUST be maintained during mixing and spraying of HELENA® PENDIMETHALIN. If the spray mixture is allowed to settle for any period of time, thorough agitation is essential to resuspend the mixture before spraying is resumed. Continue agitation while spraying.

Cleaning Spray Equipment

Clean application equipment thoroughly by using a strong detergent or commercial spray cleaner according to the manufacturer's directions, and then triple rinsing the equipment before and after applying this product.

Restrictions and Limitations

- DO NOT exceed the maximum labeled rate for any soil type.
- HELENA® PENDIMETHALIN herbicide will not control established weeds. Destroy emerged weeds prior to application.
- HELENA® PENDIMETHALIN is most effective in controlling weeds mechanically incorporated or when incorporated into the weed germination zone by adequate rainfall or overhead irrigation after application.
- When using tank mixtures with HELENA® PENDIMETHALIN, always read the companion product label(s) to determine the specific use rates by soil types, weed species, and weed or crop growth stage. In addition, follow all precautions and restrictions including state and local use restrictions that may apply to specific products. Always follow the most restrictive label.
- In the event of a crop loss due to adverse weather conditions or other reasons, any crop registered for a preplant incorporated application of HELENA® PENDIMETHALIN can be replanted without adverse effects the same year (see Crop-Specific Information for exceptions). If replanting is necessary, DO NOT work the soil deeper than the treated zone.
- Refer to Crop-Specific Information for crop-specific preharvest intervals and feeding and grazing restrictions.

CROP ROTATION RESTRICTIONS

- Use of HELENA® PENDIMETHALIN in accordance with label directions is expected to result in normal growth of rotational crops in most situations; however, various environmental and agronomic factors, such as arid conditions, make it impossible to eliminate all risks associated with the use of this product and, therefore, rotational crop injury is always possible. Soil characteristics and environmental conditions which may contribute to crop stress that may be accentuated by the use of HELENA® PENDIMETHALIN include: coarse soils, compaction, high salinity, eroded knolls/hilltops, cold and/or wet soils, drought, and heavy rainfall soon after application.
- When HELENA® PENDIMETHALIN is used in tank mix or sequential combinations, refer to labels of other herbicides for additional rotational crop restrictions.
- Restrictions for rotational cropping after the use of HELENA® PENDIMETHALIN are dependent on the application use rate of HELENA® PENDIMETHALIN in the primary crop. The user should thoroughly read the following restrictions to determine the rotational crops for their specific situation, according to application use rate.

I. Rotational Crop Restrictions Following Applications of HELENA® PENDIMETHALIN to Field and Row Crops

1. Application Rate less than or equal to 4.8 pts/A (2.0 lbs ai/A):

- (a) Crops which are labeled for preplant incorporated application may be planted the same season in which HELENA® PENDIMETHALIN was applied.
- (b) **Sugar beets, Red beets and Spinach**
To avoid crop injury, DO NOT plant sugar beets, red beets or spinach for 12 months following a spring application of HELENA® PENDIMETHALIN or 14 months following a fall application of HELENA® PENDIMETHALIN.
These crops should not be planted for 18 months following a spring application of HELENA® PENDIMETHALIN or 20 months following a fall application of HELENA® PENDIMETHALIN if rainfall or irrigation was not sufficient to produce a crop.
To ensure thorough mixing of soil prior to planting sugar beets, red beets and spinach, land should be plowed using a moldboard plow to a depth of 12 inches.
- (c) **Proso millet, Sorghum (milo), and Annual or Perennial grass crops or mixtures**
Proso millet, sorghum (milo), and annual or perennial grass crops or mixtures should not be planted for 10 months after a spring application of HELENA® PENDIMETHALIN or 12 months after a fall application of HELENA® PENDIMETHALIN except in the following conditions:
In the states of Minnesota, North Dakota and South Dakota, these crops should not be planted for 18 months following a spring application of HELENA® PENDIMETHALIN or 21 months following a fall application of HELENA® PENDIMETHALIN.
To avoid the possibility of crop injury in areas that receive less than 20" of rainfall or irrigation to produce a crop, these crops should not be planted for 18 months following a spring application of HELENA® PENDIMETHALIN or 20 months following a fall application of HELENA® PENDIMETHALIN if rainfall or irrigation was not sufficient to produce a field or row crop.
- (d) **Wheat and Barley**
Wheat and barley may be planted 4 months after an application of HELENA® PENDIMETHALIN, except under the following conditions:
If less than 12" of rainfall or overhead irrigation was received between application and rotational crop planting, wheat should not be planted before 12 months after a spring application of HELENA® PENDIMETHALIN or 14 months after a fall application of HELENA® PENDIMETHALIN.
In dryland areas and/or areas where irrigation is necessary to produce the crop treated with HELENA® PENDIMETHALIN, DO NOT plant winter wheat or barley as a follow crop if crop failure/destruction occurs and land is fallowed during the summer.
- (e) **All Other Rotational Crops Not Specifically Addressed Above**
Crops, other than those to which HELENA® PENDIMETHALIN may be applied as a preplant incorporated treatment, may be planted the year following application of HELENA® PENDIMETHALIN, except under the following condition:
If rainfall or irrigation was not sufficient to produce a crop, delay planting for 18 months following a spring application of HELENA® PENDIMETHALIN herbicide or 20 months following a fall application of HELENA® PENDIMETHALIN.

2. Application Rate greater than 4.8 pts/A (2.0 lbs ai/A):
In the growing season following application of HELENA® PENDIMETHALIN to field and row crops at greater than 4.8 pts/A, plant only those crops for which HELENA® PENDIMETHALIN is labeled for preplant incorporated treatment or crop injury may occur. DO NOT plant other crops for 24 months.
- II. Rotational Crop Restrictions Following Applications of HELENA® PENDIMETHALIN to Orchard, Grove, and Vineyard Crops
In the growing season following application of HELENA® PENDIMETHALIN to fruit and nut trees, plant only those crops for which HELENA® PENDIMETHALIN is labeled for preplant incorporated treatment or crop injury may occur.
DO NOT rotate to other crops (except for nut crops, fruit trees, or grapes) for 24 months following a HELENA® PENDIMETHALIN application to fruit or nut trees.

Use Area



Crop-Specific Information

Crop Injury Disclaimer: HELENA® PENDIMETHALIN use may result in crop injury, loss or damage to certain crops under a number of conditions, including but not limited to agronomic, cultural, mechanical, and environmental. Numerous risks of loss or damage to certain crops may be associated with the use of HELENA® PENDIMETHALIN even when directions for use are followed completely. The user or grower should take all such risks into consideration before deciding to apply the product. Helena Chemical Company recommends testing on a small portion of the target crop to determine if damage is likely to occur. Each grower who is considering the product for such use should test HELENA® PENDIMETHALIN in order to determine its suitability. A grower should use HELENA® PENDIMETHALIN only to the extent that in his sole opinion the benefit of HELENA® PENDIMETHALIN use outweighs the potential injury to the grower's crop.

In addition, many factors can affect crop growth and/or yield, including but not limited to, insects, diseases, weed competition, poor seed quality, improper planting depth, mechanical cultivation, poor weather (such as freezing or excessive wind, rain, heat, or cold), lack of or excessive moisture, crusting, fertility, or hardpans. Risk of loss or damage to crops may be associated with the use of HELENA® PENDIMETHALIN and contribute to poor stands due to failure of crop to emerge, swelling of roots or other below-ground plant parts, less vigorous plant growth and development, and reduction in yield potential. HELENA® PENDIMETHALIN may also cause injury to sensitive rotational crops.

ALFALFA (Grown for Seed Production)

HELENA® PENDIMETHALIN may be applied by ground, air, chemigation, flooded basin irrigation systems, or on dry bulk fertilizer.

Use Methods, Timings and Rates

Established Alfalfa Grown for Seed Production (defined as alfalfa planted in the fall or spring that has gone through a summer season of cutting/mowing):

Uniformly apply HELENA® PENDIMETHALIN at a broadcast rate of 1.2 to 4.8 quarts per acre prior to weed emergence in one of the following ways:

1. Apply to dormant established alfalfa.
2. Apply before alfalfa exceeds 10 inches in height after first mowing/beating.
3. Once the alfalfa reaches 10 inches in height or if the alfalfa has been mowed/beaten two or more times, HELENA® PENDIMETHALIN must be applied with drop nozzles directing the spray so that there is little to no contact with the foliage.

Chemigation Applications

HELENA® PENDIMETHALIN may be applied through sprinkler irrigation systems. Follow all recommendations, special instructions and precautions in the general section covering Chemigation in Spraying Instructions.

Flooded Basin Irrigation Systems

HELENA® PENDIMETHALIN may be applied in flooded basin irrigation systems. Follow all recommendations, special instructions and precautions in the general section covering Flooded Basin Irrigation in Spraying Instructions.

Restrictions and Limitations

- DO NOT exceed 4.8 quarts of HELENA® PENDIMETHALIN per acre in any one crop season.
- Follow all precautions and restrictions on the labels of all products applied in combination with HELENA® PENDIMETHALIN. Always follow the most restrictive label.
- DO NOT apply HELENA® PENDIMETHALIN less than 50 days prior to alfalfa harvest for forage or hay.
- DO NOT apply HELENA® PENDIMETHALIN less than 90 days prior to alfalfa harvest for seed.
- Some stunting and chlorosis of the alfalfa may occur with postemergence applications.
- Applications made after the alfalfa exceeds 6 inches in height may result in poor weed control due to possible reduced spray coverage to the soil.

CORN (Field, Pop, Seed, Sweet)

HELENA® PENDIMETHALIN herbicide may be applied by ground, air or chemigation.

HELENA® PENDIMETHALIN may be applied in conventional, minimum, or no-till as a preemergence, postemergence, or postemergence incorporated (CULTI-SPRAY) application in field corn.

HELENA® PENDIMETHALIN may be applied in conventional tillage as a preemergence or postemergence application in sweet corn, seed corn, or popcorn.

Regardless of tillage system, plant corn at least 1 1/2 inches deep and completely cover with soil.

In conventional tillage systems, plant into a seedbed that is firm and free of clods and trash. Use only where adequate tillage is practiced to provide good soil coverage of the corn seed.

In no-till systems, utilize a no-till planter that is capable of planting through crop residue. The use of no-till planters under conditions that do not allow good soil coverage of the corn seed can result in reduced crop stand or injury if HELENA® PENDIMETHALIN contacts the germinating corn seed. Check equipment to ensure good seed coverage.

HELENA® PENDIMETHALIN or HELENA® PENDIMETHALIN tank mix combination treatments are most effective in controlling weeds when adequate rainfall or overhead irrigation is received within 7 days after application. If cultivation is necessary because of soil crusting or weed germination, use shallow tillage and make certain corn seeds are below the tilled area.

Additional Weeds Controlled: In addition to the weeds listed in Table 1, HELENA® PENDIMETHALIN will control the following weeds in corn with CULTI-SPRAY application: wild proso millet and shattercane.

Use Methods and Timings

Preemergence – Apply after planting but before weeds and crop emerge.

Postemergence – Apply postemergence until field corn is 30 inches tall (20 to 24 inches tall for pop, seed and sweet corn) or in the V8 growth stage, whichever is more restrictive. If the corn canopy prevents applications from reaching the soil, use drop nozzles and apply as a directed spray.

CULTI-SPRAY – Apply HELENA® PENDIMETHALIN alone or HELENA® PENDIMETHALIN plus atrazine when field corn is at least 4 inches tall until last cultivation (layby). HELENA® PENDIMETHALIN plus atrazine must be applied before the field corn reaches 12 inches in height.

DO NOT exceed 1.2 lbs ai per acre of atrazine, as specified on the atrazine label. Under situations of low rainfall or soil moisture when deep germinating weeds such as shattercane or field sandbur are anticipated, mechanical incorporation will provide best results. If cultivation is needed after application and incorporation of HELENA® PENDIMETHALIN, the depth of cut should be no deeper than the depth of cut used to incorporate.

Chemigation Applications

HELENA® PENDIMETHALIN may be applied through sprinkler irrigation systems. Follow all recommendations, special instructions and precautions in the general section covering Chemigation in Spraying Instructions.

Use Rates

Preemergence or Postemergence Applications

Soil Texture	Organic Matter		
	<1.5% (pts/A)	1.5 to 3.0% (pts/A)	>3.0% (pts/A)
Coarse	1.8 to 2.4	2.4 to 3.6	3.6
Medium	2.4 to 3.6	3.6	3.6 to 4.8
Fine	2.4 to 3.6	3.6 to 4.8	3.6 to 4.8

CULTI-SPRAY Applications – Field Corn ONLY

Soil Texture	Southern States ¹ (pts/A)	Northern States ¹ (pts/A)
Coarse	1.2 to 1.8	1.8 to 2.4 pts
Medium	1.8 to 2.4	2.4 to 3.6 pts
Fine	1.8 to 3.6	2.4 to 3.6 pts

¹ See Restrictions and Limitations for map of specific states.

Restrictions and Limitations

- DO NOT apply HELENA® PENDIMETHALIN in reduced, minimum or no-till sweet corn, seed corn or popcorn.
- DO NOT apply HELENA® PENDIMETHALIN in no-till in California.
- DO NOT apply preplant incorporated.
- DO NOT apply postemergence in liquid fertilizer.
- Livestock can graze or be fed forage from treated corn after 21 days following application.
- DO NOT exceed one application per crop season at the highest rate per acre for any given soil type and application method.

COTTON

HELENA® PENDIMETHALIN may be applied by ground, air, or chemigation in conventional, minimum, stale seedbed, or no-till as a preplant surface, preplant incorporated, preemergence, or layby application in cotton.

Preplant surface, preemergence, and layby treatments are most effective in controlling weeds when adequate rainfall or overhead irrigation is received within 7 days after application. A shallow cultivation is recommended if soil crusting or soil compaction occurs. If weeds begin to germinate or adequate moisture is not received within 7 days after application, use shallow tillage (rotary hoe or light harrow) and make sure cotton seeds are below tilled area. The use of a postemergence herbicide treatment may be required to control weed escapes at planting or following cotton emergence.

Additional Weeds Suppressed: In addition to the weeds listed in Table 1, HELENA® PENDIMETHALIN herbicide will suppress Russian thistle in the state of Arizona.

Use Methods and Timings

Preplant Surface – Apply HELENA® PENDIMETHALIN up to 15 days prior to planting. Apply HELENA® PENDIMETHALIN tank mixes and sequential programs as specified under the tank mix section.

Preplant Incorporated – Apply HELENA® PENDIMETHALIN up to 60 days prior to planting and incorporate within 7 days of application. Apply HELENA® PENDIMETHALIN tank mixes and sequential programs as specified under the tank mix section.

Preemergence – Apply HELENA® PENDIMETHALIN at planting or up to 2 days after planting. Apply to a seedbed that is firm and free of clods. Apply HELENA® PENDIMETHALIN tank mixes and sequential programs as specified under the tank mix section.

Preplant Incorporated followed by Preemergence – Apply HELENA® PENDIMETHALIN up to 60 days prior to planting and incorporate within 7 days of application. Apply overlay application of HELENA® PENDIMETHALIN at planting or up to 2 days after planting. Total amount of HELENA® PENDIMETHALIN applied per acre cannot exceed the highest labeled rate for a given soil type. Preplant incorporated and preemergence applications of HELENA® PENDIMETHALIN may be applied with the labeled tank mix herbicide(s).

Layby Application (at last cultivation) – Apply HELENA® PENDIMETHALIN directly to the soil between rows as a directed spray following the last normal cultivation (layby). Layby applications can be applied in cotton previously treated with HELENA® PENDIMETHALIN or any herbicide(s)

Disclaimer: Always refer to the label on the product before using Helena or any other product.

registered for use in cotton. Consult the labels of those herbicides for suggested treatments, rates to be used, and precautions or restrictions for use in cotton, and for follow-crop restrictions. The total amount of HELENA® PENDIMETHALIN applied per acre per season cannot exceed the highest labeled rate for a given soil type.

DO NOT apply as a broadcast spray over the top of the cotton or **SERIOUS CROP INJURY CAN RESULT. AVOID CONTACT OF THE SPRAY** to the non-woody portion of cotton stems and to cotton foliage or **SERIOUS CROP INJURY CAN RESULT**. To reduce the potential for crop injury caused by herbicide contact with cotton foliage and stems, use protective shields when conditions favoring spray drift occur.

Glyphosate-containing products may be applied with HELENA® PENDIMETHALIN at layby in cotton with the Roundup Ready® gene. DO NOT apply glyphosate-containing products at layby on non-Roundup Ready cotton. DO NOT apply HELENA® PENDIMETHALIN and glyphosate tank mix as a broadcast spray over the top of cotton or **CROP INJURY MAY RESULT**.

Chemigation Applications

HELENA® PENDIMETHALIN may be applied through sprinkler irrigation systems. Follow all recommendations, special instructions and precautions in the general section covering Chemigation in Spraying Instructions.

Fall Application – HELENA® PENDIMETHALIN may be applied for weed control in cotton in the fall after October 15 (up to 140 days prior to planting cotton) in Arizona, California, Louisiana, New Mexico, Mississippi, Oklahoma and Texas. Apply HELENA® PENDIMETHALIN at the broadcast rate of 2.4 pints per acre on coarse or medium soils and 3.6 pints per acre on fine soils.

Use Rates

Soil Texture	Conventional or Minimal Tillage (pts/A)	No-Till ² (pts/A)
Coarse	1.2 to 2.4 ¹	1.8 to 2.4
Medium	1.8 to 2.4	2.4 to 3.6
Fine	2.4 to 3.6	3.6 to 4.8

¹ DO NOT exceed 1.8 pts/A on coarse-textured soils in California.

² Not recommended for soils with more than 3% organic matter.

Restrictions and Limitations

- DO NOT apply HELENA® PENDIMETHALIN in no-till in California.
- Preharvest Interval (PHI) is 60 days between the last HELENA® PENDIMETHALIN application and harvest.
- DO NOT feed forage or graze livestock in treated cotton fields.
- DO NOT exceed the highest seasonal rate per acre for any given soil type.

EDIBLE BEANS

Dry, Lima, Snap, Chickpeas (Garbanzo Beans), Southern Peas (Cowpeas), and Sweet Lupines

HELENA® PENDIMETHALIN may only be applied (fall) preplant surface or preplant incorporated in (chickpeas [garbanzo beans]), dry beans, lima beans, snap beans, and Southern peas (cowpeas). HELENA® PENDIMETHALIN may be applied (fall) preplant surface or preplant incorporated or preemergence in sweet lupines.

Use Methods and Timings

Preplant Incorporated – Apply up to 60 days prior to planting and incorporate within 7 days of application.

Preemergence – Apply only to sweet lupines at planting or up to 2 days after planting. Apply to a seedbed that is firm and free of clods.

Use Rates

Soil Texture	Southern States ¹ (pts/A)	Northern States ¹	
		< 3% Organic Matter	> 3% (pts/A)
Coarse	1.8	2.4	2.4
Medium	2.4	3.0	3.6
Fine	3.6	3.6	3.6

¹ See Restrictions and Limitations for map of specific states.

Fall Applications – Fall preplant surface and preplant incorporated applications may be made in North Dakota, South Dakota, Minnesota, Oregon, Washington, Montana, Idaho, and Wyoming only. Rainfall or irrigation is required for incorporation and activation. Unpredictable weed control can be expected since factors such as length of time between application and planting as well as uncontrollable weather factors will determine herbicide activity and longevity.

Apply HELENA® PENDIMETHALIN herbicide and incorporate (rainfall, irrigation or mechanically) in late fall prior to planting edible beans [chickpeas (garbanzo beans)], dry beans (such as navy, great northern, red kidney, black turtle, cranberry, and small white type), lima beans, snap beans, Southern peas (cowpeas), and sweet lupines the following spring. Apply HELENA® PENDIMETHALIN in the late fall when soil temperatures are 45°F or below but before the ground freezes.

DO NOT apply when the air temperature is below 45°F.

Use Rates

Soil Texture	Broadcast Rate < 3% Organic Matter (pts/A)	Broadcast Rate > 3% Organic Matter (pts/A)
Coarse	1.2 to 2.4	2.4
Medium	1.8 to 3.0	3.0 to 3.6
Fine	2.4 to 3.6	3.6

¹ For use in North Dakota, South Dakota, Minnesota, Oregon, Washington, Montana, Idaho, and Wyoming only.

Restrictions and Limitations

- DO NOT feed lupine hay and forage or graze livestock in treated lupine fields.
- DO NOT apply HELENA® PENDIMETHALIN more than once per cropping season.
- DO NOT apply in any type of irrigation system.

FORAGE LEGUMES

HELENA® PENDIMETHALIN may be used in forage legumes used as a cover crop in Federal set-aside or conservation reserve program areas.

Some stand reduction of the legume cover crop may occur with this use. Consult local county extension service or the local ASC committee for recommended cover crops.

If loss of cover crop occurs due to adverse weather conditions, any crop registered for HELENA® PENDIMETHALIN preplant incorporated use can be replanted the same year into HELENA® PENDIMETHALIN-treated soil without adverse effects. If replanting is necessary, DO NOT rework the soil deeper than the HELENA® PENDIMETHALIN-treated zone. DO NOT feed or graze legume cover crops established following HELENA® PENDIMETHALIN application.

The cover crop residue should ultimately be destroyed by tillage or left on the surface to retard erosion or as directed by the local ASC committee.

Use Methods, Timings, and Rates

HELENA® PENDIMETHALIN may be applied preplant incorporated or preemergence for weed control in legume cover crops.

Use Rates Preplant Incorporated or Preemergence

Soil Texture	Broadcast Rate (pts/A)
Coarse	1.2 to 1.8
Medium	1.8 to 2.4
Fine	2.4 to 3.0

GARLIC

HELENA® PENDIMETHALIN may be applied preemergence, postemergence, or split application by ground, air, or chemigation.

Use Methods and Timings

Preemergence – After planting but before crop and weeds emerge.

Postemergence – 1st to 5th true-leaf growth stage.

Split Application – At both preemergence and postemergence timings.

Chemigation Applications

HELENA® PENDIMETHALIN may be applied through sprinkler irrigation systems. Apply between the 2nd and 9th true-leaf stage (2nd to 6th true-leaf stage in California). DO NOT irrigate in excess of 0.5 inch of water. Follow all recommendations, special instructions and precautions in the general section covering Chemigation in Spraying Instructions.

Use Rates

Soil Texture	Broadcast Rate (pts/A)
Coarse	1.8
Medium	2.4
Fine	3.6

Restrictions and Limitations

- DO NOT exceed 3.6 pints per acre per crop (except Idaho, Oregon, and Washington).
- DO NOT apply within 60 days of harvest in California and within 45 days of harvest in all other states.
- DO NOT feed or graze these crops.

GRAIN SORGHUM

Uniformly apply HELENA® PENDIMETHALIN in water by ground equipment or by aircraft.

HELENA® PENDIMETHALIN may be applied as a postemergence incorporated (CULTI-SPRAY) application in grain sorghum grown in all states.

In addition, HELENA® PENDIMETHALIN may be applied early postemergence in grain sorghum grown in states east of the Mississippi River and in Arkansas, eastern Texas, Louisiana, and the Missouri “bootheel.”

DO NOT apply HELENA® PENDIMETHALIN in grain sorghum preplant incorporated or preemergence as serious crop injury can result. DO NOT apply HELENA® PENDIMETHALIN in grain sorghum more than once per crop season.

Additional Weeds Controlled: In addition to the weeds listed in Table 1, HELENA® PENDIMETHALIN as a CULTI-SPRAY application will control the following weeds in grain sorghum: wild proso millet and shattercane.

Use Methods and Timings

CULTI-SPRAY: HELENA® PENDIMETHALIN treatments can be applied from the 4-inch growth stage to as late as the last cultivation (layby) of grain sorghum. See specific directions for (CULTI-SPRAY) application under **Application Instructions**.

Early Postemergence: For use only in states east of the Mississippi River plus Arkansas, eastern Texas, Louisiana, and the “bootheel” of Missouri.

The seedbed should be firm and free of clods and trash. Use only where adequate tillage is practiced to provide good seed coverage. Plant grain sorghum at least 1 1/2 inches deep to ensure good seed coverage.

Use Rates

CULTI-SPRAY Application

Soil Texture	Southern States ¹ (pts/A)	Northern States ¹ (pts/A)
Coarse	1.8	2.4
Medium	2.4	3.6
Fine	3.6	3.6

¹ See Restrictions and Limitations for map of specific states.

Early Postemergence Application

Soil Texture	HELENA® PENDIMETHALIN
Coarse	DO NOT USE
Medium, Fine	2.4 pts/A

Restrictions and Limitations

- DO NOT apply HELENA® PENDIMETHALIN preplant incorporated or preemergence.
- DO NOT apply HELENA® PENDIMETHALIN as a CULTI-SPRAY treatment in grain sorghum planted in double row beds.
- DO NOT replant grain sorghum if crop loss occurs.
- DO NOT apply in liquid fertilizer.
- Livestock can graze or be fed forage from HELENA® PENDIMETHALIN-treated grain sorghum fields after 21 days following application.

LENTILS AND PEAS
(English, Dry, Garden, Dwarf, Green, Pigeon, and Edible Pod)

HELENA® PENDIMETHALIN may be applied (fall) preplant surface or preplant incorporated for weed control in lentils and peas.

Use Methods and Timings

Preplant Incorporated – HELENA® PENDIMETHALIN may be applied 60 days prior to planting up to immediately before planting. After application, rotary hoeing and shallow cultivation/tillage can be practiced without reducing weed control. Avoid tillage that will bring untreated soil to the surface.

Use Rates

Soil Texture	Broadcast Rate (pts/A)
Coarse	1.8
Medium	2.4
Fine	3.6

Fall Applications – Fall preplant surface and preplant incorporated applications may be made in North Dakota, South Dakota, Minnesota, Oregon, Washington, Montana, Idaho, and Wyoming only. Rainfall or irrigation is required for incorporation and activation. Unpredictable weed control can be expected since factors such as length of time between application and planting as well as uncontrollable weather factors will determine herbicide activity and longevity.

Apply HELENA® PENDIMETHALIN and incorporate (via rainfall, irrigation or mechanically) in late fall prior to planting lentils or peas (English, dry, garden, dwarf, green, pigeon, and edible pod) the following spring. Apply HELENA® PENDIMETHALIN in the late fall when soil temperatures are 45°F or below but before the ground freezes.

DO NOT apply when the air temperature is below 45°F.

Preplant Surface and Preplant Incorporated (Fall Application¹)

Use Rates

Soil Texture	Broadcast Rate (pts/A)
Coarse	1.2 to 1.8
Medium	1.8 to 2.4
Fine	2.4 to 3.6

¹ For use in North Dakota, South Dakota, Minnesota, Oregon, Washington, Montana, Idaho, and Wyoming only.

Restrictions and Limitations

- DO NOT use in California.
- DO NOT apply HELENA® PENDIMETHALIN preemergence in peas.
- DO NOT apply HELENA® PENDIMETHALIN more than once per cropping season.
- DO NOT apply to peas, lentils, pea or lentil forage, pea silage, pea hay, or pea straw grown for livestock feed.
- DO NOT apply in any type of irrigation system.
- Any crop registered for a preplant incorporated application of HELENA® PENDIMETHALIN herbicide can be double cropped after peas.

NONBEARING FRUIT AND NUT TREE CROPS and NONBEARING VINEYARDS

HELENA® PENDIMETHALIN may be applied for preplant incorporated, preplant surface, surface incorporated or preemergence weed control in several nonbearing fruit and nut tree crops and nonbearing vineyards. HELENA® PENDIMETHALIN may be used before or after transplanting the following nonbearing crops:

almond apple apricot cherry citrus grape grapefruit	lemon nectarine orange peach pear pecan pistachio	plum prune tangelo tangerine walnut, English
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Apply the spray directly to the ground beneath the trees or vines. DO NOT apply over the top of trees or vines with leaves or buds. Contacting leaves, shoots, or buds with the spray mixture may cause malformed plant tissue. DO NOT apply to newly seeded nursery stock.

FOR NEWLY TRANSPLANTED AND ONE-YEAR-OLD GRAPEVINES:

- Apply only to dormant grapevines.
- DO NOT apply if buds have started to swell. Application after buds have started to swell may result in leaf distortion.
- DO NOT apply to newly transplanted trees or vines until ground has settled and no cracks are present.

Use Methods, Timings and Rates

HELENA® PENDIMETHALIN may be applied by ground, air, chemigation or flooded basin irrigation systems.

HELENA® PENDIMETHALIN may be applied either in a single application or sequentially with an interval of 30 days or more. Apply HELENA® PENDIMETHALIN at 2.4 to 4.8 quarts per acre (depending on desired length of control, see chart below) per application, but not to exceed a total of 4.8 quarts/A per year in pome, stone and other fruit trees, and not to exceed a total of 7.3 quarts/A per year in citrus, nut trees and grapevines.

Preplant Surface – Prior to transplanting, uniformly apply with ground or aerial equipment. Avoid root contact with treated soil when placing transplants into the hole or injury may occur.

Preplant Incorporated – Uniformly apply HELENA® PENDIMETHALIN prior to transplanting but before weeds emerge. Incorporate HELENA® PENDIMETHALIN to a depth of 1 to 2 inches. Application and incorporation must be made prior to transplanting to avoid mechanical injury to the crop. Avoid root contact with treated soil when placing transplants into the hole or injury may occur.

Preemergence (postplant) – Applications may be in a band or broadcast.

Chemigation Applications

HELENA® PENDIMETHALIN may be applied through sprinkler irrigation systems. Follow all recommendations, special instructions and precautions in the general section covering Chemigation in Spraying Instructions. DO NOT apply HELENA® PENDIMETHALIN-treated irrigation water over top of trees or vines with leaves or buds.

Flooded Basin Irrigation Systems

HELENA® PENDIMETHALIN may be applied in flooded basin irrigation systems. Follow all recommendations, special instructions and precautions in the general section covering Flooded Basin Irrigation in Spraying Instructions.

Use Rate per Acre

Short-term control	2.4 quarts
Long-term control	4.8 quarts

Restrictions and Limitations

- DO NOT feed forage or graze livestock in treated fields.
- DO NOT apply more than 4.8 quarts of HELENA® PENDIMETHALIN per acre per year in pome, stone and other fruit trees.
- DO NOT apply more than 7.3 quarts of HELENA® PENDIMETHALIN per acre per year in citrus, nut trees and grapevines.

ONIONS

(Direct-Seeded and Transplanted Dry Bulb)
and SHALLOTS (Dry Bulb)

HELENA® PENDIMETHALIN may be applied by ground, air or chemigation.

Chemigation Applications

HELENA® PENDIMETHALIN may be applied through sprinkler irrigation systems. Apply between the 2nd and 9th true-leaf stage (2nd to 6th true-leaf stage in California) unless otherwise specified below. DO NOT irrigate in excess of 0.5 inch of water. Follow all recommendations, special instructions and precautions in the general section covering Chemigation in Spraying Instructions.

Mineral Soils

Use Rates, Methods and Timings

Soil Texture	Broadcast Rate (pts/A)
Coarse	1.8
Medium	2.4
Fine	3.6

State-Specific Instructions

In All States Except California:

Apply HELENA® PENDIMETHALIN as a broadcast treatment when onions or shallots have 2 to 9 true leaves.

Additional Use in Colorado, Kansas, and Nebraska:

HELENA® PENDIMETHALIN may be applied sequentially in seeded onions. Apply first application of HELENA® PENDIMETHALIN at loop stage. Apply sequential application of HELENA® PENDIMETHALIN early postemergence (2nd to 9th true-leaf stage).

DO NOT exceed the maximum labeled rate for a given soil texture. DO NOT apply HELENA® PENDIMETHALIN at loop stage through the 9th true-leaf stage if heavy rains are expected, or severe crop injury may result.

Additional Use in Colorado and the High Plains of Texas:

For transplanted onions only, apply and shallow incorporate (less than 2" deep) HELENA® PENDIMETHALIN into preformed beds prior to transplanting.

Additional Use in Idaho, Oregon, and Washington:

Apply HELENA® PENDIMETHALIN as a broadcast treatment when onions or shallots are between the flag leaf to 9th true-leaf stage.

HELENA® PENDIMETHALIN may be used at 3.6 to 4.8 pints per acre for dodder control on medium- and fine-textured soils. DO NOT apply HELENA® PENDIMETHALIN using chemigation at the dodder control rate.

HELENA® PENDIMETHALIN may be applied in the fall or spring to the furrow area of land bedded in the fall in preparation for planting seed of dry bulb onions the following spring. Apply HELENA® PENDIMETHALIN as a banded application at rates based on appropriate soil texture. Band width should be approximately 1/2 the width of the row spacing. Keep HELENA® PENDIMETHALIN away from the area where onion seed will be planted. Harrow-off tops of beds following HELENA® PENDIMETHALIN furrow applications prior to planting onions. For selective weed control in the onion row, apply HELENA® PENDIMETHALIN as a banded postemergence application to flag leaf onions at the labeled rates based on soil texture. Apply HELENA® PENDIMETHALIN only once to the furrow area and once to the onion row as a postemergence application.

Additional Use in Michigan:

For mineral soils containing >10% organic matter, follow the directions for muck soils (see below).

In California:

HELENA® PENDIMETHALIN may only be applied as a single application when onions or shallots have 2 to 6 true leaves.

Restrictions and Limitations (Mineral Soils)

- DO NOT mechanically incorporate except as specified for use on dry bulb onions in Colorado and the Texas High Plains.
- DO NOT exceed 3.6 pints per acre per crop (except Idaho, Oregon, and Washington).
- DO NOT apply within 60 days of harvest in California and within 45 days of harvest in all other states.
- DO NOT feed or graze these crops.
- DO NOT apply HELENA® PENDIMETHALIN preemergence through the loop stage if heavy rains are expected or severe crop injury may result. If irrigating immediately after HELENA® PENDIMETHALIN application at the preemergence through loop stage, DO NOT irrigate in excess of 0.5 inch of water.

Muck Soils

Use Rates, Methods and Timings

HELENA® PENDIMETHALIN may be applied sequentially on muck soils as follows:

Application Timing and Growth Stage	Rate (pts/A)
Preemergence through Loop Stage	4.8
Early Postemergence (2 nd to 6 th true-leaf stage)	4.8
Late Postemergence (6 th to 9 th true-leaf stage)	4.8

Restrictions and Limitations (Muck Soils)

- DO NOT apply to muck soils in California.
- DO NOT apply within 45 days of harvest.
- DO NOT feed or graze these crops.

- DO NOT apply more than 14.4 pints per acre per growing season on muck soils. To maximize crop safety, ensure good soil coverage during planting or transplanting and delay preemergence applications to the loop stage, if possible.
- DO NOT apply HELENA® PENDIMETHALIN preemergence through the loop stage if heavy rains are expected or severe crop injury may result. If irrigating immediately after HELENA® PENDIMETHALIN application at the preemergence through loop stage, DO NOT irrigate in excess of 0.5 inch of water.
- DO NOT plant sugar beets, red beets, spinach, winter wheat, or winter barley as rotational crops on muck soils for 12 months from the time of last application if more than 3.6 pints per acre of HELENA® PENDIMETHALIN is applied to the onion crop.
- If loss of onion crop occurs, DO NOT replant any crop other than onions in muck soil during the same cropping year and DO NOT work the soil deeper than 2 inches.

PEANUTS

HELENA® PENDIMETHALIN may be applied by ground, air, or chemigation.

HELENA® PENDIMETHALIN may be applied preplant incorporated in peanuts.

HELENA® PENDIMETHALIN may also be applied preemergence to peanuts grown under overhead irrigation.

DO NOT use in California.

Use Methods and Timings

Preplant Incorporated - Apply HELENA® PENDIMETHALIN up to 60 days prior to planting and incorporate within 7 days after applications.

Preemergence - Apply HELENA® PENDIMETHALIN at planting or up to 2 days after planting and before crop emergence. To prevent decreased crop pegging, adequate incorporation must be achieved by applying a minimum of 0.75 inch of overhead irrigation or rainfall within 48 hours of application.

Chemigation Applications

HELENA® PENDIMETHALIN herbicide may be applied through sprinkler irrigation systems. Follow all recommendations, special instructions and precautions in the general section covering Chemigation in Spraying Instructions.

Use Rates

Region	Rate (pts/A)
Texas, Oklahoma and New Mexico	1.2 to 2.4
Other peanut growing states*	2.4

*For heavy weed infestations, especially of Texas panicum, up to 3.6 pts/A of HELENA® PENDIMETHALIN can be used in Alabama, Georgia or Florida.

POTATOES

HELENA® PENDIMETHALIN may be applied by ground, air, or chemigation.

HELENA® PENDIMETHALIN may be applied preemergence, preemergence incorporated, or early postemergence in potatoes.

Additional Weeds Controlled: In addition to the weeds listed in Table 1, HELENA® PENDIMETHALIN will control stinging nettle in potatoes.

Use Methods and Timings

Preemergence – Apply HELENA® PENDIMETHALIN after planting, but before potatoes and weeds emerge, or after dragoff.

Preemergence Incorporated – Apply HELENA® PENDIMETHALIN and incorporate after planting but before potatoes and weeds emerge. Where dragoff is practiced, apply HELENA® PENDIMETHALIN and incorporate before, at, or after dragoff, but before potatoes and weeds emerge. Incorporate HELENA® PENDIMETHALIN within 7 days of application. HELENA® PENDIMETHALIN must be thoroughly and uniformly incorporated into the top 1 to 2 inches of soil. Mechanical incorporation is not required if adequate rainfall for good crop and weed emergence occurs or irrigation is received within 7 days after application. Care must be taken so that incorporation equipment does not damage seed pieces or elongating sprouts.

Early Postemergence – Apply HELENA® PENDIMETHALIN from crop emergence to the 6-inch stage of growth. DO NOT apply HELENA® PENDIMETHALIN postemergence if potatoes are under stress from cold/wet or hot/dry conditions or crop injury may occur.

Chemigation Applications

HELENA® PENDIMETHALIN may be applied through sprinkler irrigation systems. Apply HELENA® PENDIMETHALIN preemergence after planting, after dragoff, or early postemergence through sprinkler irrigation systems. Follow all recommendations, special instructions and precautions in the general section covering Chemigation in Spraying Instructions.

Use Rates

Soil Texture	< 3% Organic Matter >3% (pts/A)	
	Coarse	1.8
Medium	2.4	3.6
Fine	3.6	3.6

Restrictions and Limitations

- DO NOT apply to sweet potatoes or yams.
- DO NOT apply preplant.
- DO NOT make more than one application of HELENA® PENDIMETHALIN per season.
- Application of HELENA® PENDIMETHALIN on White Rose variety potatoes during or followed by cool and/or wet weather conditions may result in crop injury.

RICE

HELENA® PENDIMETHALIN may be applied as a delayed preemergence application in drilled dry-seeded rice or as an early postemergence application in dry-seeded rice. Treatments may be applied to conventional, reduced or minimum tillage, and no-till (stale seedbed) rice. The seedbed should be firm and free of clods and must be prepared to allow for good seed coverage. The use of a planter under conditions that do not allow good soil coverage of the rice seed can result in reduced stand or stunting if HELENA® PENDIMETHALIN contacts germinating rice seed.

Additional Weeds Controlled: In addition to the weeds listed in Table 1, HELENA® PENDIMETHALIN will control the following weeds in rice: junglerice and sprangletop.

Use Methods and Timings

Delayed Preemergence – Apply HELENA® PENDIMETHALIN alone or with tank mix partner for delayed preemergence weed control in grain-drilled, dry-seeded rice. Apply HELENA® PENDIMETHALIN alone or in tank mixture to levees after the levees are pulled and planted. Exposed seeds that come in contact with HELENA® PENDIMETHALIN may be injured. Apply only when growing conditions favor vigorous rice growth. The seedbed should have adequate moisture for seed germination. Not for use in California.

Uniformly apply the recommended rate of HELENA® PENDIMETHALIN after rice planting and before rice and weed emergence (spiking). Apply after the rice seed has absorbed water and germinated and after the soil has been previously sealed over the seed by at least 1 inch of rainfall or by irrigation (flush). If the soil has not been sealed by rain or flush, apply when 80 percent of germinated seeds have a primary root (radicle) or shoot at least ½ inch long. If there is insufficient moisture, flushing is recommended before HELENA® PENDIMETHALIN application to supply moisture for root (radicle) initiation and for vigorous rice and weed growth.

If applied to soil prior to these conditions or to cracked soil, stand reduction or stunting of rice may occur. Under some conditions, use of gibberellic acid-treated seed, heavy rainfall after application, or flushing after application may result in herbicide injury to rice. Rice can overcome moderate injury with appropriate cultural practices.

Due to the residual activity of HELENA® PENDIMETHALIN herbicide, this treatment may be applied if rice is too small to maintain a flood on the field for weed control. However, proper water management practices must be followed for normal rice growth and activity of HELENA® PENDIMETHALIN.

Early Postemergence – Apply HELENA® PENDIMETHALIN as a tank mix partner. Base applications on weed and crop size guidelines of the tank mix partner. DO NOT apply to fields with standing water. If necessary, fields may be flushed prior to treatment to produce vigorous rice and weed growth. Since soil and weeds must be completely exposed to spray coverage, no flood water should be on the field at the time of application. Cloddy soil, standing water (puddles) at the time of application, or cracks in the soil that form after application may result in reduced weed control. Because of residual activity of HELENA® PENDIMETHALIN, this treatment may be applied if rice is too small to maintain a flood on the field for weed control. However, proper water management practices must be followed for normal rice growth and activity of HELENA® PENDIMETHALIN.

Since the residual activity of HELENA® PENDIMETHALIN is activated by moisture, HELENA® PENDIMETHALIN is most effective in controlling emerging weeds when adequate rainfall or irrigation (flush) is received within 7 days after application.

Use Rates

Delayed Preemergence Applications

Soil Texture	Rate (pts/A)
Sands, loamy sands	DO NOT USE
Sandy loams	1.8
Loams, silt loams, silts, sandy clay loams	2.4
Silty clay loams, clay loams, sandy clays, silty clays, clays	2.4

Early Postemergence Application

Soil Texture	Rate (pts/A)
Coarse	1.8
Medium	2.4
Fine	2.4

Restrictions and Limitations

- DO NOT apply HELENA® PENDIMETHALIN through any type of irrigation system.
- DO NOT apply in liquid fertilizer.
- DO NOT use on water-seeded rice except as specified in other HELENA CHEMICAL COMPANY labeling.
- DO NOT apply to rice fields if fields are used for fish production, especially catfish or crayfish farming.
- DO NOT use water containing HELENA® PENDIMETHALIN residues from rice cultivation to irrigate food or feed crops that are not registered for use with HELENA® PENDIMETHALIN.
- In case of a crop failure due to weather conditions or disease following treatment with HELENA® PENDIMETHALIN alone or in a tank mixture, only drilled dry-seeded rice may be immediately replanted; however, the grower assumes all risks and consequences associated with replanting of rice because there is the potential for stand reduction or stunting. A 10 percent increase in seeding rate is recommended. Replant seed below the herbicide layer because reduced stand or stunting may occur if HELENA® PENDIMETHALIN contacts germinating rice seed. DO NOT replant with gibberellic acid-treated seed. DO NOT reapply HELENA® PENDIMETHALIN alone or in a tank mixture.
- DO NOT apply HELENA® PENDIMETHALIN and then flush for germination.
- DO NOT apply to stressed rice. Stress factors include cold or hot temperature extremes, excessive moisture or drought, problem soils, poor field drainage, or deep water after application.
- DO NOT apply early preemergence nor preplant incorporated as severe rice injury is possible.
- DO NOT feed forage or graze livestock in treated fields.

SOYBEANS

HELENA® PENDIMETHALIN may be applied in conventional, minimum, or no-till as a fall surface, fall incorporated, preplant surface, preplant incorporated, or preemergence application in soybeans.

Additional Weeds Controlled: In addition to the weeds listed in Table 1, HELENA® PENDIMETHALIN will control or reduce competition from the following weeds in soybeans:

itchgrass and red rice. For specific rates for red rice and itchgrass management, see table at end of this section.

Use Methods and Timings

Fall Applied – HELENA® PENDIMETHALIN may be surface applied or incorporated in the fall, after fall harvest and prior to ground freeze in states north of I-80 and the entire states of Iowa, Illinois, Indiana, Kansas, Kentucky, Missouri, Nebraska, Ohio, Oklahoma, and Texas. Fall applications of HELENA® PENDIMETHALIN will not provide season-long weed control.

Preplant Surface – Apply HELENA® PENDIMETHALIN up to 15 days prior to planting. HELENA® PENDIMETHALIN may be applied up to 45 days prior to planting when used in a tank mix or applied sequentially with Extreme®, Raptor®, or Pursuit® herbicides. Apply HELENA® PENDIMETHALIN tank mixes and sequential programs as specified under the tank mix section.

Preplant Incorporated – Apply HELENA® PENDIMETHALIN up to 60 days prior to planting and incorporate within 7 days after application.

Preemergence – Apply HELENA® PENDIMETHALIN at planting or up to 2 days after planting. Apply to a firm seedbed free of clods. DO NOT make applications of HELENA® PENDIMETHALIN preemergence north of Interstate 80, except in the states of Indiana, Michigan and Ohio, or as specified in HELENA CHEMICAL COMPANY supplemental labeling.

Use Rates

Fall Surface, Fall Incorporated, Preplant Surface, or Preplant Incorporated

Soil Texture	< 3% Organic Matter >3% (pts/A)	
Coarse	1.8	2.4
Medium	3.0 ¹	3.6
Fine ²	3.6	3.6

¹ DO NOT exceed 2.1 pts for southern states; see Restrictions and Limitations for map of specific states.

² For heavy clay soils, apply HELENA® PENDIMETHALIN at the broadcast rate of 3.6 pints per acre.

Preemergence Applications

Soil Texture	< 3% Organic Matter >3% (pts/A)	
Coarse	1.8	1.8
Medium	2.4	2.4
Fine	2.4	3.0

Preplant Incorporated Applications for Red Rice Control and Itchgrass Suppression

Soil Texture	< 3% Organic Matter >3%	
Coarse	3.6	
Medium	3.6	
Fine	4.8	

¹ This use is not recommended for soils with more than 3% organic matter.

Restrictions and Limitations

- DO NOT APPLY POSTEMERGENCE or serious crop injury can result.
- DO NOT use HELENA® PENDIMETHALIN in soybeans in California.
- Livestock can graze or be fed forage from treated soybean fields.
- DO NOT apply within 85 days of harvest.
- DO NOT exceed one application per crop season at the highest rate per acre for any given soil type and application method.

SUGARCANE

Use Methods and Timings

HELENA® PENDIMETHALIN may be applied preemergence through layby to plant or ratoon sugarcane. Applications may be made band or broadcast. Although there may be adequate crop tolerance for postemergence applications at layby, the spray must be directed under the sugarcane canopy in order to obtain effective weed control.

HELENA® PENDIMETHALIN must be thoroughly and uniformly incorporated into the soil with either (a) mechanical incorporation equipment as outlined below, or (b) with rainfall or irrigation, if rainfall or irrigation is adequate for good crop and weed emergence and received within 7 days after application. If rainfall or irrigation is not obtained, HELENA® PENDIMETHALIN should be mechanically incorporated.

Mechanical Incorporation

HELENA® PENDIMETHALIN should be applied to loosened beds and incorporated into the top 1 to 2 inches of soil within 7 days after application.

Use Rates

Use Area	Broadcast Rate ¹ (pts/A)
All states, except Hawaii	4.8 to 7.2
Muck soils (Florida only)	4.8 to 9.7
Hawaii	4.8 to 9.7

¹ Use the high rate if: clay soils; no mechanical incorporation is planned; heavy weed populations are anticipated; itchgrass infestation is anticipated; shaving is planned.

Restrictions and Limitations

- DO NOT exceed 14.4 pints of HELENA® PENDIMETHALIN per acre in one growing season.
- DO NOT use less than 11 gallons of water as a carrier when applying HELENA® PENDIMETHALIN for weed control.
- Ratoon sugarcane must be lightly shaved in early spring to remove the old stubble before incorporation over the line of sugarcane is possible. Carefully adjust equipment to incorporate without causing excessive damage to emerging shoots.
- DO NOT make aerial applications at close-in because complete and uniform coverage cannot be obtained.
- DO NOT apply through any type of irrigation system.
- DO NOT apply within 90 days of harvest.

Disclaimer: Always refer to the label on the product before using Helena or any other product.

- DO NOT graze treated fields or feed treated forage or fodder to livestock.

SUNFLOWERS

HELENA® PENDIMETHALIN may be applied preplant incorporated in all states. Fall preplant incorporated applications may be made in North Dakota, South Dakota and Minnesota only.

HELENA® PENDIMETHALIN may be applied preemergence in conventional tillage sunflowers, except in the state of California. Plant sunflowers 1.5" to 2" deep and completely cover with soil.

Use Methods and Timings

Preplant Incorporated (Spring) – Apply up to 60 days prior to planting and incorporate within 7 days after application.

Preplant Incorporated (Fall applications in North Dakota, South Dakota and Minnesota) – Apply HELENA® PENDIMETHALIN and immediately incorporate in late fall prior to planting sunflowers the following spring. Apply HELENA® PENDIMETHALIN in the late fall when soil temperatures are 45°F or below but before the ground freezes. DO NOT apply when the air temperature is below 45°F. Prior to sunflower planting in the spring, fields treated with HELENA® PENDIMETHALIN herbicide should receive at least one shallow additional incorporation. Spring incorporation should be at an angle to the last tillage operation.

Preemergence – Apply HELENA® PENDIMETHALIN at planting or up to 2 days after planting. Preemergence applications of HELENA® PENDIMETHALIN to sunflowers may increase the likelihood of crop injury, especially when sunflowers are grown in stress situations, such as compacted soils. Decreased herbicide performance compared to preplant incorporated applications may also result from a preemergence application. If dry conditions with limited precipitation exist or unseasonably cool temperatures following planting are forecast, apply HELENA® PENDIMETHALIN prior to planting and mechanically incorporate with tillage.

Use Rates

Preplant Incorporated (Spring) or Preemergence (Conventional Tillage)

Soil Texture	Northern States		
	Southern States ¹ (pts/A)	< 3% Organic Matter >3% (pts/A)	
Coarse	1.8	2.4	2.4
Medium	2.4	3.0	3.6
Fine	3.6	3.6	3.6

¹ See Restrictions and Limitations for map of specific states.

Preplant Incorporated (Fall) Application¹

Soil Texture	< 3% Organic Matter >3% (pts/A)	
Coarse	3.0	3.0
Medium	3.6	4.2
Fine	4.2	4.2

¹ For use in North Dakota, South Dakota and Minnesota only.

NO-TILL SUNFLOWERS

HELENA® PENDIMETHALIN may be applied at 3.6 pints per acre up to 30 days before planting (preplant) to immediately after planting (preemergence).

HELENA® PENDIMETHALIN is most effective in controlling weeds when adequate rainfall or overhead irrigation is received within 7 days after application.

Restrictions and Limitations (all tillage types)

- DO NOT apply HELENA® PENDIMETHALIN postemergence.
- DO NOT feed forage or graze livestock in treated sunflower fields.
- DO NOT use in California.

TOBACCO

HELENA® PENDIMETHALIN may be applied preplant incorporated or as a layby application in transplanted tobacco.

Use Methods and Timings

Preplant Incorporated – Apply HELENA® PENDIMETHALIN with ground sprayer up to 60 days prior to transplanting tobacco and incorporate within 7 days after application.

Applied according to directions and under normal growing conditions, HELENA® PENDIMETHALIN will not harm transplanted tobacco. Under stress conditions for plant growth such as cold/wet or hot/dry weather, HELENA® PENDIMETHALIN can produce a temporary retardation of tobacco development.

Layby – HELENA® PENDIMETHALIN may be applied as a directed spray following the last normal cultivation (layby), usually 4 to 6 weeks after transplanting tobacco. Apply HELENA® PENDIMETHALIN in a 16- to 24-inch band between the crop rows. The spray should not contact tobacco plants.

Use Rates

Preplant Incorporated Application

Use Area	Soil Texture	Rate (pts/A)
Florida Georgia Maryland North Carolina South Carolina Virginia	Coarse	2.4
	Medium sandy clay loams, loams	2.4
	silt loams, silts	3.0
	Fine	3.0
Other states	Coarse	2.4
	Medium	3.6
	Fine	3.6

Layby Application

Soil Texture	Broadcast Rate (pts/A)
Coarse	1.8
Medium	2.4
Fine	2.4

Restrictions and Limitations

- DO NOT apply as a broadcast spray as contact may cause malformed tobacco leaves.

**CONDITIONS OF SALE-LIMITED WARRANTY
AND LIMITATIONS OF LIABILITY AND REMEDIES**

Read the Conditions of Sale-Warranty and Limitations of Liability and Remedies before using this product. If the terms are not acceptable, return the product, unopened, and the full purchase price will be refunded.

The directions on this label are believed to be reliable and should be followed carefully. Insufficient control of pests and/or injury to the crop to which the product is applied may result from the occurrence of extraordinary or unusual weather conditions or the failure to follow the label directions or good application practices, all of which are beyond the control of Helena Chemical Company (the "Company") or seller. In addition, failure to follow label directions may cause injury to crops, animals, man or the environment. The Company warrants that this product conforms to the chemical description on the label and is reasonably fit for the purpose referred to in the directions for use subject to the factors noted above which are beyond the control of the Company. The Company makes no other warranties or representations of any kind, express or implied, concerning the product, including no implied warranty of merchantability or fitness for any particular purpose, and no such warranty shall be implied by law.

The exclusive remedy against the Company for any cause of action relating to the handling or use of this product shall be limited to, at Helena Chemical Company's election, one of the following:

1. Refund of the purchase price paid by buyer or user for product bought, or
2. Replacement of the product used

To the extent allowed by law, the Company shall not be liable and any and all claims against the Company are waived for special, indirect, incidental, or consequential damages or expense of any nature, including, but not limited to, loss of profits or income. The Company and the seller offer this product and the buyer and user accept it, subject to the foregoing conditions of sale and limitation of warranty, liability and remedies.

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