

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

WASHINGTON, D.C. 20460

OFFICE OF  
PREVENTION, PESTICIDES  
AND TOXIC SUBSTANCES

LG Life Sciences  
c/o Dr. Mathew Brooks  
Ag-Chem Consulting  
12208 Quinque Lane  
Clifton, VA 20124

NOV 10 2008

Dear Dr. Brooks:

Subject: Amendments – Response to Agency's February 21, 2008 letter implementing spray drift language and Permethrin RED risk mitigation labeling; and Add soybeans

Permastar AG

EPA Reg. No. 71532-15

Your submissions dated August 12, 22, and 28, 2008

The amendment referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) section 3(c)(7)(a), is acceptable provided that you:

1. Submit and/or cite all data or other material required for registration/reregistration of your product under FIFRA section 3(c)(5) or FIFRA section 4 when the Agency requires all registrants of similar products to submit such data.
2. Make the labeling changes listed below before you release the product for shipment bearing the amended labeling:
  - a. Since the label includes directions for fogging in mushroom houses, in the Personal Protective Equipment (PPE) section add following as the first entry after the introductory paragraph

Applicators using ULV cold foggers or fog/mist generators in indoor spaces must wear:

- Coveralls over long-sleeved shirt and long pants,
- Chemical-resistant gloves,
- Chemical-resistant footwear plus socks, and
- Chemical-resistant headgear, if overhead exposure

b. In the same PPE section, revise the beginning of the next paragraph to read "All other mixers, loaders, applicators, and other handlers must wear:". In the last bullet item under this heading, delete "and for handlers performing animal dip applications", since there are no animal dip application direction on this label. As the last sentence of the PPE section, add "See Engineering Controls for additional requirements."

c. Add the missing heading "User Safety Requirements" then enclose that heading and the associated two paragraphs beginning with "Follow manufacturer's instructions for cleaning...etc" and "Discard clothing and other absorbent materials...etc" within an outline box.

d. In the Environmental Hazards, delete the introductory phrase "For terrestrial uses," since all the uses on the label are terrestrial uses.

e. Directly under the heading DIRECTIONS FOR USE, add RESTRICTED USE PESTICIDE in bold type.

f. Relocate the paragraph beginning "Do not apply this pesticide in a way...etc." and ending "...State or Tribe, consult the agency responsible for pesticide regulation" from beneath "It is a violation of Federal law...etc" to appear directly above the Agricultural Use Requirements box.

g. Under the heading "Chemigation Use Directions", delete the precaution "Do not apply when wind speed favors drift beyond the area intended for treatment." . The appropriate spray drift precautions now appear under the heading "Spray Drift Requirements".

h. Add the heading BUFFER ZONES above the heading "Vegetative Buffer Strips". In the first sentence under that subheading, correct "natural ponts" to read "natural ponds". Throughout the Vegetative Buffer Strips text, qualify the site "ponds" to read "natural ponds" in all locations where the term "ponds" occurs. Also, qualify "streams" to read "permanent streams" and correct the website URL (address) for guidance to read as follows: [www.in.nrcs.gov/technical/agronomy/newconbuf.pdf](http://www.in.nrcs.gov/technical/agronomy/newconbuf.pdf)

\*? i. In the notes appearing under each crop entry give the maximum rate per application and the seasonal maximum application rate (in both pounds of active ingredient and ounces of formulated product per acre).

j. For Cabbage, in the Method of Application delete "at a minimum of 5 day intervals" which follows "but no sooner than 5 day intervals".

k. For Chrysanthemums, add a note that states "Spoons must not be used for food purposes after use in measuring pesticides."

1. In the specific directions under the heading "Corn (field), Field Corn Grown for Seed, Popcorn" revise the "Rate of Application" entry for the "Pre-emergent Use" to read 4 to 6 ounces (0.1 to 0.15 pound active ) per acre. Revise the pre-emergent 1000 linear feet rate accordingly.
- m. In the table under the entry for "Corn (Field), Field Corn Grown for Seed, Popcorn (At Plant Use)", align the Row Spacing numbers with the other numbers in the table.  
For the column 20 inch row spacing revise the pounds per acre to read "0.15" and the formulated ounces per acre to read "6.0".
- n. For Leafy Vegetable (except Brassica), revise the note for "All other crops" to show a maximum rate of 1.0 pound of active ingredient and 40 oz of product.
- o. In the list of prohibitions for Pine Seed Orchards, in the notes add "Harvesting of conifer seed cones is prohibited within 30 days of application.". Also, delete "Avoid contact with open water.". The Environmental Hazards statement lists the appropriate prohibition with respect to application in the vicinity of water.
- p. Under "Ornamental Nursery Stock (Field Grown)" and "Roses (Greenhouse)", there is a box with the heading "Method of Application" but no directions on how (equipment) to apply the product are given. Please identify the method of application. For the greenhouse use on roses, identify whether ULV cold foggers or fog/mist generators are permitted or prohibited, as this will change the PPE requirements.
- q. In the Rate Conversion chart, delete the entry 0.40 Pounds Active and 16.0 Formulation Ounces, since that rate exceeds the highest rate for agricultural crops presented in Attachment 2 of the Agency's February 21, 2008 letter.
- r. On page 27, revise "The Directions for Use of this product should be followed carefully." to read "The Directions for Use of this product must be followed carefully."

A stamped copy of the label is enclosed for your records. For your convenience and to aid you with state registrations, the unified labeling including both the soybean addition and the RED risk mitigation revisions has been stamped. Please submit three copies of the amended labeling bearing the above revisions before you release the amended label for shipment. Please note that acceptance of this amendment does not constitute reregistration of the subject product.

Sincerely,

*Dana R. Pilitt*  
Richard Gebken  
Product Manager 13  
Insecticide Branch  
Registration Division (7505P)

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**RESTRICTED USE PESTICIDE**  
Due to toxicity to fish and aquatic organisms.  
For retail sale to and use only by certified applicators or persons under their direct supervision and only for those uses covered by the certified applicator's certification.

# PermaStar AG

## Agricultural Insecticide

**ACCEPTED  
with COMMENTS**  
In EPA Letter Dated:  
**NOV 10 2008**  
Under the Federal Insecticide,  
Fungicide, and Rodenticide Act,  
as amended, for the pesticide  
registered under EPA Reg. No.  
71532-15

Active Ingredient:	
*Permethrin**	38.0%
Other Ingredients:***	62.0%
	100.0%

\**(3-Phenoxyphenyl)methyl (+) 3-(2,2-dichloroethyl)-2,2-dimethylcyclopropanecarboxylate*  
 \*\**cis/trans ratio: Max. 55% (+) cis and min. 45% (+) trans*  
 \*\*\**Contains petroleum distillates*

KEEP OUT OF REACH OF CHILDREN  
**CAUTION**  
**AVISO**

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.)

LG Life Sciences  
910 Sylvan Avenue  
Englewood Cliffs, NJ 07632

EPA Registration No. 71532-15  
EPA Establishment No. 44616-MO-1

Net Contents: 2.5 gallons

**PRECAUTIONARY STATEMENTS**

**Hazards to Humans and Domestic Animals**

**CAUTION**

Harmful if swallowed, inhaled or absorbed through skin. Causes moderate eye irritation. Avoid contact with skin, eyes, or clothing. Avoid breathing spray mist.

FIRST AID	
If Inhaled:	<ul style="list-style-type: none"> <li>• Move person to fresh air.</li> <li>• If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible.</li> <li>• Call a poison control center or doctor for further treatment advice.</li> </ul>
If on Skin or Clothing:	<ul style="list-style-type: none"> <li>• Take off contaminated clothing.</li> <li>• Rinse skin immediately with plenty of water for 15-20 minutes.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
If in Eyes:	<ul style="list-style-type: none"> <li>• Hold eye open and rinse slowly and gently with water for 15-20 minutes.</li> <li>• Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
If Swallowed:	<ul style="list-style-type: none"> <li>• Call a poison control center or doctor immediately for treatment advice.</li> <li>• Do not give any liquid to the person.</li> <li>• Do not induce vomiting unless told to do so by the poison control center or doctor.</li> <li>• Do not give anything by mouth to an unconscious person.</li> </ul>
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact the Poison Control Center at 1-800-222-1222 for emergency medical treatment information.	
Note to Physician: This product contains petroleum distillates – vomiting may cause aspiration pneumonia. Consideration should be given to gastric lavage with an endotracheal tube in place. Treatment is controlled removal of exposure followed by symptomatic and supportive care.	

**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 G on an EPA chemical-resistance category selection chart.

All mixers, loaders, applicators, and other handlers must wear:

- Long-sleeved shirt and long pants,
- Shoes plus socks
- Chemical-resistant gloves for all handlers except for applicators using motorized ground equipment, pilots and flaggers,
- Chemical-resistant apron for mixers/loaders, persons cleaning equipment, and persons exposed to the concentrate and for handlers performing animal dip applications.

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

Discard clothing and other absorbent materials that have been drenched (except as required by directions for use) or heavily contaminated with this product's concentrate. Do not reuse them.

**Engineering Control Statement**

Pilots must use an enclosed cockpit that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(6)].

**User Safety Recommendations**

Users should:

- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco.

**ENVIRONMENTAL HAZARDS**

This pesticide is extremely toxic to aquatic organisms, including fish and invertebrates. For terrestrial uses, do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not apply when weather conditions favor drift from treated areas. Drift and runoff from treated areas may be hazardous to aquatic organisms in neighboring areas. Do not contaminate water when disposing of equipment washwaters.

Under some conditions, it may also have a potential for transport into surface water in runoff (primarily adsorbed to suspended soil particles), for several months or more after application. These include poorly draining or wet soils with readily visible slopes toward adjacent surface waters, frequently flooded areas, and areas overlying extremely shallow groundwater, areas with in-field canals or ditches that drain to surface water, areas not separated from adjacent surface waters with vegetated filter strips, and areas over-lying tile drainage systems that drain to surface waters.

This pesticide is highly toxic to bees exposed to direct treatment on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds while bees are actively visiting the treatment areas.

Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

**PHYSICAL OR CHEMICAL HAZARDS**

Do not use or store near heat or open flame.

**DIRECTIONS FOR USE**

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

**Resistance:** Some insects are known to develop resistance to products used repeatedly for control. Because the development of resistance cannot be predicted, the use of this product should conform to resistance management strategies established for the use area. Consult your local or state agricultural authorities for details.

If resistance to this product develops in your area, this product, or other products with a similar mode of action, may not provide adequate control. If poor performance cannot be attributed to improper application or extreme weather conditions, a resistant strain of insect may be present. If you experience difficulty with control and resistance is a reasonable cause, immediately consult your local company representative or agricultural advisor for the best alternative method of control for your area.

**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 12 hours.

**PROHIBITION** – Harvesting of conifer seed cones is prohibited within 30 days of application.

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,
- Shoes plus socks,
- Chemical-resistant gloves such as Barrier Laminate or Viton.

**STORAGE AND DISPOSAL**

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

**Pesticide Storage:** Do not store below 10F, (-12C). Do not use or store near heat, open flame or hot surfaces.

Keep out of reach of children and animals. Store in original containers only. Store in a cool, dry place and avoid excess heat. Carefully open containers. After partial use, replace lids and close tightly. Do not put concentrate or dilute material into food or drink containers. Do not contaminate other pesticides or fertilizers by storage or disposal.

In case of spill, avoid contact, isolate area and keep out animals and unprotected persons. Confine spill by: If liquid, dike surrounding area or absorb with sand, cat litter, commercial clay or gel absorbents. If dry material, cover to prevent dispersal. Place damaged package in a holding container. Identify contents.

**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 instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative of the nearest EPA Regional Office for guidance.

**Container Disposal:**

**Plastic Containers:** *For containers equal to or less than 5 Gallons:* Nonrefillable container. Do not reuse or refill this container. Clean container promptly after emptying. Triple rinse as follows: Empty the remaining contents into the application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container ¼ 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. Offer for recycling if available. **CONTAINER IS NOT SAFE FOR FOOD, FEED, OR DRINKING WATER!**

**Chemigation Use Directions**

Apply this product only through sprinkler including center pivot, lateral move end tow, side (wheel) roll, traveler, big gun, solid set, or hand move irrigation systems. Do not apply this product through any other type of irrigation system. Do not connect an irrigation system (including greenhouse systems) used for pesticide application to a public water system.

Crop injury, lack of effectiveness, or illegal residues in the crop can result from nonuniform distribution of treated water. If you have questions about calibration, you should contact State Extension Service specialists, equipment manufacturers, or other experts. A person knowledgeable of the chemigation system and responsible for its operation, or under the supervision of the responsible person, shall shut the system down and make necessary adjustments should the need arise.

The system must contain a functional check valve, vacuum relief valve, and low pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from backflow.



The pesticide injection pipeline must also contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.

The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops.

The irrigation line or water pump must include a functional pressure switch which will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected.

Systems must use a metering pump, such as a positive displacement injection pump (e.g. diaphragm pump) effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.

Do not apply when wind speed favors drift beyond the area intended for treatment.

PermaStar AG Agricultural Insecticide should be applied continuously for the duration of the water application. PermaStar AG Agricultural Insecticide should be diluted in sufficient volume to ensure accurate application over the area to be treated. When using chemigation, a minimum of 0.1 inch per acre of irrigation water is recommended. Agitation generally is not required when a suitable diluent is used. A diluent test should be conducted to ensure that phase separation will not occur during dilution and application. Failure to achieve a uniform dilution throughout the time of application may result in undesirable residues or less than desirable control.

**Commercial Impregnation and Application of PermaStar AG Agricultural Insecticide On Dry Bulk Fertilizers**

PermaStar AG Agricultural Insecticide may be impregnated on dry bulk fertilizers. When applied as directed, PermaStar AG Agricultural Insecticide/dry bulk fertilizer mixtures provide insect control equal to that provided by the same rates of PermaStar AG Agricultural Insecticide applied in water.

The PermaStar AG Agricultural Insecticide/fertilizer mixtures may be surface applied or shallow incorporated. The higher rate should be used if incorporation is used.

**Impregnation:** Apply using a minimum of 200 pounds of dry bulk fertilizer per acre and up to a maximum of 450 pounds per acre with the recommended amount of PermaStar AG Agricultural Insecticide per acre. Use a closed rotary-drum mixer or a similar type of closed blender equipped with suitable spray equipment. The spray nozzle(s) should be positioned to provide a uniform, fine spray pattern over the tumbling fertilizer for thorough coverage. The physical properties of fertilizers vary, particularly in liquid absorptive capacity. When absorptivity is sufficient, simple spray impregnation of the fertilizer with PermaStar AG Agricultural Insecticide provides a satisfactory, dry mixture. If the absorptive capacity is inadequate, the use of a highly absorptive powder is required to provide a dry, flowable mixture. Microcel E (Johns-Manville Products Corporation) is a recommended absorbent powder. Generally less than 2% by

weight of Microcel E is required. DO NOT impregnate PermaStar AG Agricultural Insecticide onto straight coated ammonium nitrate or straight limestone because these materials will not absorb the insecticide. Dry fertilizer blends containing mixtures of ammonium nitrate or limestone may be impregnated with PermaStar AG Agricultural Insecticide.

The amount of PermaStar AG Agricultural Insecticide actually required in the preparation of individual fertilizer mixtures should be determined carefully for each production operation. This is necessary to ensure that the amount of pesticides actually contained in the mixture applied to the soil represents the correct rate of use. Bulk fertilizer impregnated with PermaStar AG Agricultural Insecticide should be applied immediately, not stored.

All individual state regulations relating to bulk dry fertilizer blending, registration, labeling, and application of the mixtures are the responsibility of the individual and/or company selling the fertilizer and PermaStar AG Agricultural Insecticide mixture.

**GENERAL PRECAUTIONS AND RESTRICTIONS**

**A. Vegetative Buffer Strips**

Construct and maintain a minimum 10-foot wide vegetative filter strip of grass or other permanent vegetation between the field edge and down gradient aquatic habitat (such as, but not limited to, lakes; reservoirs, rivers, permanent streams; marches or natural ponds, estuaries, and commercial fish farm ponds).

Only apply products containing PermaStar AG onto fields where a maintained vegetative buffer strip of at least 10 feet exists between the field and down gradient aquatic habitat. For guidance, refer to the following publication for information on constructing and maintaining effective buffers:

- *Conservation Buffers to Reduce Pesticide Losses. Natural Resources Conservation Services. USDA, NRCS. 2000. Fort Worth, Texas. 21 pp.*  
<http://www.in.csusda/v/technical/agronom/newconbuf.pdf>

**Buffer Zone for Ground Application (groundboom, overhead chemigation, or airblast)**

Do not apply within 25 feet of aquatic habitats (such as, but not limited to, lakes, reservoirs, rivers, streams, marshes, ponds, estuaries, and commercial fish ponds).

**Buffer Zone for ULV Aerial Application**

Do not apply within 450 feet of aquatic habitats (such as, but not limited to, lakes, reservoirs, rivers, streams, marshes, ponds, estuaries, and commercial fish ponds).

**Buffer Zone for Non-ULV Aerial Application**

Do not apply within 150 feet of aquatic habitats (such as, but not limited to, lakes, reservoirs, rivers, streams, marshes, ponds, estuaries, and commercial fish ponds).

**B. Spray Drift Requirements**

**Wind Direction and Speed** - Only apply this product if the wind direction favors on-target deposition. Do not apply when the wind velocity exceeds 15 MPH.

**Temperature Inversion** - Do not make aerial or ground applications into temperature inversions. Inversions are characterized by stable air and increasing temperatures with height above the ground. Mist or fog may indicate the presence of an inversion in humid areas. The applicator may detect the presence of an inversion by producing smoke and observing a smoke layer near the ground surface.

**Droplet Size** - Use only Medium or coarser spray nozzles (for ground and non-ULV aerial application) according to ASAE (S572) definition for standard nozzles. In conditions of low humidity and high temperatures, applicators should use coarser droplet size.

**Additional Requirements for Ground Applications** - Wind speed must be measured adjacent to the application site on the upwind side, immediately prior to application. For ground boom applications, apply using a nozzle height of no more than 4 feet above the ground or crop canopy. For airblast applications, turn off outward pointing nozzles at row ends and when spraying the outer two rows. To minimize spray loss over the top in orchard applications, spray must be directed into the canopy.

**Additional Requirements for Aerial Applications** - The spray boom should be mounted on the aircraft as to minimize drift caused by wingtip or rotor vortices. The minimum practical boom length should be used and must not exceed 75% of the wing span or 80% of the rotor diameter. Flight speed and nozzle orientation must be considered in determining droplet size. Spray must be released at the lowest height consistent with pest control and flight safety. Do not release spray at a height greater than 10 feet above the crop canopy unless a greater height is required for aircraft safety. When applications are made with a cross-wind, the swath will be displaced downwind. The applicator must compensate for this displacement at the downwind edge of the application area by adjusting the path of the aircraft upwind.

**GENERAL INSTRUCTIONS**

Unless otherwise directed by registered supplemental labeling, follow the Directions for Use in each crop group section.

PermaStar AG Agricultural Insecticide is a 3.2 pounds per gallon formulation of the insecticide permethrin. Apply PermaStar AG Agricultural Insecticide when insects appear or feeding is noticed. The higher rate should be used as pest populations increase. Repeat the application as necessary to maintain control. PermaStar AG Agricultural Insecticide may be applied by both ground and aerial equipment. Use sufficient water to obtain full coverage. With the exception of crops listed below, do not rotate other crops within 60 days of last application.

This label must be in the possession of the user at the time of application.

**Alfalfa: Alfalfa grown for seed (0 day phi)\*** (Includes Lucerne, sainfoin, holy clover, esparcet, birdsfoot trefoil and varieties and/or hybrids of these)

Insects Controlled	Rate of Application	Method of Application
Alfalfa Caterpillar Armyworms Blue Alfalfa Aphid Cutworms Green Cloverworm Green Peach Aphid Loopers Pea Aphid Spotted Alfalfa Aphid Velvetbean Caterpillar Webworms	2 to 8 ounces (0.05 to 0.2 pound active) per acre	Use higher recommended dosage for increased pest pressure or for increased residual pest control. Apply with ground equipment in a minimum of 10 gallons of finished spray per acre or 2 gallons of finished spray per acre by aircraft.  A second application per cutting may be made as long as the minimum interval between applications is 30 days and the maximum product applied per cutting does not exceed 0.2 pound active ingredient (8 oz product).
Alfalfa Weevil Cucumber Beetle Egyptian Alfalfa Weevil Meadow Spittlebug Plant Bugs (including <i>Lygus</i> spp.) Potato Leafhopper Stink Bugs	4 to 8 ounces (0.1 to 0.2 pound active) per acre	
Do not apply more than 0.2 pound active ingredient (8 oz product) per cutting. *When rates greater than 0.1 pound active per acre are used, do not apply within 14 days of harvest. Do not apply to mixed stands with intentionally grown forage grasses and/or legumes.		

**Almonds (7 day phi)**

Insects Controlled	Rate of Application	Method of Application
Navel Orangeworm Peach Twig Borer	8 to 10 ounces (0.2 to 0.25 pound active) per acre	Apply when insects appear. Apply in a minimum of 15 gallons of finished spray per acre by aircraft or 25-400 gallons of finished spray per acre with ground equipment. If additional applications are required for control, the minimum interval between applications is 10 days.
Ants	10 ounces (0.25 pound active) per acre	Apply by ground equipment in a minimum of 15 gallons of finished spray per acre. Application should follow mowing of weed growth to insure maximum coverage of the soil surface. Overhead moisture following application will enhance activity. If additional applications are required for control, the minimum interval between

	applications is 10 days.
Do not apply more than 0.75 pound active ingredient (30 oz product) per acre per season.	
Do not graze livestock in treated areas.	
Do not feed cover crops from treated areas to livestock.	

**Apples**

Insects Controlled	Rate of Application	Method of Application
Green Fruitworm Oblique Banded Leafroller Plum Curculio Redbanded Leafroller Rosy Apple Aphid Spotted Tentiform Leafminer Tarnished Plant Bug White Apple Leafhopper	4 to 10 ounces (0.1 to 0.25 pound active) per acre	Use with ground equipment only. Apply in 25-400 gallons of finished spray per acre when insects first appear and repeat as required to maintain control. If additional applications are required for control, the minimum interval between applications is 10 days.
Do not apply more than 0.5 pound active ingredient (20 oz product) per acre per season.		
Do not apply after petal fall.		
Do not graze livestock in treated areas.		
Do not feed cover crops from treated areas to livestock.		

**Artichoke (0 day phi)**

Insects Controlled	Rate of Application	Method of Application
Artichoke Plum Moth Leafminers	4 to 12 ounces (0.1 to 0.3 pound active) per acre	Apply with ground equipment in a minimum of 10 gallons of finished spray per acre or in a minimum of 2 gallons per acre by aircraft. Apply as needed. Buds may be harvested on the day of application. If additional applications are required for control, the minimum interval between applications is 10 days.
Do not apply more than 0.9 pound active ingredient (36 oz product) per acre per season.		
Do not apply more than 5 applications per acre per season.		

**Asparagus (1 day phi)**

Insects Controlled	Rate of Application	Method of Application
Asparagus Beetle Cutworms	2 to 4 ounces (0.05 to 0.1 pound active) per acre	Apply with ground equipment in a minimum of 10 gallons of finished spray per acre. If additional applications are required for control, the minimum interval between applications is 7 days.
Asparagus Beetle Japanese Beetle (Adult)	4 ounces (0.1 pound active)	For post harvest application, apply to the fern stage of the asparagus plant

stage)* Lygus Bugs Tarnished Plant Bug	per acre	after spear harvest when larval and adult stage are present. If additional applications are required for control, the minimum interval between applications is 7 days. * Not for control of this insect in California
Do not apply more than 0.4 pound active ingredient (16 oz product) per acre per season.		

**Avocado (7 day phi)**

Insects Controlled	Rate of Application	Method of Application
Avocado Caterpillar Avocado Lace Bug Avocado Leafhopper Avocado Leafroller Avocado Looper Avocado Tree Girdler Avocado Whitefly Brown Soft Scale Mirids Omnivorous Looper Orange Tortrix Scale Crawlers Spanworm Thrips Twig Borers	8 ounces (0.2 pound active) per acre	Apply with ground equipment in 25-400 gallons of finished spray per acre. Apply when insects first appear and repeat applications to maintain control. The minimum interval between applications is 7 days.
Do not apply more then 0.8 pounds active ingredient (32 oz product) per acre per season. Do not graze livestock in treated areas. Do not feed cover crops from treated areas to livestock.		

**Broccoli; Chinese Broccoli (gai lon, white flowering broccoli); Cavalo broccoli, Kohlrabi (1 day phi)**

Insects Controlled	Rate of Application	Method of Application
Armyworm spp. Cabbage Looper Diamondback Moth Imported Cabbageworm Plant Bugs Thrips	2 to 8 ounces (0.05 to 0.2 pound active) per acre	Apply with ground equipment in a minimum of 10 gallons of finished spray per acre or in a minimum of 2 gallons per acre by aircraft. Apply as needed for control but no sooner than 5 day intervals.
Do not apply more than 0.8 pound active ingredient (32 oz product) per acre per season.		

**Brussels Sprouts**

Insects Controlled	Rate of Application	Method of Application
Armyworm spp. Cabbage Looper Diamondback Moth	2 to 4 ounces (0.05 to 0.1 pound active) per acre	Apply with ground equipment in a minimum of 10 gallons of finished spray per acre or in a minimum of 2

Imported Cabbageworm Plant Bugs Thrips		gallons per acre by aircraft. Apply as needed for control but no sooner than 5 day intervals.
Do not apply more than 0.4 pound active ingredient (16 oz product) per acre per season.		

**Cauliflower**

Insects Controlled	Rate of Application	Method of Application
Armyworm spp. Cabbage Looper Diamondback Moth Imported Cabbageworm Plant Bugs Thrips	2 to 4 ounces (0.05 to 0.1 pound active) per acre	Apply with ground equipment in a minimum of 10 gallons of finished spray per acre or in a minimum of 2 gallons per acre by aircraft. Apply as needed for control but no sooner than 5 day intervals.
In all states but Hawaii, do not apply more than 0.4 pound active ingredient (16 oz product) per acre per season. In Hawaii, do not apply more than 0.6 pound active ingredient (24 oz product) per acre per season.		

**Cabbage; Cabbage, Chinese (napa) (tight-heading varieties only) (1 day phi)**

Insects Controlled	Rate of Application	Method of Application
Cabbage Looper Diamondback Moth Imported Cabbageworm Southern White Butterfly	2 to 8 ounces (0.05 to 0.2 pound active) per acre	Apply with ground equipment in a minimum of 10 gallons per acre or in a minimum of 2 gallons per acre by aircraft. Apply as needed for control but no sooner than 5 day intervals.
Armyworm spp. Cutworms Flea Beetles	4 to 8 ounces (0.1 to 0.2 pound active) per acre	at a minimum of 5 day intervals up to a seasonal maximum of 0.4 lb ai/A (16 oz. formulated product). [In Hawaii apply up to 0.8 lb ia/A (32 oz formulated product)].
In all states but Hawaii, do not apply more than 0.4 pound active ingredient (16 oz product) per acre per season. In Hawaii, do not apply more than 0.8 pound active ingredient (32 oz product) per acre per season.		

**Celery, Florence fennel** (sweet anise, sweet fennel, finocchio) (fresh leaves and leaf petioles only): For general use directions refer to the **Leafy Vegetables** crop grouping.

**Cherries** (includes Sweet Cherries and Tart Cherries) (3 day phi)

Insects Controlled	Rate of Application	Method of Application
Green Fruitworm Lesser Peach Tree Borer Plum Curculio Redbanded Leafroller Rose Chafer Tarnished Plant Bug	4 to 8 ounces (0.1 to 0.2 pound active) per acre	Use PermaStar AG Agricultural Insecticide as a dilute spray. Apply when insects appear. Apply with ground equipment in 25-400 gallons of finished spray per acre. If additional applications are required for control, the minimum interval between applications is 10 days.

Do not apply more than 0.6 pound active ingredient (24 oz product) per acre per season.  
 Do not graze livestock in treated areas.  
 Do not feed cover crops from treated areas to livestock.  
*East of the Rockies*, do not exceed 6 applications per season, with no more than 4 applications after petal fall.  
*West of the Rockies*, do not apply more than 4 applications per season, with no more than 3 applications after petal fall.

**Chrysanthemums**

Insects Controlled	Rate of Application	Method of Application
Liriomyza Leafminer Fliers	20 fluid ounces (0.5 pound active) per 100 gallons (1 teaspoon per gallon)	Avoid spraying the blooms. Caution: Before treating large numbers of plants of a particular cultivar, treat a few plants and observe prior to full scale application.

**Collards and Turnip Greens (1 day phi)**

Insects Controlled	Rate of Application	Method of Application
Beet Armyworm Cabbage Looper Corn Earworm Cutworms Diamondback Moth European Corn Borer Fall Armyworm Green Cloverworm Imported Cabbageworm Leafhoppers Leafminers Southern Armyworm Southern White Butterfly Tobacco Budworm Vegetable Leafminer Aphids*	2 to 6 ounces (0.05 to 0.15 pound active) per acre	Apply with ground equipment only. Apply with ground equipment in a minimum spray volume of 10 gallons of finished spray per acre. Apply as needed for control but no sooner than 3 day intervals.

For use on Collards in AR, AZ, GA, IL, NC, OK, SC, and TX and on Turnip Greens in FL, GA, IL, IN, OK, SC, TX, and WA.  
 Do not apply more than 0.45 pound active ingredient (18 oz product) per acre per season.  
 \* Suppression only.

**Conifers (Container and Field Grown)**

Insects Controlled	Rate of Application	Method of Application
Nantucket Pine Tip Moth	4 to 8 fluid ounces (0.1 to 0.2 pound active) per acre	PermaStar AG Agricultural Insecticide may be diluted in a non-volatile vegetable oil or water in a minimum of 1 gallon of finished spray per acre using equipment calibrated to give



		adequate coverage. Begin application when the adults appear and repeat at 5 to 7 day intervals or as needed throughout the season.
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**Corn (Field), Field Corn Grown for Seed, Popcorn**

Insects Controlled	Rate of Application	Method of Application
<i>Preemergent Use:</i> Armyworms Cutworms Stalk Borers	4 to 8 ounces (0.1 to 0.2 pound active) per acre as a broadcast spray OR 0.3 to 0.6 ounces per 1,000 linear row feet (based on 4" band and 40" row spacing)	PermaStar AG Agricultural Insecticide may be applied as a preplant incorporated, preemergence, or at planting time application. Apply as a broadcast spray by ground or air (minimum of 2 gallons finished spray per acre by air) or 4-15 inch band using sufficient spray volume to achieve adequate coverage.  Linear row calculations should be used proportional to the standard Band Width/Row Width formula to adjust rates for different band widths or row spacings. Use higher rates of PermaStar AG Agricultural Insecticide when incorporating into the soil without exceeding the recommended dosage.  When using tank mixes, observe all restrictions and precautions which appear on the labels of these products. Provide constant agitation during mixing and application to keep the mixture in solution.
<i>Foliar Use:</i> Armyworm (including Fall Armyworm) Corn Borer European Southwestern Corn Earworm Corn Rootworm Beetles Cutworms Flea Beetle Hop Vine Borer Stalk Borers Webworms	4 to 6 ounces (0.1 to 0.15 pound active) per acre	When treating for stalk borers, PermaStar AG Agricultural Insecticide must be applied when or shortly before the stalk borer larvae are moving into the corn from surrounding weeds and grasses. Mowing or burndown herbicides are suggested to initiate movement. For control of Corn Earworm apply just before silking and continue as necessary to maintain control. Apply a minimum of 2 gallons of finished spray per acre by air or 10 gallons per acre with ground equipment. The minimum interval between spray applications is 7 days.
<i>Foliar Use:</i> Western Bean Cutworm	2 to 4 ounces (0.05 to 0.1 pound active) per acre	
Do not apply more than 0.45 pound active ingredient (18 oz product) per acre per season.		

Do not apply less than 30 days prior to harvest of grain or fodder (stover).  
 Forage may be harvested on the day of application.

**Corn (Field), Field Corn Grown for Seed, Popcorn (At Plant Use)**

Insects Controlled	Rate of Application	Method of Application
Armyworms Cutworms Seed Corn Maggot* Wireworm* *Not for use in California	0.3 ounces per 1,000 linear feet of row	Apply as an in-furrow, band, or T-band treatment using a minimum 4" band. Use table below to determine the PermaStar AG Agricultural Insecticide needs for each acre.
Row Spacings (inches)		40      30      20
PermaStar AG Agricultural Insecticide (pounds ai/acre)	0.10	0.15    0.20
PermaStar AG Agricultural Insecticide (formulated ounces/acre)	4.0	6.0      8.0

**Corn, Sweet (1 day phi)**

Insects Controlled	Rate of Application	Method of Application
Corn Earworm Corn Rootworm Beetles* European Corn Borer Fall Armyworm Flea Beetle Hop Vine Borer Leafhoppers Southern Armyworm Stalk Borers	4 to 8 ounces (0.1 to 0.2 pound active) per acre	Apply every 3 to 5 days or as needed but no sooner than every 3 days.  Apply with ground equipment in a minimum of 10 gallons of finished spray per acre or in a minimum of 2 gallons per acre by aircraft.  *Pest does not occur on this crop in California.
Do not apply more than 0.8 pounds active ingredient (32 oz product) per acre per season.		

**Corn, Sweet (Florida Only)**

Insects Controlled	Rate of Application	Method of Application
Aster Leafhopper Corn Earworm Cutworm European Corn Borer Fall Armyworm Southern Armyworm	4 to 8 ounces (0.1 to 0.2 pound active) per acre	Apply every 3 to 5 days as needed but no sooner than every 3 days.  Apply with ground equipment in a minimum of 10 gallons of finished spray per acre or in a minimum of 2 gallons per acre by aircraft.
Do not apply more than 0.8 pounds active ingredient (32 oz product) per acre per season.		

**Cucurbit Vegetables (0 day phi):** **Chayote (fruit)** (*Sechium edule*); **Chinese waxgourd (Chinese preserving melon)** (*Bernincasa hispida*); **Citron melon** (*Citrullus lanatus* var. *citroides*); **Cucumber** (*Cucumis sativus*); **Gherkin** (*Cucumis anguria*); **Gourd, edible** (*Lagenaria* spp.) (includes hyotan, cucuzza); (***Luffa* spp.**) (includes hechima, Chinese okra); (***Momordica* spp.**) (includes balsam apple, balsam pear, bitter melon, Chinese cucumber); **Muskmelon (hybrids and/or cultivars of *Cucumis melo*)** (includes true cantaloupe, cantaloupe, casaba, Crenshaw melon, golden pershaw melon, honeydew melon, honey balls, mango melon, Persian melon, pineapple melon, Santa Claus melon, and snake melon); **Pumpkin** (*Cucurbita* spp.); **Squash, Summer** (*Cucurbita pepo* var. *melopepo*) (includes crookneck squash, scallop squash, straightneck squash, vegetable marrow, zucchini); **Squash, winter** (*Cucurbita maxima*; *C. moshata*) (includes butternut squash, calabaza, hubbard squash); (***C. mixta*; *C. pepo***) (includes acorn squash, spaghetti squash); **Watermelon** (includes hybrids and/or varieties of *Citrullus* spp.).

Insects Controlled	Rate of Application	Method of Application
Aphids Leafminers Squash Bug	8 ounces (0.2 pound active) per acre	Apply with ground equipment in a minimum spray volume of 20 gallons of finished spray per acre or in a minimum of 4 gallons per acre by aircraft. If additional applications are required for control, the minimum interval between applications is 7 days.
Cabbage Looper Cucumber Beetle (adults) Cutworms Leafhoppers Melonworm Pickleworm Plant Bugs (including Lygus and Stink Bugs) Rindworms Squash Vine Borer	4 to 8 ounces (0.1 to 0.2 pound active) per acre	
<p><b>Cantaloupes</b> – In all states but Hawaii, do not apply more than 0.8 pound active ingredient (32 oz product) per acre per season. In Hawaii, do not apply more than 1.2 pounds active ingredient (48 oz product) per acre per season.</p> <p><b>All Other Crops</b> - Do not apply more than 1.2 pounds active ingredient (48 oz product) per acre per season. Applications may be made up to harvest.</p>		

**Eggplants (3 day phi)**

Insects Controlled	Rate of Application	Method of Application
Colorado Potato Beetle	6 ounces (0.15 pound active) per acre	Apply with ground equipment in a minimum of 10 gallons of finished spray per acre or a minimum of 2 gallons by aircraft. Apply using sufficient water to obtain uniform coverage. If additional applications are required for control, the minimum interval between applications is 7 days.
Cabbage Looper Flea Beetle Vegetable Leafminer	4 to 6 ounces (0.1 to 0.15 pound active) per acre	
<p>In all states but Hawaii, do not apply more than 0.6 pound active ingredient (24 oz product) per acre per season. In Hawaii, do not apply more than 1.0 pound active ingredient (40 oz product) per acre per season.</p>		

**Filberts (14 day phi)**

Insects Controlled	Rate of Application	Method of Application
Filbertworm Oblique Banded Leafroller	8 to 10 ounces (0.2 to 0.25 pound active) per acre	For full coverage application apply 0.05 to 0.0625 pound active per 100 gallons (based on 400 gallons finished spray per acre) and spray to run-off, OR for low volume concentrate application apply 0.2 to 0.25 pound active per acre (50 to 200 gallons finished spray per acre). For aerial application apply 0.2 to 0.25 pound active in a minimum of 10 gallons of finished spray per acre. Apply when insects appear but do not retreat any sooner than a minimum of 10 days.
Do not apply more than 0.75 pounds active ingredient (30 oz product) per acre per season. Do not graze livestock in treated areas. Do not feed cover crops from treated areas to livestock.		

**Horseradish (30 day phi)**

Insects Controlled	Rate of Application	Method of Application
Imported Crucifer Weevil ( <i>Baris lepidii</i> )	0.1% active solution (2 pints, 1 ounce of PermaStar AG Agricultural Insecticide per 100 gallons)	As a spring preplant dip, soak sets for 30 minutes and air-dry before planting.
	6 ounces (0.15 pound active) per acre	For foliar application, apply with ground equipment in a minimum spray volume of 20 gallons finished spray per acre. Make up to 3 foliar applications as needed to control weevil adults during oviposition. The minimum interval between applications is 10 days.
Do not apply more than 0.45 pounds active ingredient (18 oz product) per acre per season.		

**Leafy Vegetables (except Brassica) (1 day phi):** Amaranth (leafy amaranth, Chinese spinach, tampala); Arugula (Roquette); Cardoon; Celery; Celery, Chinese; Celtuce; Chervil; Chrysanthemum, edible-leaved and garland; Corn salad; Cress, garden; Cress, upland (yellow rocket, winter cress); Dandelion; Dock (sorrel); Endive (escarole); Fennel, Florence (finocchio); Lettuce, head and leaf; Orach; Parsley; Purslane, garden; Purslane, winter; Radicchio (red chicory); Rhubarb; Swiss chard.

**Spinach** (including New Zealand and vine, Malabar spinach, Indian spinach).

Insects Controlled	Rate of Application	Method of Application
Aphids Beet Armyworm Corn Earworm Cutworms European Corn Borer Fall Armyworm Green Cloverworm Leafminers Southern Armyworm Tobacco Budworm	4 to 8 ounces (0.1 to 0.2 pound active) per acre	Apply every 3 to 7 days by air or ground. Use sufficient water to obtain full coverage of foliage. Apply with ground equipment in a minimum of 10 gallons of finished spray per acre or in a minimum of 2 gallons per acre by aircraft. For spinach, the minimum spray interval is 3 days. For crops other than spinach, the minimum spray interval is 7 days.
Alfalfa Looper Cabbage Looper Leafhoppers	2 to 8 ounces (0.05 to 0.2 pound active) per acre	
<p><b>Celery:</b> Do not apply more than 1.0 pound active ingredient (40 oz product) per acre per season. In Hawaii, do not apply more than 1.2 pound active ingredient (48 oz product) per acre per season.</p> <p><b>Lettuce:</b> Do not apply more than 0.8 pound active ingredient (32 oz product) per acre per season. In Hawaii, do not apply more than 1.2 pound active ingredient (48 oz product) per acre per season.</p> <p><b>Spinach:</b> Do not apply more than 0.6 pound active ingredient (24 oz product) per acre per season.</p> <p><b>All other crops:</b> Do not apply more than 2.0 pound active ingredient (80 oz product) per acre per season.</p>		

**Lettuce, Head:** For general use directions refer to the **Leafy Vegetable** crop grouping.

**Mushrooms (Mushroom houses and adjacent premise areas) (3 day phi)**

Insects Controlled	Rate of Application	Method of Application
Mushroom Flies (Sciarid and Phorid adults)	Apply as a fogging or aerosol treatment at the rate of 2.0 to 2.5 ounces (0.05 to 0.0625 pound active) per 30 ounces of water or suitable diluent.  Use 1 quart of solution per standard double	Preparation of the building prior to fogging: (1) Close all doors, windows, and ventilators, (2) Lock or barricade all entrances, turn off pilot lights, post warning signs, and take precautions to prevent persons and animals from entering the area.  Use prior to filling the house, during

	<p>house (35,000 cu. ft.; 8,000 sq. ft.)</p>	<p>cool-down, during spawning, up to pinning, and between breaks. Do not use when mushrooms are present.</p> <p>Treat once daily as needed when flies appear. Do not make more than 20 applications prior to pinning of first break; apply no more than 2 applications between each break. Do not apply more than 30 applications total per crop of 5 breaks.</p> <p>Length of exposure time should be limited to 1 hour; then ventilate the house. Use fans to ventilate in houses that do not have forced air circulation.</p> <p>Wear a respirator with either an organic vapor removing cartridge with a prefilter approved for pesticides (MSHA/NIOSH approval number prefix TC-23C), or a canister approved for pesticides (MSHA/NIOSH approval number prefix TC-14G).</p>
<p><b>NOTE: USE OF HIGH PRESSURE HAND WAND IS PROHIBITED IN MUSHROOM HOUSES</b></p>		

**Garlic (1 day phi)**

Insects Controlled	Rate of Application	Method of Application
<p>Army worms Onion Thrips</p>	<p>6 to 8 ounces (0.15 to 0.2 pound active) per acre</p>	<p>Apply with ground equipment in a minimum of 20 gallons of finished spray per acre or in a minimum of 5 gallons per acre by aircraft. Begin applications when pests appear and repeat as necessary to maintain control. The minimum interval between applications is 10 days. Use the higher label rates as Onion Thrips population increases and avoid rescue situations.</p>
<p>Cutworms Leafminers Onion Maggots (Adults) Stink Bugs</p>	<p>4 to 8 ounces (0.1 to 0.2 pound active) per acre</p>	
<p>Do not apply more than 0.8 pound active ingredient (32 oz product) per acre per season.</p>		

**Onions, Bulb (1 day phi)**

Insects Controlled	Rate of Application	Method of Application
Army worms Onion Thrips	6 to 12 ounces (0.15 to 0.3 pound active) per acre	Apply with ground equipment in a minimum of 20 gallons of finished spray per acre or in a minimum of 5 gallons per acre by aircraft. Begin applications when pests appear and repeat as necessary to maintain control. The minimum interval between applications is 7 days. Use the higher label rates as Onion Thrips population increases and avoid rescue situations.
Cutworms Leafminers Onion Maggots (Adults) Stink Bugs	4 to 12 ounces (0.1 to 0.3 pound active) per acre	
Do not apply more than 1.0 pound active ingredient (40 oz product) per acre per season.		

**Ornamental Nursery Stock (Field Grown)**

Insects Controlled	Rate of Application	Method of Application
Bagworm Beet Armyworm Cabbage Looper Citrus Thrips <i>Heliothis</i> spp. Lace Bug Leafhoppers Leafminers Whiteflies	4 to 8 ounces (0.1 to 0.2 pound active) per 100 gallons of water	PermaStar AG Agricultural Insecticide may be used to control specified pests on non-edible ornamentals and non-bearing plants of fruiting species.  Caution: Marginal leaf burn may occur on <i>Salvia</i> , <i>Dieffenbachia</i> and <i>Pteris</i> Fern. Application to blooming plants may cause browning of petals. Before treating large numbers of plants of a particular variety, treat a few plants and observe prior to full scale application.

**Papaya (Florida Only) (7 day phi)**

Insects Controlled	Rate of Application	Method of Application
Aphids Brown Soft Scale Mealybug Papaya Fruit Fly Papaya Webworm Papaya Whitefly Scale Crawlers	6 ounces (0.15 pound active) per acre	Apply with ground equipment in 25-400 gallons of finished spray per acre. Apply when insects first appear and repeat applications at a minimum of 10 day intervals as needed to provide control.
Do not apply more than 0.75 pound active ingredient (30 oz product) per acre per season. Do not graze livestock in treated areas. Do not feed cover crops from treated areas to livestock.		

**Peaches, Nectarines (14 day phi)**

Insects Controlled	Rate of Application	Method of Application
Green Fruitworm Lesser Peach Tree Borer Oriental Fruit Moth Peach Twig Borer Plum Curculio Rose Chafer Tarnished Plant Bug	4 to 10 ounces (0.1 to 0.25 pound active) per acre	Apply with ground equipment using 25-400 gallons of spray per acre or a minimum of 10 gallons per acre by aircraft. Spray to wet all foliage. If additional applications are required for control, the minimum interval between applications is 10 days.
Do not apply more than 0.75 pound active ingredient (30 oz product) per acre per season. Do not graze livestock in treated areas. Do not feed cover crops from treated areas to livestock.		

**Pears**

Insects Controlled	Rate of Application	Method of Application
<b>Dormant through Delayed Dormant</b> Pear Psylla	8 to 10 ounces (0.2 to 0.25 pound active) per acre	PermaStar AG Agricultural Insecticide may be combined with 2 to 8 gallons of spray oil per acre. Apply during the dormant through delayed dormant growth periods only. Apply in a minimum of 10 gallons of finished spray per acre by aircraft and 25-400 gallons per acre by ground equipment. The minimum interval between applications is 10 days.
<b>Pre-Bloom</b> Codling Moth Green Fruitworm Pear Psylla	8 to 10 ounces (0.2 to 0.25 pound active) per acre	Apply with ground equipment using 25-400 gallons of finished spray per acre or a minimum of 10 gallons per acre by aircraft. Pre-bloom sprays can be applied from dormant through bud burst stages. The minimum interval between applications is 10 days.
Do not apply more than 0.65 pound active ingredient (26 oz product) per acre per season. Do not graze livestock in treated areas. Do not feed cover crops from treated areas to livestock.		

**Peppers, Bell (3 day phi)**

Insects Controlled	Rate of Application	Method of Application
Cabbage Looper Corn Earworm Cutworms Flea Beetle Pepper Weevil Vegetable Leafminer	4 to 8 ounces (0.1 to 0.2 pound active) per acre	Apply using sufficient water to obtain uniform coverage. Apply as needed, but no sooner than every 5 days. Apply with ground equipment using a minimum of 10 gallons of finished



European Corn Borer	8 ounces (0.2 pound active) per acre	spray per acre or a minimum of 2 gallons per acre by aircraft.
Do not apply more than 0.8 pound active ingredient (32 oz product) per acre per season.		

**Pine Seed Orchards**

Insects Controlled	Rate of Application	Method of Application
Coneworms Seed Bugs	8 ounces in 100 gallons of water (0.025% dilution by weight)	For high volume sprayers, apply 5 to 10 gallons of finished spray per tree.
	42 ounces in 100 gallons of water (0.125% dilution by weight)	For low volume sprayers, apply 100 gallons per acre.
	30 ounces per acre	For aerial application, use in not less than 10 gallons of water.
To control Webbing Coneworm – make first application within 1 week of female flower closure or peak pollen flight. To control other coneworms and seed bugs – make first application within 30 days following female flower closure. Repeat applications at 4 week intervals, but do not apply more than 6 applications.		
Do not graze livestock in treated areas. Do not feed cover crops from treated areas to livestock. Avoid Contact with open water.		

**Pistachios (0 day phi)**

Insects Controlled	Rate of Application	Method of Application
Leaffooted Bugs Naval Orangeworm Peach Twig Borer Plant Bugs Stink Bugs	8 to 12 ounces (0.2 to 0.3 pound active) per acre	Use sufficient water to obtain full coverage of foliage. Apply PermaStar AG Agricultural Insecticide in a minimum of 10 gallons of finished spray per acre by aircraft or by ground equipment in 25-400 gallons of finished spray per acre. If additional applications are required for control, the minimum interval between applications is 10 days.
Ants	12 ounces (0.3 pound active) per acre	Application should follow mowing of weed growth to insure maximum coverage of the soil surface. Overhead moisture following application will enhance activity. If additional applications are required for control, the minimum interval between applications is 10 days.
Do not apply more than 0.9 pound active ingredient (36 oz product) per acre per crop season. Do not apply after 10% hull split.		

Do not graze livestock in treated areas.  
Do not feed cover crops from treated areas to livestock.

**Potatoes (14 day phi)**

Insects Controlled	Rate of Application	Method of Application
Aster leafhopper Beet Armyworm Cabbage Looper Colorado Potato Beetle Cutworms European Corn Borer Potato Aphid Potato Flea Beetle Potato Leafhopper Potato Psyllid Potato Tuberworm Tarnished Plant Bug	4 to 8 ounces (0.1 to 0.2 pound active) per acre	Apply with ground equipment in a minimum of 10 gallons of finished spray per acre or in a minimum of 2 gallons per acre by aircraft. PermaStar AG Agricultural Insecticide may also be applied using refined non-volatile vegetable oil for control of listed pests. PermaStar AG Agricultural Insecticide should be diluted with oil and applied in a minimum of one quart total volume per acre using equipment calibrated to give adequate coverage. Use sufficient spray volume to obtain full coverage. The minimum interval between applications is 10 days.
Do not apply more than 0.8 pound active ingredient (32 oz product) per acre per season.		

**Pumpkins:** For general use directions refer to the **Cucurbit Vegetables** crop grouping.

**Range Grass (New Mexico Only)**

Insects Controlled	Rate of Application	Method of Application
Range Caterpillar	0.4 ounces (0.01 pound active) per acre	Apply using sufficient spray volume to obtain uniform coverage. Apply with ground equipment in a minimum of 10 gallons of finished spray per acre or in a minimum of 2 gallons per acre by aircraft.
Do not apply more than once per year. Cattle may be present during application. Do not harvest or feed hay to livestock.		

**Roses (Field Grown)**

Insects Controlled	Rate of Application	Method of Application
<i>Heliothis</i> spp.	4 to 8 fluid ounces (0.1 to 0.2 pound active) per acre	PermaStar AG Agricultural Insecticide may be applied with ground equipment in a minimum of 10 gallons of finished spray per acre or in a minimum of 2 gallons of finished spray per acre by aircraft.

**Roses (Greenhouse)**

Insects Controlled	Rate of Application	Method of Application
Beet Armyworm Cabbage Looper Omnivorous Leafroller	8 fluid ounces (0.2 pound active) per 100 gallons of water	Caution: PermaStar AG Agricultural Insecticide is not phytotoxic to the following varieties of greenhouse roses: Ballena, Bettina, Cara Mia, Coquette, Excitement, Forever Yours, G. Wave, Jack Frost, Jr. Bridesmaid, Matador, Paul's Pink, Samantha, Seventeen, Sonia, Town Crier, Tropicana and Visa. Other varieties may vary in their sensitivity to PermaStar AG Agricultural Insecticide and a small number of plants should be treated under local conditions to determine plant safety prior to commercial use.

**Soybeans (60 day phi)**

Insects Controlled	Rate of Application	Method of Application
<u>Bean Leaf Beetle</u> <u>Cabbage Looper</u> <u>Corn Rootworm Beetles</u> <u>Cutworms</u> <u>Flea Beetle</u> <u>Green Cloverworm</u> <u>Japanese Beetle</u> <u>Mexican Bean Beetle</u> <u>Potato Leafhopper</u> <u>Saltmarsh Caterpillar</u> <u>(Woollybear Caterpillar)</u> <u>Thistle Caterpillar</u> <u>Velvetbean Caterpillar</u>	<u>2 to 4 ounces</u> <u>(0.05 to 0.1 pound active)</u> <u>per acre</u>	<u>Apply with ground equipment in a minimum of 10 gallons of finished spray per acre or in a minimum of 2 gallons per acre by aircraft. PermaStar AG Agricultural Insecticide may also be applied using refined non-volatile vegetable oil for control of listed pests. PermaStar AG Agricultural Insecticide should be diluted with oil and applied in a minimum of 1 quart total volume per acre using equipment calibrated to give adequate coverage. When applying in water by aircraft, 1 quart of oil may be substituted for 1 quart of water per gallon of finished spray. The minimum interval between applications is 10 days.</u>
<u>Beet Armyworm</u> <u>Corn Earworm</u> <u>Soybean Looper</u> <u>Webworms</u>	<u>4 to 8 ounces</u> <u>(0.1 to 0.2 pound active)</u> <u>per acre</u>	
<u>Do not apply more than 0.4 pound active ingredient (16 oz product) per acre per season.</u> <u>Do not graze or feed soybean forage or hay.</u>		

**Spinach:** Refer to Leafy Vegetable crop grouping for general use directions. Do not apply more than 0.6 pound active ingredient (24 oz product) per acre per season.

**Tomatoes, Tomatillos (0 day phi)**

Insects Controlled	Rate of Application	Method of Application
Beet Armyworm Cabbage Looper Colorado Potato Beetle Granulate Cutworm Hornworms Southern Armyworm Tomato Fruitworm Tomato Pinworm Vegetable Leafminer	2 to 8 ounces (0.05 to 0.2 pound active) per acre	Apply with ground equipment in a minimum of 10 gallons finished spray per acre or in a minimum of 2 gallons per acre by aircraft. The minimum interval between applications is 7 days.
In all states but Hawaii, do not apply more than 0.6 pound active ingredient (24 oz product) per acre per season. In Hawaii, do not apply more than 0.8 pound active ingredient (32 oz product) per acre per season. Do not apply to cherry tomatoes or other varieties which produce fruit less than one inch in diameter.		

**Walnuts (1 day phi)**

Insects Controlled	Rate of Application	Method of Application
Codling Moth Navel Orangeworm Walnut Husk Fly	8 to 10 ounces (0.2 to 0.25 pound active) per acre	For full coverage application apply 0.05 to 0.0625 pound active per 100 gallons (based on 400 gallons finished spray per acre), spray to run-off; OR, for low volume application apply 0.2 to 0.25 pound active per acre (25-200 gallons finished spray per acre). For aerial application apply 0.2 to 0.25 pound active in a minimum of 10 gallons of finished spray per acre. The minimum interval between applications is 10 days.
Do not apply more than 0.75 pounds active ingredient (30 oz product) per acre per season. Do not graze livestock in treated areas. Do not feed cover crops from treated areas to livestock.		

**Premises Spray**

For agricultural use only.

Spray directly to walls and ceiling as residual surface treatment only. Do not treat manure or litter. Avoid contamination of feed and water. Do not apply directly to livestock or poultry.

For Application In	Insects Controlled	Rate of Application	Method of Application
Dairies, Barns, Feedlots, Stables, Poultry Houses, Swine and Livestock Houses	House Flies, Stable Flies and Other Manure Breeding Flies. Also aids in the reduction of Cockroaches, Mosquitoes and Spiders	1 gallon per 750 square feet of surface	Dilute 4 ounces to 12.5 gallons of water. Apply with sprayer.

Re-treat as necessary, but not more often than once every 2 weeks.

The use of any residual fly spray should be supplemental with proper manure management and general sanitation to reduce or eliminate fly breeding site.

**Treatment of Preconstruction Lumber and Logs**

**General Information**

PermaStar AG Agricultural Insecticide should be diluted with water. To prepare the spray, dilute PermaStar AG Agricultural Insecticide as shown in the following spray dilution chart:

Spray Dilution Chart			
Gallons of Spray Mixture Desired	Gallons of PermaStar AG Agricultural Insecticide to Use		
	0.5% Solution	0.75% Solution	1.0% Solution
40	1/2	3/4	1
80	1	1 1/2	2
200	2 1/2	3 3/4	5
400	5	7 1/2	10
800	10	15	20

**Directions for Application**

To protect unseasoned lumber and logs from wood destroying insects, such as Termites, Carpenter Ants, and Beetles (Ambrosia, Powder-post, Old house borers, and others), totally treat wood with a 0.5% to 1.0% solution of PermaStar AG Agricultural Insecticide. This solution can be applied by various methods including spraying, brushing, dipping, and pressure treatment. Frequent monitoring of dip and pressure systems are necessary to insure that the desired level of

PermaStar AG Agricultural Insecticide is maintained. Wood can be handled after treatment when dry.

1. For dip treatments, the wood should be totally submersed in the solution until thoroughly wet and then allowed to dry in a suitable location. Dipping solutions to which PermaStar AG Agricultural Insecticide has been added should be agitated before use if left unused for long periods of time. Sediment, debris and other deposits should be periodically cleaned from the tank.
2. For pressure treatments the wood should be placed in the treatment chamber, the PermaStar AG Agricultural Insecticide solution added and the system pressurized up to 250 psi for up to one hour depending on the density and type of wood treated. After the pressure is released and the system drained, the wood should be placed in a suitable location for drying.
3. For spray treatments, the wood should be sprayed thoroughly including back and ends.
4. For brush treatments, all parts of wood surfaces should be thoroughly treated.

**Rate Conversion Chart**

Pounds Active Per Acre	Formulation Ounces Per Acre
0.05	2.0
0.10	4.0
0.15	6.0
0.20	8.0
0.25	10.0
0.30	12.0
0.40	16.0

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