

# Thwartex™

**insecticide**

## For control of lepidoptera in listed use sites

### Active Ingredient:

methoxyfenozide: Benzoic acid, 3-methoxy-

2-methyl-, 2-(3,5-dimethylbenzoyl)-2-

(1,1-dimethylethyl) hydrazide ..... 22.6%

Other Ingredients ..... 77.4%

Total ..... 100.0%

Contains 2 lb active ingredient per gallon

EPA Reg. No. 85588-18

EPA Est. No. 352-GA-002

## KEEP OUT OF REACH OF CHILDREN

## CAUTION

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.)

### AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. Refer to the label booklet under "Agricultural Use Requirements" in the Directions for Use section for information about this standard.

Refer to accompanying labeling for additional precautions and complete direction for use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Read all Directions for Use carefully before applying.

**NOTICE TO BUYER:** Purchase of this material does not confer any rights under patents of countries outside of the United States.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

### Shake Well Before Use – Avoid Freezing

Thwartex™ is a trademark of Agsurf Corporation

**Produced for**

**Agsurf Corporation**

**9805 Statesville Road Suite 6309**

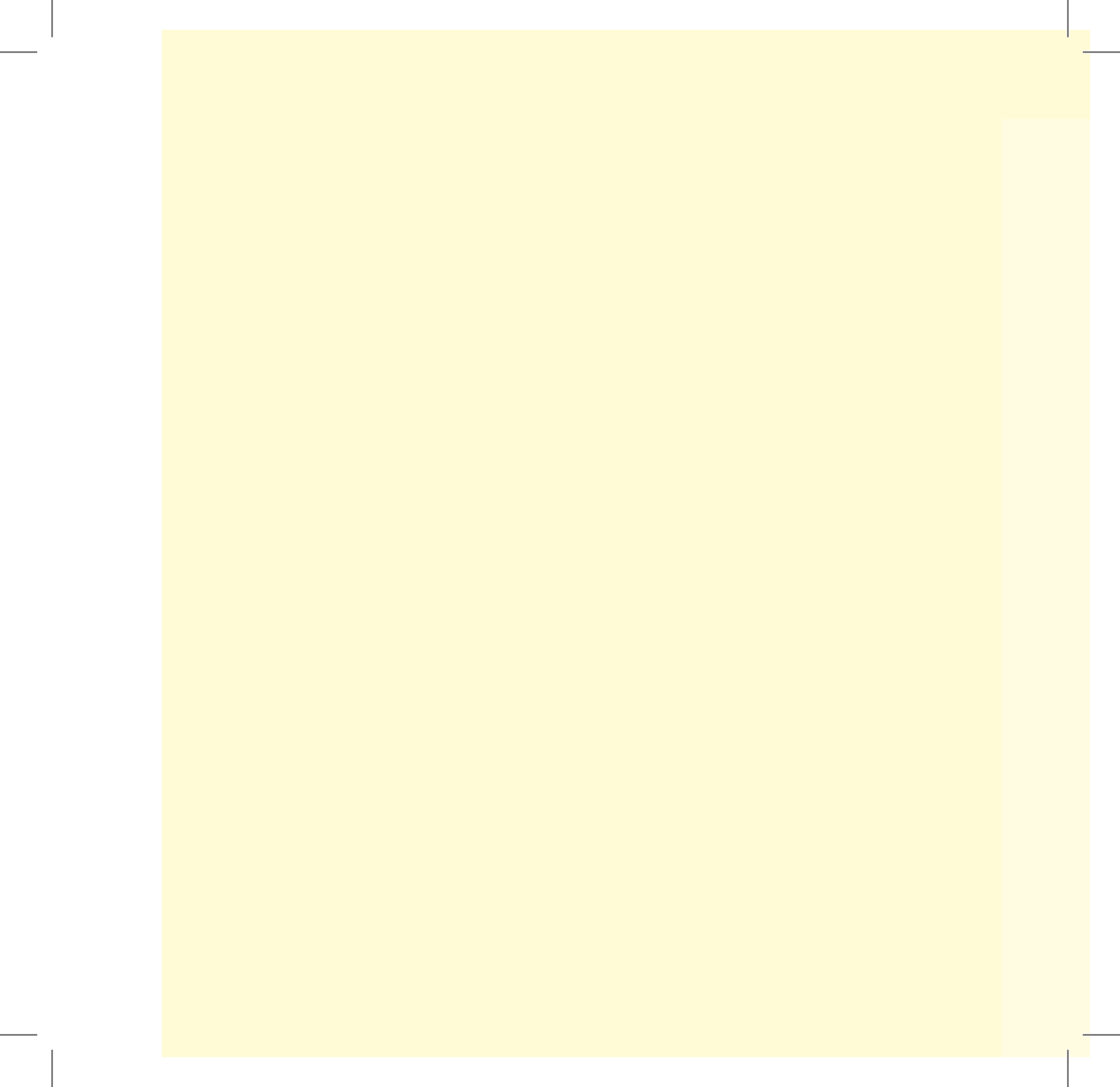
**Charlotte NC 28269**

260243 2108

**Agsurf™**  
Corporation

**Net 1 gal**

**Nonrefillable Container**





METHOXYFENOZIDE GROUP 18 INSECTICIDE



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## FIRST AID

**IF INHALED:** Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or doctor for further treatment advice.

**IF ON SKIN OR CLOTHING:** Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. Contact 1-800-992-5994 for emergency medical treatment information.

## PRECAUTIONARY STATEMENTS HAZARD TO HUMANS AND DOMESTIC ANIMALS

**CAUTION:** Harmful if Absorbed through Skin or Inhaled. Avoid contact with skin, eyes, or clothing. Avoid breathing spray mist. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove and wash contaminated clothing before reuse.

## PERSONAL PROTECTIVE EQUIPMENT (PPE)

**Applicators and other handlers must wear:**

- Long-sleeved shirt and long pants
- Chemical-resistant gloves made of any waterproof material
- Shoes plus socks

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.

## ENGINEERING CONTROLS

When handlers use closed systems, enclosed cabs or aircraft in a manner that meet the requirements listed in the Worker Protection Standards (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:**

- Remove contaminated clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.

## ENVIRONMENTAL HAZARDS

Drift and runoff from applications of this product may be hazardous to sensitive aquatic invertebrates in water bodies adjacent to the treatment area. 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 contaminate water when cleaning equipment or disposing of equipment washwaters.

This chemical has properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

Methoxyfenozide can contaminate surface water through spray drift. Under some conditions, methoxyfenozide may also have a high potential for runoff into surface water (primarily via dissolution in runoff water) for several months post-application. These include poorly draining or wet soils with readily visible slopes toward adjacent surface waters, frequently flooded areas, areas over-laying extremely shallow groundwater, areas with in-field canals or ditches that drain to overlying tile drainage systems that drain to surface water.

Do not cultivate within 10 feet of aquatic areas to allow growth of a vegetative filter strip.

Do not apply by ground within 25 feet, or by air within 150 feet, of lakes, reservoirs, rivers, permanent streams, marshes, or natural ponds; estuaries and commercial fish farm ponds.

## PRODUCT INFORMATION

Thwartex™ insecticide belongs to the diacylhydrazine class of insecticides and has a novel mode of action that mimics the action of the molting hormone of lepidopterous (moths, butterflies) larvae. Upon ingestion, larval stages of the order lepidoptera undergo an incomplete and developmentally lethal premature molt. This process interrupts and rapidly halts their feeding. Feeding typically ceases within hours of ingestion, although complete mortality of the larvae may take several days. Affected larvae often become lethargic and often develop discolored areas or bands between segments.

Thwartex is a narrow spectrum insecticide that specifically targets Lepidoptera, making it an ideal tool for Integrated Pest Management (IPM).

## Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Read all Directions for Use carefully before applying.

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.

**Not for Sale, Use, or Distribution in Nassau County and Suffolk County in New York State.**

### 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 4 hours.

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 any waterproof material
- Shoes plus socks

### NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries or greenhouses.

Keep unprotected persons out of treated area until sprays have dried.

## USE INFORMATION – ALL CROPS AND USES

### USE RATE DETERMINATION

Carefully read, understand and follow label use rates and restrictions. Apply the amount specified in the following tables with properly calibrated aerial or ground spray equipment. Prepare only the amount of spray solution required to treat the measured acreage. Use the lower rates for light infestations of the target lepidopterous species and the higher rates for moderate to heavy infestations. Thwartex may be applied in either dilute or concentrate sprays so long as the application equipment is calibrated and adjusted to deliver thorough, uniform coverage. Use the specified amount of Thwartex per acre regardless of the spray volume used.

## MIXING DIRECTIONS

Always shake well before use. Avoid freezing.

Application Rate Reference Table

Application Rate of Thwartex (fl oz/acre)	Active Ingredient Equivalent (lb ai/acre)	Acres per Gallon of Thwartex
4	0.06	32
6	0.09	21
8	0.12	16
10	0.16	13
12	0.19	11
16	0.25	8
24	0.38	5

### Thwartex - Alone

Fill the spray tank one-third to one-half full of clean water and slowly pour Thwartex into the spray tank. Maintain agitation in the spray tank during mixing, loading and application. Triple rinse empty container and add rinsate to the spray tank.

### Thwartex - Tank Mix

Thwartex is believed to be compatible with most commonly used agricultural fungicides, insecticides, growth regulators, foliar fertilizers and spray adjuvants. However, whenever preparing a new tank mix, always conduct a compatibility test by mixing proportional amounts of all spray ingredients in a test vessel (jar). Shake the mixture vigorously and allow it to stand for 15 minutes. Rapid precipitation of the ingredients and failure to re-suspend when shaken indicates that the mixture is incompatible and should not be applied.

**It is the pesticide user's responsibility to ensure that all products are registered for the intended use. Read and follow the applicable restrictions and limitations and directions for use on all product labels involved in tank mixing. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.**

**Mixing Order for Tank Mixes:** Fill the spray tank with water to one-fourth to one-third of the required spray volume. Start agitation. Add different formulation types in the order indicated below, allowing time for complete dispersion and mixing after addition of each product. Allow extra dispersion and mixing time for dry flowable products.

Add different formulation types in the following order:

1. Water dispersible granules
2. Wettable powders
3. Thwartex and other aqueous suspensions

Maintain agitation and fill spray tank to three-fourths of total spray volume. Then add:

4. Emulsifiable concentrates and water-based solutions
5. Spray adjuvants
6. Foliar fertilizers

Finish filling the spray tank. Maintain continuous agitation during mixing, final filling and throughout application. If spraying and agitation must be stopped before the spray tank is empty, the materials may settle to the bottom. Settled materials must be resuspended before spraying is resumed. A sparger agitator is particularly useful for this purpose.

## APPLICATION TIMING

The activity of Thwartex is expressed primarily through ingestion by the target larvae. Consequently, the timing of application is dependent upon the feeding behavior of the target pest. For cryptic (internal) feeding larvae, application must be made prior to the time that surface feeding occurs, i.e., just prior to initiation of egg hatch. For foliar or surface feeding larvae, application may be made while active feeding is occurring.



Reapplication may be required to protect new flushes of foliage, rapidly expanding fruit, or for extended infestations. The reapplication interval will vary depending upon how rapidly the crop is growing, the generation time of the target pest and the duration of the infestation.

Thwartex is effective against all larval instars; however, it is good practice to make applications to early instars to minimize feeding damage. For best results, begin applications when threshold levels of moths, eggs or larvae occur. Consult the Cooperative Extension Service, or other qualified professional authorities, to determine the appropriate threshold and timing for application in your area.

## APPLICATION DIRECTIONS

Thwartex must be ingested by insect larvae to be fully effective. Applications must be in a manner that assures uniform and thorough coverage. Higher water volume and increased spray pressure generally provide better coverage.

### SPRAY DRIFT REQUIREMENTS

#### Aerial Applications:

- **DO NOT** release spray at a height greater than 10 feet above the vegetative canopy, unless a greater application height is necessary for pilot safety.
- Applicators are required to use a medium or coarser droplet size (ASABE S572.1).
- Do not apply when wind speeds exceed 15 mph at the application site. If the wind speed is greater than 10 mph, the boom length must be 65 % or less for fixed wing aircraft and 75% or less helicopters. Otherwise, the boom length must be 75% or less for fixed-wing aircraft and 90% or less for helicopters.
- Applicators must use  $\frac{1}{2}$  swath displacement upwind at the downwind edge of the field.
- **DO NOT** apply during temperature inversions.

#### Airblast Applications:

- Sprays must be directed into the canopy.
- User must turn off outward pointing nozzles at row ends and when spraying outer rows.

#### Ground Boom Applications:

- User must only apply with the nozzle height recommended by the manufacturer, but no more than 4 feet above the ground or crop canopy.
- Applicators are required to use a medium or coarser droplet size (ASABE S572.1).
- **DO NOT** apply when wind speeds exceed 15 miles per hour at the application site.
- **DO NOT** apply during temperature inversions.

## SPRAY DRIFT ADVISORIES

THE APPLICATOR IS RESPONSIBLE FOR AVOIDING OFF-SITE SPRAY DRIFT.

BE AWARE OF NEARBY NON-TARGET SITES AND ENVIRONMENTAL CONDITIONS.

### IMPORTANCE OF DROPLET SIZE

An effective way to reduce spray drift is to apply large droplets. Use the largest droplets that provide target pest control. While applying larger droplets will reduce spray drift, the potential for drift will be greater if applications are made improperly or under unfavorable environmental conditions.

#### Controlling Droplet Size – Ground Boom

- **Volume** - Increasing the spray volume so that larger droplets are produced will reduce spray drift. Use the highest practical spray volume for the application. If a greater spray volume is needed, consider using a nozzle with a higher flow rate.
- **Pressure** - Use the lowest spray pressure recommended for the nozzle to produce the target spray volume and droplet size.
- **Spray Nozzle** - Use a spray nozzle that is designed for the intended application. Consider using nozzles designed to reduce drift.

#### Controlling Droplet Size – Aircraft

- **Adjust Nozzles** - Follow nozzle manufacturers recommendations for setting up nozzles. Generally, to reduce fine droplets, nozzles should be oriented parallel with the airflow in flight.

**BOOM HEIGHT – Ground Boom**

For ground equipment, the boom should remain level with the crop and have minimal bounce.

**RELEASE HEIGHT – Aircraft**

Higher release heights increase the potential for spray drift.

**SHIELDED SPRAYERS**

Shielding the boom or individual nozzles can reduce spray drift. Consider using shielded sprayers. Verify that the shields are not interfering with the uniform deposition of the spray on the target area.

**TEMPERATURE AND HUMIDITY**

When making applications in hot and dry conditions, use larger droplets to reduce effects of evaporation.

**TEMPERATURE INVERSIONS**

Drift potential is high during a temperature inversion. Temperature inversions are characterized by increasing temperature with altitude and are common on nights with limited cloud cover and light to no wind. The presence of an inversion can be indicated by ground fog or 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. Avoid applications during temperature inversions.

**WIND**

Drift potential generally increases with wind speed. AVOID APPLICATIONS DURING GUSTY WIND CONDITIONS.

- Applicators need to be familiar with local wind patterns and terrain that could affect spray drift.

**SPRAY DRIFT**

Handheld Technology Applications:

- Take precautions to minimize spray drift.

**Chemigation Application**

Thwartex may be applied to cranberries and ornamentals through sprinkler irrigation equipment. Do not apply this product by chemigation unless specified in crop-specific directions in this label.

**General Directions for Chemigation:** Apply through a properly calibrated chemigation system that has the appropriate back flow prevention devices. See the Mixing section of the product label for specific mixing and dilution instructions. Apply Thwartex in dedicated chemigation cycles only, not as a part of a regular irrigation cycle. Do not exceed 900 gallons of water per acre application volume using just enough water to thoroughly wet the plants but not the soil. Use minimum volume for flushout to avoid diluting or rinsing off product. Washout time should not exceed six (6) minutes. Set sprinkler heads in a spacing not exceeding 50 feet by 60 feet and adjusted to provide 100% overlap.

**Apply this product only through solid-set sprinkler systems designed specifically for chemigation.** Do not apply this product through any other type of irrigation system. Crop injury, lack of effectiveness, or illegal pesticide residues in the crop can result from non-uniform distribution of treated water. If you have questions about calibration, contact State Extension Service specialists, equipment manufacturers or other experts. Do not connect an irrigation system (including greenhouse systems) used for pesticide application to a public water system unless the pesticide label prescribed safety devices for public water systems are in place. A person knowledgeable of the chemigation system and responsible for its operation, or under the supervision of the responsible person, shall shut the system down and make necessary adjustments should the need arise.

- 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.
- Chemigation systems connected to public water systems must contain a functional reduced-pressure zone (RPZ), back flow preventer 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.
- 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 back flow.
- The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump.

- The pesticide injection pipeline must 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, or in cases where there is no water pump, when the water pressure decreases to the point where pesticide distribution is adversely affected.
- 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.
- Systems not connected to a public water supply must contain a functional check valve, vacuum relief valve, and low-pressure drain appropriately located in the irrigation pipeline to prevent water source contamination from back flow.
- Systems must use a positive displacement, metering 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.
- If you have questions about calibration, you should contact State Extension Service specialists, equipment manufacturers or other experts.

### **Rainfastness**

As soon as dry, Thwartex will resist wash-off better than most insecticides. However, efficacy or residual will be reduced with exposure to rainfall or overhead irrigation.

### **Spray Adjuvants**

The addition of agricultural adjuvants to sprays of Thwartex may improve initial spray deposits, redistribution and weatherability. Select adjuvants that are recommended and registered for your specific use pattern and follow their use directions. When an adjuvant is to be used with this product, Agsurf recommends the use of a Chemical Producers and Distributors Association certified adjuvant. Always add adjuvants last in the mixing process.

## **INSECTICIDE RESISTANCE MANAGEMENT**

Thwartex contains Methoxyfenozide, a Group 18 insecticide. Any insect population may contain individuals naturally resistant to Methoxyfenozide and other Group 18 insecticides. The resistant individuals may dominate the insect population if this group of insecticides is used repeatedly in the same fields. Appropriate resistance-management strategies should be followed.

### **To delay insecticide resistance, take the following steps:**

- Rotate the use of Thwartex or other Group 18 insecticides within a growing season, or among growing seasons, with different groups that control the same pest. Avoid application of more than 3 and consecutive sprays of Thwartex or other insecticides in the same group in a season.
- Use tank mixes with insecticides from different groups that are equally effective on the target pest when such use is permitted. Do not rely on same mixture repeatedly for the same pest population. Consider any known cross-resistance issues (for the targeted pests) between the individual components of a mixture. In addition, consider the following recommendations provided by the Insecticide Resistance Action Committee (IRAC):
  - Individual insecticides selected for use in mixtures should be highly effective and be applied at the rates at which they are individually registered for use against the target species.
  - Mixtures with components having the same IRAC mode of action classification are not recommended for insect resistance management.
  - When using mixtures, consider any known cross-resistance issues between the individual components for the targeted pests(s).
  - Mixtures become less effective if resistance is already developing to one or both active ingredients, but they may still provide pest management benefits.
  - The insect resistance management benefits of an insecticide mixture are greatest if the two components have similar periods of residual insecticidal activity. Mixtures of insecticides with unequal periods of residual insecticide activity may offer an insect resistance management benefit only for a period where both insecticides are active.
- Adopt an integrated pest management program for insecticide use that includes scouting, uses historical information related to pesticide use, crop rotation, record keeping, and which considers cultural, biological and other chemical control practices.
- Monitor after applications for unexpected target pest survival. If the level of survival suggests the presence of resistance, consult with your local university specialist or certified pest control advisor.

- Contact your local extension specialist or certified crop advisors for any additional pesticide resistance-management and/or IPM recommendations for the specific site and pest problems in your area.
- For further information or to report suspected resistance contact 1-800-258-3033.

## USE RESTRICTIONS ENDANGERED SPECIES

It is a federal offense to use any pesticide in a manner that results in the death of an endangered species. Use this product may pose a hazard to endangered or threatened species. When using this product, you must follow the measures contained in the Endangered Species Protection Bulletin for the county in which you are applying the product. To obtain Bulletins, no more than six months before using this product, consult <http://www.epa.gov/espp/>. You must use the Bulletin valid for the month in which you will apply the product.

## ROTATIONAL CROP RESTRICTIONS

The following rotational crops may be planted at intervals defined below following the final application of Thwartex at specified rates for a registered use.

Crop	Re-Planting Interval
crops registered use	no restrictions
all other crops grown for food or feed	7 days

**Note:** When using Thwartex with other registered pesticides, always refer to rotational restrictions and precautions on the other product's label and comply with the most restrictive rotational guidelines.

## USES

**Bushberries (Subgroup 13-07B)<sup>1</sup>, Aronia Berry, Buffalo Currant, Chilean Guava, European Barberry, Highbush Cranberry, Honeysuckle, Jostaberry, Juneberry, Lingonberry, Native Currant, Salal, Sea Buckthorn, and Cultivars and/or Hybrids of Each**

(Not registered for use in New York)

<sup>1</sup>Bushberries (subgroup 13-07B) including black currant, elderberry, gooseberry, highbush blueberry, huckleberry, lowbush blueberry, red currant

**Ground Application:** Apply in a minimum of 30 gallons per acre (gpa) by conventional ground equipment. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 10 gpa. Use a higher carrier volume for heavy infestations and in situations where thorough coverage is difficult to achieve.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
cherry fruitworm cranberry fruitworm	10 - 16 (0.16 - 0.25 lb ai/ acre)	Apply at initiation of egg laying [approximately 400 Day Degrees (DD) base 50°F] following biofix <sup>1</sup> . Make a second application at 100% petal fall (usually 7 to 14 days following the first application). An additional application (third) no sooner than 7 days following the second application may be required under high pressure or sustained moth flight.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 7 days of harvest.</li> <li>• Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 48 fl oz of Thwartex (0.75 lb ai) per acre per year.</li> <li>• Do not make more than 3 applications per acre per year.</li> <li>• <b>Minimum Re-treatment Interval:</b> 7 days</li> <li>• See Rotational Crop Restrictions.</li> </ul>

Pests (Cont.)	Application Rate (fl oz/acre)	Application Timing	Restrictions
European grapevine moth light brown apple moth obliquebanded leafroller	10 - 16 (0.16 - 0.25 lb ai/ acre)	<b>Spring (overwintering) generation:</b> Make one or two applications at bloom to petal fall to small larvae when threshold levels occur. <b>Summer generation:</b> Begin applications at peak moth flight (200 to 300 DD base 43°F) following biofix. An additional application (third) no sooner than 7 days following the second application may be required under high pressure or sustained moth flight.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 7 days of harvest.</li> <li>• Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 48 fl oz of Thwartex (0.75 lb ai) per acre per year.</li> <li>• Do not make more than 3 applications per acre per year.</li> <li>• <b>Minimum Re-treatment Interval:</b> 7 days</li> <li>• See Rotational Crop Restrictions.</li> </ul>
redbanded leafroller variegated leafroller		For control of other leafrollers, apply at early egg hatch for each generation. Make the first application before webbing and sheltering begins. Make a second application to ensure complete coverage of rapidly expanding fruits or foliage.	
spanworm		Apply when first signs of feeding damage appear or when infestations reach threshold levels as defined by cooperative extension service or other qualified professional authorities.	
green fruitworm		Apply when larvae are first detected in the clusters or when infestations reach threshold levels as defined by cooperative extension service or other qualified professional authorities.	
armyworm cutworm	8 - 16 (0.12 - 0.25 lb ai/ acre)	Apply when first signs of feeding damage appear or when infestations reach threshold levels as defined by cooperative extension service or other qualified professional authorities.	
gypsy moth	4 - 8 (0.06 - 0.12 lb ai/ acre)	Apply to early instars (1st, 2nd, or 3rd) at first signs of infestation.	

<sup>1</sup> Biofix is defined as first sustained adult catch in pheromone traps, typically five moths in three traps within a 7-day period. Consult state extension specialists or other qualified authorities for specific information regarding number, placement and management of pheromone traps.

## Caneberries (Subgroup 13-07A)<sup>1</sup>

(Not registered for use in New York)

<sup>1</sup>Caneberries (subgroup 13-07A) including bababerry, bingleberry, blackberry, blackcap, black raspberry, black satin berry, boysenberry, caneberry, Cherokee blackberry, chesterberry, Cheyenne blackberry, coryberry, darrowberry, dewberry, dirksen thornless berry, framboise, frambueso, Himalayaberry, himbeere, hullberry, keriberry, lavacaberry, loganberry, lowberry, lucretiaberry, mammoth blackberry, marionberry, mayberry, nectarberry, olallieberry, Oregon evergreen berry, phenomenalberry, rangerberry, ravenberry, red raspberry, rossberry, Shawnee blackberry, thimbleberry, tulaeen, yellow raspberry, youngberry, cultivars, varieties, and/or hybrids of these

**Ground Application:** Apply in a minimum of 30 gallons per acre by conventional ground equipment. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 10 gallons per acre. Use a higher carrier volume for heavy infestations and in situations where thorough coverage is difficult to achieve.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
cherry fruitworm cranberry fruitworm	10 - 16 (0.16 - 0.25 lb ai/ acre)	Apply at initiation of egg laying [approximately 400 Day Degrees (DD) base 50°F] following biofix <sup>1</sup> . Make a second application at 100% petal fall (usually 7 to 14 days following the first application). An additional application (third) no sooner than 7 days following the second application may be required under high pressure or sustained moth flight.	<ul style="list-style-type: none"> <li>Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 48 fl oz of Thwartex (0.75 lb ai) per acre per year.</li> <li>Do not make more than 3 applications per acre per year.</li> <li><b>Preharvest Interval:</b> Do not apply within 3 days of harvest.</li> <li><b>Minimum Re-treatment Interval:</b> 7 days</li> <li>See Rotational Crop Restrictions.</li> </ul>
light brown apple moth obliquebanded leafroller		<p><b>Spring (overwintering) generation:</b> Make one or two applications at bloom to petal fall to small larvae when threshold levels occur.</p> <p><b>Summer generation:</b> Begin applications at peak moth flight (200 to 300 DD base 43°F) following biofix.</p> <p>An additional application (third) no sooner than 7 days following the second application may be required under high pressure or sustained moth flight.</p>	
redbanded leafroller variegated leafroller		For control of other leafrollers, apply at early egg hatch for each generation. Make the first application before webbing and sheltering begins. Make a second application to ensure complete coverage of rapidly expanding fruits or foliage.	
spanworm		Apply when first signs of feeding damage appear or when infestations reach threshold levels as defined by cooperative extension service or other qualified professional authorities.	
green fruitworm		Apply when larvae are first detected in the clusters or when infestations reach threshold levels as defined by cooperative extension service or other qualified professional authorities.	

Pests (Cont.)	Application Rate (fl oz/acre)	Application Timing	Restrictions
armyworm cutworm	8 – 16 (0.12 – 0.25 lb ai/ acre)	Apply when first signs of feeding damage appear or when infestations reach threshold levels as defined by cooperative extension service or other qualified professional authorities.	<ul style="list-style-type: none"> <li>Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 48 fl oz of Thwartex (0.75 lb ai) per acre per year.</li> </ul>
gypsy moth	4 – 8 (0.06 – 0.12 lb ai/ acre)	Apply to early instars (1st, 2nd, or 3rd) at first signs of infestation.	<ul style="list-style-type: none"> <li>Do not make more than 3 applications per acre per year.</li> <li><b>Preharvest Interval:</b> Do not apply within 3 days of harvest.</li> <li><b>Minimum Re-treatment Interval:</b> 7 days</li> <li>See Rotational Crop Restrictions.</li> </ul>

<sup>1</sup>Biofix is defined as first sustained adult catch in pheromone traps, typically five moths in three traps within a 7-day period. Consult state extension specialists or other qualified authorities for specific information regarding number, placement and management of pheromone traps.

### Cilantro Leaves, *Brassica* (Cole) Leafy Vegetables (Crop Group 5)<sup>1</sup>, Leafy Vegetables (Crop Group 4)<sup>2</sup>, Leaves of Root and Tuber Vegetables (Crop Group 2)<sup>3</sup>, and Turnip Greens (Not registered for use in New York)

<sup>1</sup>*Brassica* (cole) leafy vegetables (crop group 5) including broccoli, broccoli raab, Brussels sprouts, cabbage, cauliflower, cavalo broccolo, Chinese broccoli, Chinese cabbage (bok choy, napa), Chinese mustard cabbage (gai choy), collards, kale, kohlrabi, mizuna, mustard greens, mustard spinach, rape greens.

<sup>2</sup>Leafy vegetables (except *Brassica*) (crop group 4) including amaranth, arugula, cardoon, celery, celtuce, chervil, Chinese celery, corn salad, dandelion, dock, edible-leaved chrysanthemum, endive (escarole), Florence fennel, garden cress, garden purslane, garland chrysanthemum, lettuce (head, leaf), New Zealand spinach, orach, parsley, radicchio, rhubarb, spinach, Swiss chard, upland cress, vine spinach, winter purslane.

<sup>3</sup>Leaves of root and tuber vegetables (crop group 2) including bitter cassava, black salsify, carrot, celeriac, chicory, dasheen, edible burdock, garden beet, parsnip, oriental radish, radish, rutabaga, sugarbeet, sweet cassava, sweet potato, taniar, true yam, turnip, and turnip-rooted chervil

**Ground Application:** Apply in a minimum of 10 gpa by conventional ground equipment to young crop or small plants. Apply in a minimum of 20 gpa to densely foliated or difficult to cover crops to ensure thorough coverage. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 10 gpa.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
beet armyworm cabbage looper cutworms (suppression only) fall armyworm garden webworm imported cabbageworm southern armyworm true armyworm yellowstriped armyworm	4 – 8 (0.06 – 0.12 lb ai/ acre)	For early season applications only to young crops and small plants. Apply at first sign of feeding damage or when infestations reach threshold levels as defined by a cooperative extension service or other qualified professional authorities.	<ul style="list-style-type: none"> <li><b>Preharvest Interval:</b> Do not apply within 1 day of harvest.</li> <li>Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> <li>See Rotational Crop Restrictions.</li> </ul>

Pests (Cont.)	Application Rate (fl oz/acre)	Application Timing	Restrictions
beet armyworm cabbage looper cabbage webworm cross-striped cabbageworm cutworms (suppression only) fall armyworm garden webworm imported cabbageworm southern armyworm true armyworm yellowstriped armyworm	8 - 10 (0.12 - 0.16 lb ai/ acre)	For mid- to late-season applications, heavier infestations, and under conditions in which thorough coverage is more difficult.  For heavy infestations, continuous moth flights, and/or egg masses and larvae in all stages of development, a 10- to 14-day re-treatment interval is required to protect new growth until moth flights and/or hits subside.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 1 day of harvest.</li> <li>• Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> <li>• See Rotational Crop Restrictions.</li> </ul>
diamondback moth (suppression only)	12 - 16 (0.19 - 0.25 lb ai/ acre)	Infestations and crop damage are reduced when applied at initiation of egg laying.	

## Citrus Fruits (Crop Group 10-10)<sup>1</sup>

(Not registered for use in New York)

<sup>1</sup>Citrus fruits (crop group 10-10) including Australian desert lime, Australian finger lime, Australian round lime, brown river finger lime, calamondin, citron, citrus hybrids, grapefruit, Japanese summer grapefruit, kumquat, lemon, lime, Mediterranean mandarin, mount white lime, New Guinea wild lime, pummelo, russell river lime, satsuma mandarin, sour orange, sweet lime, sweet orange, tachibana orange, Tahiti lime, tangelo, tangerine (Mandarin), tangor, trifoliate orange, niqu fruit, cultivars, varieties and/or hybrids of these

**Ground Application:** Apply in a minimum of 50 gallons per acre by conventional ground equipment to trellised trees or trees 10 feet tall or less. For trees more than 10 feet tall, use a minimum of 100 gallons per acre. For low volume applications, apply in a minimum of 20 gallons per acre by ground equipment. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Optimum results are achieved when higher spray volumes are used. Calibrate equipment to the desired spray volume. When using a new application method or product for the first time, treat a small area before applying to larger areas.

**Resistance Management:** To reduce the potential for resistance development in target pest species, do not make more than 3 consecutive applications of Thwartex. If additional treatments are required after two consecutive applications of Thwartex, rotate to another class of effective insecticide mode of action for at least two applications and utilize Integrated Pest Management practices such as routine monitoring, treatment thresholds to time applications, and cultural and biological controls whenever possible. Consult your Agsurf representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
citrus leafminer citrus peelminer cutworms leafrollers orange dog worm	8 - 16 (0.12 - 0.25 lb ai/ acre)	Apply at the first observation of the pests on the flushing leaves. Reapply no sooner than 14-day intervals.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 1 day of harvest.</li> <li>• Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> <li>• Do not make more than 4 applications per year.</li> <li>• <b>Minimum Re-treatment Interval:</b> 14 days</li> </ul>



## Corn (Field, Sweet, Seed)

(Not registered for use in New York)

### Specific Use Directions-Field Corn:

**Ground Application:** Apply in a minimum of 5 gpa by conventional ground equipment to young crop or small plants. Higher carrier volumes may be required to provide thorough coverage to larger, more mature crop. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 5 gpa. Use sufficient carrier volume to provide thorough, uniform coverage.

### Specific Use Directions-Sweet Corn:

**Ground Application:** Apply in a minimum of 10 gpa by conventional ground equipment to young crop or small plants. Apply in a minimum of 20 gpa after initiation of tasseling. Calibrate equipment and spray volume to assure uniform coverage of infested parts of the crop.

**Aerial Application:** Apply in a minimum of 10 gpa.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
European corn borer southwestern corn borer sugarcane borer	4 – 16 (0.06 – 0.25 lb ai/ acre)	Apply at first sign of egg hatch or when infestations reach threshold levels as defined by a cooperative extension service or other qualified professional authorities. Direct application at the whorl for early season (first generation) infestations. Apply as broadcast or multi-nozzle over the row application to mid- and late-season infestations.	<ul style="list-style-type: none"><li>• <b>Preharvest Interval-Field Corn:</b> Do not apply within 21 days of harvest.</li><li>• <b>Preharvest Interval-Sweet Corn:</b> Do not apply within 3 days of harvest for ears and/or green chop (forage) and within 21 days of harvest for dry fodder.</li><li>• Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li><li>• Do not make more than 4 applications per year.</li><li>• <b>Minimum Re-treatment Interval:</b> 5 days</li><li>• See Rotational Crop Restrictions.</li></ul>
true armyworm western bean cutworm		Apply at first sign of egg hatch (field corn), feeding damage (sweet corn), or when infestations reach threshold levels as defined by a cooperative extension service or other qualified professional authorities. Under heavy infestations, continuous moth flights, or rapid crop growth and development, reapply at 5- to 10-day re-treatment interval.	

## Cotton

(Not registered for use in New York)

**Ground Application:** Make applications by conventional ground sprayers which are calibrated to deliver a minimum of 5 gpa.

**Aerial Application:** Apply in a minimum of 3 gpa. Use a higher carrier volume or heavy infestations and in situations where thorough coverage is difficult to achieve.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
beet armyworm cabbage looper cotton leafworm cotton leaf perforator fall armyworm <sup>1</sup> saltmarsh caterpillar southern armyworm soybean looper true armyworm yellowstriped armyworm	4 - 10 (0.06 - 0.16 lb ai/ acre)	Apply at egg hatch or when first signs of feeding occur. Use a higher rate for heavier infestations and under conditions in which thorough coverage is more difficult (most fall armyworm). Under heavy infestations, continuous moth flights and/or egg masses and larvae in all stages of development, a 10- to 14-day re-treatment interval is required to protect new growth until moth flights and/or hits subside.	<ul style="list-style-type: none"><li>• <b>Preharvest Interval:</b> Do not apply within 14 days of harvest.</li><li>• Do not apply more than 10 fl oz per acre (0.16 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li><li>• Do not make more than 6 applications per year.</li><li>• <b>Minimum Re-treatment Interval:</b> 10 days</li></ul>

<sup>1</sup>Suppression only. Use a higher rate in the rate range and ensure thorough coverage. Tank mixing Thwartex with other products registered for fall armyworm control in cotton (e.g., pyrethroids, spinosad, or others) has been shown to improve control. Consult your Agsurf representative, extension service specialist, certified crop advisor or state agricultural experiment station for any additional local use recommendations for your area.

## Cranberry

(Not registered for use in New York)

**Ground Application:** Apply in a minimum of 10 gpa by conventional ground equipment to young crop or small plants. Apply in a minimum of 20 gpa to densely foliated or difficult to cover crops to ensure thorough coverage. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 10 gpa.

**Chemigation Application:** Thwartex may be applied through sprinkler irrigation systems to control listed pests. Use specified broadcast application rates. See Chemigation Application section.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
blackheaded fireworm gypsy moth <i>sparganothis</i> fruitworm spanworms spotted fireworm	10 - 16 (0.16 – 0.25 lb ai/ acre)	<p><b>Spring (overwintering) generation:</b> Make 1 to 2 applications during the flower bud development period depending upon infestation level.</p> <p><b>Summer generation:</b> Make the first application during the period of peak egg lay to early egg hatch. Reapply 10 to 18 days later.</p> <p>A higher rate in the rate range and additional applications at 10- to 18-day intervals may be required for heavy infestations, sustained moth flight, situations in which it is difficult to achieve thorough coverage, and for quicker knockdown of larvae.</p> <p>For control of light to moderate infestations, begin applications before egg hatch of each generation and before the larvae penetrate the fruit. The product provides 10 to 18 days of protection depending upon application rate and how rapidly fruit is expanding.</p>	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 14 days of harvest.</li> <li>• Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> </ul>

## Cucurbit Vegetables (Crop Group 9)<sup>1</sup>

(Not registered for use in New York)

<sup>1</sup>Cucurbit vegetables (crop group 9) including balsam apple, balsam pear, bitter melon, chayote (fruit), Chinese cucumber, Chinese waxgourd (Chinese preserving melon), citron melon, cucumber, edible gourd (including Chinese okra, cucuzza, hechima, hyotan), gherkin, muskmelon (including cantaloupe, casaba, crenshaw melon, golden pershaw melon, honey balls, honeydew melon, mango melon, persian melon, pineapple melon, santa claus melon, snake melon, true cantaloupe), pumpkin, summer squash (including crookneck squash, scallop squash, straightneck squash, vegetable marrow, zucchini), winter squash (including acorn squash, butternut squash, calabaza, hubbard squash, spaghetti squash), watermelon

**Ground Application:** Apply in a minimum of 10 gpa by conventional ground equipment to young crop or small plants. Apply in a minimum of 20 gpa to densely foliated or difficult to cover crops to ensure thorough coverage. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 10 gpa.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
beet armyworm cabbage looper melon worm pickle worm rind worm southern armyworm true armyworm yellowstriped armyworm	4 – 10 (0.06 – 0.16 lb ai/ acre)	Apply at first sign of infestation, targeting eggs and small larvae, or when infestations reach threshold levels as defined by a cooperative extension service or other qualified professional authorities.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 3 days of harvest.</li> <li>• Do not apply more than 10 fl oz per acre (0.16 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> <li>• Do not make more than 4 applications per acre per year.</li> <li>• <b>Minimum Re-treatment Interval:</b> 7 days</li> <li>• See Rotational Crop Restrictions.</li> </ul>

## Dates

(Not registered for use in New York)

**Ground Application:** Apply in a minimum of 100 gallons per acre. Equipment and spray volume should be calibrated to assure uniform coverage of infested parts of the crop.

Target Pest	Thwartex (fl oz/acre)	Application Timing	Restrictions
carob moth	10 - 20 (0.16 – 0.31 lb ai/ acre)	<p>For control of light to moderate infestations, begin applications before egg hatch of each generation and before the larvae penetrate the fruit. Once applied, the product provides 10 to 18 days of protection depending upon application rate and how rapidly fruit is expanding.</p> <p>Consult local spray timing advisories or follow biofix dates based on pheromone trap catches to time sprays appropriately.</p> <p>For continuous moth flight and egg laying, use the highest labeled rate. Maintain coverage on the fruit surface with 10- to 18-day re-treatment intervals.</p> <p>Alternate or intersperse with other insecticides with different modes of action targeted for the same pest so long as the re-treatment interval does not exceed the period of effectiveness of the products being alternated and Thwartex is applied before larvae penetrate the fruit.</p>	<ul style="list-style-type: none"><li>• Do not apply more than 20 fl oz per acre (0.31 lb ai/A) per application or a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li><li>• Do not make more than 3 applications per acre per year.</li><li>• <b>Preharvest Interval:</b> Do not apply within 7 days of harvest.</li><li>• <b>Minimum Re-treatment Interval:</b> 10 days</li></ul>

<sup>1</sup>Biofix is defined as first sustained adult catch in pheromone traps, typically five moths in three traps within a 7-day period. Consult state extension specialists or other qualified authorities for specific information regarding number, placement and management of pheromone traps.

## Fruiting Vegetables (Crop Group 8-10)<sup>1</sup>

(Not registered for use in New York)

<sup>1</sup>Fruiting vegetables (crop group 8-10) including African eggplant, bell pepper, bush tomato, cocona, currant tomato, eggplant, garden huckleberry, goji berry, groundcherry, hot pepper, martynia, naranjilla, nonbell pepper, okra, pea eggplant, pepino, pimento pepper, roselle, scarlet eggplant, sunberry, sweet pepper, tomatillo, tomato, tree tomato, cultivars, varieties and/or hybrids of these

**Ground Application:** Apply in a minimum of 10 gallons per acre by conventional ground equipment to young crop or small plants. Apply in a minimum of 20 gallons per acre to densely foliated or difficult to cover crops to ensure thorough coverage. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 10 gallons per acre.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
beet armyworm cabbage looper European corn borer fall armyworm southern armyworm tomato hornworm true armyworm yellowstriped armyworm western yellowstriped armyworm	4 – 8 (0.06 – 0.12 lb ai/ acre)	For early season applications only to young crops and small plants. Apply at first sign of feeding damage or when infestations reach threshold levels as defined by a cooperative extension service or other qualified professional authorities.	<ul style="list-style-type: none"> <li>Do not apply more than 16 fl oz (0.25 lb ai/A) per acre per application or a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> <li><b>Preharvest Interval:</b> Do not apply within 1 day of harvest.</li> <li>Do not make more than 4 applications per year.</li> <li><b>Minimum Re-treatment Interval:</b> 7 days</li> <li>See Rotational Crop Restrictions.</li> </ul>
	8 - 16 (0.12 – 0.25 lb ai/ acre)	For mid- to late-season applications, heavier infestations, and under conditions in which thorough coverage is more difficult.  For heavy infestations, continuous moth flights, and/or egg masses and larvae in all stages of development, a 7- to 14-day re-treatment interval is required to protect new growth until moth flights and/or larval infestations subside.	
tomato fruitworm (suppression only)	10 - 16 (0.16 – 0.25 lb ai/ acre)	Apply at first sign of feeding damage or when infestations reach threshold levels as defined by a cooperative extension service or other qualified professional authorities. May provide partial control when infestations reach high levels.	
tomato pinworm (suppression only)		Leafmining and infestations of leafmining phase are reduced when applied at initiation of egg laying.	

## Globe Artichoke

(Not registered for use in New York)

**Ground Application:** Apply in a minimum of 75 gpa of water using calibrated ground application equipment that provides thorough coverage.

**Aerial Application:** Apply in a minimum of 10 gpa of water. Use higher water volumes for heavy infestations and in situations where thorough coverage is difficult to achieve.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
armyworm plume moth	4 - 16 (0.06 – 0.25 lb ai/ acre)	Apply at egg hatch or when first signs of feeding occur.  Use a higher rate for heavier infestations and under conditions in which thorough coverage is more difficult.  Under conditions of heavy infestations, continuous moth flights and/or egg masses and larvae in all stages of development, reapply Thwartex or another effective product at a minimum application interval of 7 days to protect new growth until moth flights subside.	<ul style="list-style-type: none"> <li><b>Preharvest Interval:</b> Do not apply within 4 days of harvest.</li> <li>Do not apply more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> <li>Do not make more than 4 applications per year.</li> <li><b>Minimum Re-treatment Interval:</b> 7 days</li> </ul>

## Grape

(Not registered for use in New York)

**Ground Application:** Apply in a minimum of 40 gpa by conventional airblast or over the row sprayer. If using other type of sprayer, apply in sufficient carrier volume to ensure thorough, uniform cover of the crop. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 20 gpa. This method should not be used if the density of the foliage prohibits thorough, uniform coverage of the entire vine canopy.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
grape berry moth	8 - 16 (0.12 – 0.25 lb ai/ acre)	For internal feeding lepidoptera larvae, apply at initiation of egg hatch for each generation. Reapply within 10 to 18 days to ensure complete coverage of rapidly expanding fruits or foliage.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 30 days of harvest.</li> <li>• Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 48 fl oz of Thwartex (0.75 lb ai) per acre per year.</li> <li>• Do not make more than 5 applications per year.</li> <li>• <b>Minimum Re-treatment Interval:</b> 10 days</li> </ul>
European grapevine moth grape leaf folder light brown apple moth omnivorous leafroller obliquebanded leafroller orange tortrix redbanded leafroller		<p><b>Spring generation:</b> Apply at first sign of larval infestation or to small larvae when threshold levels occur.</p> <p><b>Summer generation:</b> For each generation, apply at first egg hatch. Reapply at 10- to 14-day intervals under high pressure or sustained moth flight.</p>	

Please follow the use directions below for a reduced PHI for Grape to 21 days

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
grape berry moth	8 - 12 (0.12 – 0.19 lb ai/ acre)	For internal feeding lepidoptera larvae, apply at initiation of egg hatch for each generation.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 21 days of harvest.</li> <li>• Do not apply more than 12 fl oz per acre (0.19 lb ai/A) per application or more than a total of 48 fl oz of Thwartex (0.75 lb ai) per acre per year.</li> <li>• Do not make more than 4 applications per acre per year.</li> <li>• <b>Minimum Re-treatment Interval:</b> 21 days</li> </ul>
European grapevine moth grape leaf folder light brown apple moth omnivorous leafroller obliquebanded leafroller orange tortrix redbanded leafroller		<p><b>Spring generation:</b> Apply at first sign of larval infestation or to small larvae when threshold levels occur.</p> <p><b>Summer generation:</b> For each generation, apply at first egg hatch.</p>	

## Grass Forage, Fodder, and Hay (Crop Group 17)

(Not registered for use in New York)

**Ground Application:** Apply in a minimum of 10 gpa by conventional ground equipment. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 5 gpa. Use a higher carrier volume for heavy infestations and in situations where thorough coverage is difficult to achieve.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
armyworms	4 - 8 (0.06 - 0.12 lb ai/ acre)	Begin applications when first signs of feeding damage appear or when threshold levels of feeding damage occur.  Use a higher rate for heavier infestations and under conditions in which thorough coverage is more difficult.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply to hay within 7 days of harvest; there is no pre-harvest interval for forage. Livestock can enter and graze on treated area immediately after application.</li> <li>• Do not apply more than 8 fl oz per acre (0.12 lb ai/A) per application or more than a total of 32 fl oz of Thwartex (0.5 lb ai) per acre per year.</li> <li>• Do not make more than 1 application per cutting.</li> <li>• See Rotational Crop Restrictions.</li> </ul>

### Green Onion (Subgroup 3-07B)<sup>1</sup>, except chive (fresh leaves) (Not registered for use in New York)

<sup>1</sup>Green onion (subgroup 3-07B) including beltville bunching onion, Chinese chive (fresh leaves), elegans hosta, fresh onion, fritillaria leaves, green onion, kurrat, lady's leek, leek, macrostem onion, shallot (fresh leaves), tree onion (tops), wild leek

**Ground Application:** Apply in a minimum of 10 gpa by conventional ground equipment to young crop or small plants. Apply in a minimum of 20 gpa to densely foliated or difficult to cover crops to ensure thorough coverage. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 10 gpa.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
lepidopteran larvae including: armyworms European corn borer loopers	4 - 8 (0.06 - 0.12 lb ai/ acre)	For early season applications only to young crops and small plants. Apply at first sign of feeding damage or when infestations reach threshold levels as defined by a cooperative extension service or other qualified professional authorities.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 1 day of harvest.</li> <li>• Do not apply more than 12 fl oz per acre (0.19 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> <li>• Do not make more than 6 applications of Thwartex per acre per year.</li> <li>• See Rotational Crop Restrictions.</li> </ul>
	8 - 12 (0.12 - 0.19 lb ai/ acre)	For mid- to late-season applications, heavier infestations, and under conditions in which thorough coverage is more difficult.  For heavy infestations, continuous moth flights, and/or egg masses and larvae in all stages of development, reapplication can be made at a minimum 10-day re-treatment interval to protect new growth until moth flights and/or hits subside.	

## Herbs (Fresh and Dried) (Subgroup 19A)<sup>1</sup>

(Not registered for use in New York)

<sup>1</sup>Herbs (fresh and dried) (subgroup 19A) including angelica, annual marjoram, balm, basil, borage, burnet, camomile, catnip, chervil (dried), chive, coriander (leaf), costmary, culantro (leaf), curry (leaf), dillweed, horehound, hyssop, lavender, lemongrass, lovage (leaf), marigold, marjoram, nasturtium, oregano, parsley (dried), pennyroyal, pot marjoram, rosemary, rue, sage, summer savory, sweet bay, sweet marjoram, tansy, tarragon, thyme, wild marjoram, wintergreen, winter savory, woodruff, wormwood

**Ground Application:** Apply in a minimum of 10 gallons per acre by conventional ground equipment to young crop or small plants. Apply in a minimum of 20 gallons per acre to densely foliated or difficult to cover crops to ensure thorough coverage. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 10 gallons per acre.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
beet armyworm cabbage looper cutworms (suppression only) fall armyworm garden webworm imported cabbageworm southern armyworm true armyworm yellowstriped armyworm	4 – 8 (0.06 – 0.12 lb ai/ acre)	For early season applications only to young crops and small plants. Apply at first sign of feeding damage or when infestations reach threshold levels as defined by a cooperative extension service or other qualified professional authorities.	<ul style="list-style-type: none"><li>• Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li><li>• <b>Preharvest Interval:</b> Do not apply within 1 day of harvest.</li><li>• <b>Minimum Re-treatment Interval:</b> 10 days</li><li>• See Rotational Crop Restrictions.</li></ul>
beet armyworm cabbage looper cabbage webworm cross-striped cabbageworm cutworms (suppression only) fall armyworm garden webworm imported cabbageworm southern armyworm true armyworm yellowstriped armyworm	8 - 10 (0.12 – 0.16 lb ai/ acre)	For mid- to late-season applications, heavier infestations, and under conditions in which thorough coverage is more difficult. For heavy infestations, continuous moth flights, and/or egg masses and larvae in all stages of development, a 10- to 14-day re-treatment interval is required to protect new growth until moth flights and/or hits subside.	
diamondback moth (suppression only)	12 - 16 (0.19 – 0.25 lb ai/ acre)	Infestations and crop damage are reduced when applied at initiation of egg laying.	

## Legume Vegetables (Succulent or Dried) (Crop Group 6)<sup>1</sup> and Foliage of Legume Vegetables (Except Soybean) (Subgroup 7A)<sup>2</sup>

(Not registered for use in New York)

<sup>1</sup>Legume vegetables (succulent or dried) (crop group 6) including asparagus bean, blackeyed pea, *Cajanus* spp. (pigeon pea), Chinese longbean, *Cicer arietinum* (chick peas, garbanzo beans), cowpea, green lima bean, jackbean, *Lens* spp. (lentils), *Lupinus* spp. (grain lupine, sweet lupine, white lupine, white sweet lupine), moth bean, *Phaseolus* spp. (kidney beans, lima beans, mung beans, navy beans, pinto beans, snap beans, waxbeans), *Pisum* spp. (dwarf pea, edible-pod pea, English pea, field pea, garden pea, green pea), runner bean, snap bean, snow pea, soybean (immature seed), southern pea, succulent broad bean, sugar snap pea, sword bean, *Vicia faba* (broad beans, fava beans); *Vigna* spp. (asparagus beans, blackeyed pea, cowpeas), wax bean, yardlong bean

<sup>2</sup>Foliage of legume vegetables (except soybean) (subgroup 7A) including any cultivar of bean and field pea (except soybean)



**Ground Application:** Apply in a minimum of 10 gpa by conventional ground equipment to young crop or small plants. Apply in a minimum of 20 gpa to densely foliated or difficult to cover crops to ensure thorough coverage. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 10 gpa. Use a higher carrier volume for heavy infestations and in situations where thorough coverage is difficult to achieve.

**Resistance Management:** To reduce the potential for resistance development in target pest species, do not make more than two consecutive applications of Thwartex. If additional treatments are required after two consecutive applications of Thwartex, rotate to another class of effective insecticides for at least one application and utilize Integrated Pest Management practices such as routine monitoring, treatment thresholds to time applications, and cultural and biological controls whenever possible. Consult your Agsurf representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
alfalfa looper beet armyworm cabbage looper European corn borer fall armyworm southern armyworm tomato hornworm true armyworm yellowstriped armyworm western yellowstriped armyworm	4 – 8 (0.06 – 0.12 lb ai/ acre)	For early season applications only to young crops and small plants. Apply at first sign of feeding damage or when infestations reach threshold levels as defined by a cooperative extension service or other qualified professional authorities.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 7 days of harvest.</li> <li>• Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> <li>• Do not make more than 4 applications per year.</li> <li>• <b>Minimum Re-treatment Interval:</b> 7 days</li> <li>• Do not use adjuvants in the tank mix when applying this product to dry peas and beans.</li> <li>• Do not apply to dry peas by aerial ULV.</li> <li>• See Rotational Crop Restrictions.</li> </ul>
corn earworm ( <i>Helioverpa/ Heliothis</i> ) (suppression only)	8 - 16 (0.12 – 0.25 lb ai/ acre)	For mid- to late-season applications, heavier infestations, and under conditions in which thorough coverage is more difficult.  For heavy infestations, continuous moth flights, and/or egg masses and larvae in all stages of development, a 7- to 14-day re-treatment interval is required to protect new growth until moth flights and/or larval infestations subside.	
tomato pinworm (suppression only)	10 - 16 (0.16 – 0.25 lb ai/ acre)	Apply at first sign of feeding damage or when infestations reach threshold levels as defined by a cooperative extension service or other qualified professional authorities. May provide partial control when infestations reach high levels.	
		Leafmining and infestations of leafmining phase are reduced when applied at initiation of egg laying.	

## Low Growing Berry (Except Cranberry) (Crop Subgroup 13-07G)<sup>1</sup> (Not registered for use in New York)

<sup>1</sup>Low growing berry (except cranberry) (crop subgroup 13-07G) including bearberry, bilberry, cloudberry, lingonberry, lowbush blueberry, muntries, partridgeberry, strawberry, cultivars, varieties, and/or hybrids of these

**Ground Application:** Apply in a minimum of 10 gallons per acre by conventional ground equipment to young crop or small plants. Apply in a minimum of 20 gallons per acre to densely foliated or difficult to cover crops to ensure thorough coverage. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 10 gallons per acre.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
armyworms corn earworm (suppression only) cutworms (suppression only)	6 – 12 (0.09 – 0.19 lb ai/ acre)	For early season applications to young crops and small plants. Apply at first sign of feeding damage or when infestations reach threshold levels as defined by a cooperative extension service or other qualified professional authorities.  For heavy infestations, continuous moth flights, and/or egg masses and larvae in all stages of development, a 10- to 14-day re-treatment interval is required to protect new growth until moth flights and/or hits subside.	<ul style="list-style-type: none"> <li>Do not apply more than 12 fl oz per acre (0.19 lb ai/A) per application or a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> <li><b>Preharvest Interval:</b> Do not apply within 3 days of harvest.</li> <li><b>Minimum Re-treatment Interval:</b> 10 days</li> <li>See Rotational Crop Restrictions.</li> </ul>

## Nongrass Forage, Fodder, Straw and Hay (Crop Group 18)<sup>1</sup>

(Not registered for use in New York)

<sup>1</sup>Nongrass forage, fodder, straw and hay (crop group 18) including alfalfa, clover, crown vetch, kudzu, lespedeza, lupin, milk vetch, sainfoin, trefoil, velvet bean, vetch

**Ground Application:** Apply in a minimum of 10 gpa by conventional ground equipment. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 5 gpa. Use a higher carrier volume for heavy infestations and in situations where thorough coverage is difficult to achieve.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
armyworms, including beet fall southern striped true western yellowstriped  alfalfa caterpillar alfalfa looper webworms	4 - 10 (0.06 - 0.16 lb ai/ acre)	Begin applications when first signs of feeding damage appear or when threshold levels of feeding damage occur.  Use a higher rate for heavier infestations and under conditions in which thorough coverage is more difficult.	<ul style="list-style-type: none"> <li><b>Preharvest Interval:</b> Do not apply within 7 days of hay harvest; there is no preharvest interval for forage. Livestock can enter and graze on treated area immediately after application.</li> <li>Do not apply more than 10 fl oz per acre (0.16 lb ai/A) per application or apply more than a total of 32 fl oz of Thwartex (0.5 lb ai) per acre per year.</li> <li>Do not make more than 1 application per cutting.</li> <li>See Rotational Crop Restrictions.</li> </ul>

**ALFALFA ONLY: Please follow the use directions below for a reduced PHI for Alfalfa to 3 days**

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
armyworms, including beet fall southern striped true western yellowstriped  alfalfa caterpillar alfalfa looper webworms	4 - 8 (0.06 - 0.12 lb ai/ acre)	Begin applications when first signs of feeding damage appear or when threshold levels of feeding damage occur. Use a higher rate for heavier infestations and under conditions in which thorough coverage is more difficult.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 3 days of hay harvest; there is no preharvest interval for forage. Livestock can enter and graze on treated area immediately after application.</li> <li>• Do not apply more than 8 fl oz per acre (0.12 lb ai/A) per application or a total of 32 fl oz of Thwartex (0.5 lb ai) per acre per year.</li> <li>• Do not make more than 1 application per cutting.</li> <li>• See Rotational Crop Restrictions.</li> </ul>

**Ornamentals****(Not registered for use in New York)**

Thwartex controls the listed pests on trees; shrubs; foliage plants and flowers grown in commercial nurseries and greenhouses, in Christmas tree farms, in outdoor landscape areas such as parks, recreational areas, institutional grounds, residential property, etc., and in interior plantscapes. When applied as directed, Thwartex has shown excellent selectivity on a wide range of ornamental plants. It is impossible, however, to evaluate this product on all ornamentals or under all possible growing conditions. The user should exercise reasonable judgment and caution with this product; until familiar with results under user growing conditions, treat a limited number of plants.

**Ground Application:** Apply in a minimum of 50 gpa by conventional ground equipment or hydraulic sprayers. Apply in a minimum of 10 gpa by mist blowers or air blast sprayers. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Hand Sprayers:** Apply in enough water to thoroughly spray plant foliage until runoff.

Thwartex (fl oz/acre)	Active Ingredient (lb ai/acre)	Equivalent Thwartex in 1 Gallon of Water (Teaspoon)
4	0.06	1/4
8	0.12	1/2
16	0.25	1

**Aerial Application:** Apply in a minimum of 20 gpa. Thwartex can be aerially applied when conditions warrant. However, this method should not be used if the size of the tree or density of the foliage prohibits thorough, uniform coverage of the entire tree canopy. Do not make aerial applications in immediate proximity of residential, commercial, government, institutional or other structures where people may be present including homes, apartments, offices, churches, schools, and businesses. Aerial applicators should evaluate conditions existing at the time of application and make appropriate adjustments to reduce drift. In urban areas, however, use is limited to directed ground or chemical applications.

**Chemigation Application:** Thwartex may be applied through sprinkler irrigation systems to control listed pests. Use specified broadcast application rates. See Chemigation Application section.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
armyworm bagworms beet armyworm browntail moth codling moth cutworms eastern tent caterpillar elm spanworm eucalyptus caterpillar European grapevine moth fall armyworm fall cankerworm fall webworm Florida fern caterpillar forest tent caterpillar gypsy moth hemlock looper jack pine budworm leafrollers light brown apple moth pine tip moth processionary caterpillar puss caterpillar spruce budworm tussock moth western spruce budworm western tent caterpillar yellowneck caterpillar zimmerman pine moth	4 – 16 (0.06 – 0.25 lb ai/ acre)	Begin applications when larvae are observed or at the first sign of feeding damage. Repeat applications on a 10- to 14-day interval or as necessary based upon pest reinfestation.  Uniform coverage of the foliage is essential to provide maximum protection from defoliation and reduction of egg mass deposition.	<ul style="list-style-type: none"> <li>Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 32 fl oz of Thwartex (0.5 lb ai) per acre per year.</li> <li>Do not make more than 4 applications of Thwartex per year.</li> <li>Allow at least 6 hours between application completion and onset of precipitation to assure thorough spray drying.</li> </ul>

## Peanut

(Not registered for use in New York)

**Ground Application:** Apply in a minimum of 10 gpa by conventional ground equipment. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 5 gpa. Use a higher carrier volume for heavy infestations and in situations where thorough coverage is difficult to achieve.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
armyworms cabbage looper green clover worm saltmarsh caterpillar soybean loopers velvet bean caterpillar	6 - 10 (0.09 - 0.16 lb ai/ acre)	Apply when first signs of feeding damage appear or when threshold levels of feeding damage occur.	<ul style="list-style-type: none"> <li><b>Preharvest Interval:</b> Do not apply within 7 days of harvest.</li> <li>Do not apply more than 10 fl oz per acre (0.16 lb ai/A) per application or more than a total of 30 fl oz of Thwartex (0.47 lb ai) per acre per year.</li> <li>Do not make more than 3 applications per acre per year.</li> <li><b>Minimum Re-treatment Interval:</b> 7 days</li> <li>See Rotational Crop Restrictions.</li> </ul>

## Pineapple

(For Use only in Hawaii)

**Application Rate:** Apply as a foliar spray at the rate indicated to control target pests. Heavy infestations may require repeat applications, but follow resistance management guidelines.

**Application volume:** Apply in spray volume which will provide thorough crop coverage.

### Pests and Application Rates:

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
suppression of lepidopterous larvae such as: armyworms banana moth <i>Batrachedra commosae</i> <i>Elaphria nubicolora</i> fruit borer caterpillar ( <i>Thecla basilides</i> ; <i>Strymon basilides</i> ) pineapple caterpillar pink cornworm sugarcane bud moth	4 – 7 (0.06 - 0.10 lb ai/acre)	For determining when to treat, scout with enough regularity to monitor the population size of each of the labeled pests. Treat when pests appear, targeting eggs at hatch or small larvae. Consult your Agsurf representative, extension specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.	<ul style="list-style-type: none"> <li>Do not apply more than a total of 7 fl oz of Thwartex (0.10 lb ai) per acre per application or a total of 28 fl oz of Thwartex (0.44 lb ai of Methoxyfenozide) per acre per year.</li> <li>Do not make more than 4 applications per year.</li> <li><b>Minimum Re-treatment Interval:</b> Do not make applications less than 7 days apart.</li> <li><b>Preharvest Interval:</b> Do not apply within 3 days of harvest.</li> </ul>

## Pome Fruits (Crop Group 11-10)<sup>1</sup>

<sup>1</sup>Pome fruit (crop group 11-10) including apple, Asian pear, azarole, crabapple, loquat, mayhaw, medlar, pear, quince, tejocote, cultivars, varieties, and/or hybrids of these

For best protection, begin applications before egg hatch of each generation. For pests that penetrate fruit apply Thwartex before the larvae hatch and penetrate the fruit. Thwartex may provide 10 to 18 days of protection depending upon application rate and how rapidly fruit and/or leaves are expanding. Most effective crop protection results from an application of Thwartex made at the initiation of egg hatch. For heavy infestations, continuous moth flight and egg laying, or extended egg hatch, use the maximum specified rates. Maintain coverage on the fruit surface with 10- to 18-day re-treatment intervals.

Thwartex may also be used in a program approach alternated or interspersed with other insecticides. Make sure the re-treatment interval does not exceed the period of effectiveness of the alternate products and Thwartex.

Consult local spray timing advisories or follow biofix dates based upon pheromone trap catches to time sprays appropriately.

**Ground Application:** Apply Thwartex by conventional ground sprayers which are calibrated to deliver a minimum of 50 gallons per acre to trellised trees or trees 10 feet tall or less. For trees greater than 10 feet tall, use in a minimum of 100 gallons per acre.

**Aerial Application:** Aerial application is allowed only for the last two applications prior to harvest. Apply Thwartex in a minimum of 20 gallons per acre. Thwartex can be applied by aerial applications when conditions warrant. However, this method should not be used if the size of the tree or density of the foliage prohibits thorough, uniform coverage of the entire tree canopy.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
codling moth (suppression only) For use against low to moderate infestations in conjunction with alternate control measures such as in established mating disruption blocks.	16 (0.25 lb ai/acre)	For each generation, apply at the initiation of egg lay (usually occurs at 100 to 200 DD, base 50°F, following biofix). Reapply 10 to 18 days later.	<ul style="list-style-type: none"> <li>Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> <li><b>Preharvest Interval:</b> Do not apply within 14 days of harvest.</li> <li>Aerial application is allowed <b>only</b> for the last two applications prior to harvest.</li> </ul>
lesser appleworm oriental fruit moth	12 – 16 (0.19 - 0.25 lb ai/acre)		
obliquebanded leafroller pandemius leafroller	8 – 16 (0.12 - 0.25 lb ai/acre)	<b>Spring (overwintering) generation:</b> Make 1 to 2 applications during the pink to petal fall period depending upon infestation level. <b>Summer generation:</b> Make the first application during the period of peak egg lay to early egg hatch (usually 200 to 400 DD following biofix). Reapply 10 to 18 days later (usually 500 to 700 DD).	
eyespotted bud moth fruittree leafroller light brown apple moth redbanded leafroller variegated leafroller		For control of surface or foliar feeding leafroller larvae, apply when larvae are feeding.	
tufted apple bud moth	6 – 10 (0.09 - 0.16 lb ai/acre)	For each generation, apply at 10 to 30% egg hatch.	
spotted tentiform leafminer western tentiform leafminer	8 – 12 (0.12 - 0.19 lb ai/acre)	<b>First generation:</b> Apply at pink to petal fall. <b>Second, third generation:</b> Apply at early egg hatch for each generation.	
lacanobia fruitworm	12 (0.19 lb ai/acre)	Apply at egg hatch or at the first sign of larval infestation. Reapply within 10 to 14 days.	

<sup>1</sup>Biofix is defined as first sustained adult catch in pheromone traps, typically five moths in three traps within a 7-day period. Consult state extension specialists or other qualified authorities for specific information regarding number, placement and management of pheromone traps.

## Pomegranate

(Not registered for use in New York)

**Ground Application:** Apply in a minimum of 50 gpa by conventional ground equipment to trellised trees or trees 10 feet tall or less. For trees greater than 10 feet tall, use in a minimum of 100 gpa. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 20 gpa. This method should not be used if the size of the tree or density of the foliage prohibits thorough, uniform coverage of the entire tree canopy.

Pests	Application Rate fl oz/acre	Application Timing	Restrictions
European grapevine moth filbert worm light brown apple moth navel orangeworm obliquebanded leafroller omnivorous leafroller	8 - 16 (0.12 - 0.25 lb ai/acre)	Apply when larvae are feeding. Most effective crop protection results from application made at the initiation of egg hatch. The higher rates in the rate range and additional applications at 10- to 18-day intervals may be required for heavy infestations, sustained moth flight, situations in which it is difficult to achieve thorough coverage, and for quicker knockdown of larvae.	<ul style="list-style-type: none"><li>• <b>Preharvest Interval:</b> Do not apply within 7 days of harvest.</li><li>• Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li></ul>
redhumped caterpillar		Apply at initiation of egg hatch or at the first sign of larval infestation. Reapply in 10 to 14 days to ensure complete coverage of rapidly expanding fruits or foliage.	

## Popcorn

(Not registered for use in New York)

**Ground Application:** Apply in a minimum of 10 gpa by conventional ground equipment to young crop or small plants. Apply in a minimum of 20 gpa after initiation of tasseling. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 10 gallons per acre.

**Resistance Management:** To reduce the potential for resistance development in target pest species, do not make more than two consecutive applications of Thwartex. If additional treatments are required after two consecutive applications of Thwartex, rotate to another class of effective insecticides for at least one application and utilize Integrated Pest Management practices such as routine monitoring, treatment thresholds to time applications, and cultural and biological controls whenever possible. Consult your Agsurf representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

Pests	Application Rate fl oz/acre	Application Timing	Restrictions
European corn borer southwestern corn borer	4 – 8 (0.06 – 0.12 lb ai/ acre)	Apply at first sign of egg hatch or when infestations reach threshold levels as defined by a cooperative extension service or other qualified professional authorities. Direct application at the whorl for early season (first generation) infestations. Apply as broadcast or multi-nozzle over the row application to mid- and late-season infestations.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 21 days of harvest of grain and stover. There is no preharvest interval for popcorn forage.</li> <li>• Do not apply more than 8 fl oz per acre (0.12 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> <li>• Do not apply to popcorn by aerial ULV.</li> <li>• See Rotational Crop Restrictions below.</li> </ul>
true armyworm western bean cutworm		Apply at first sign of egg hatch (field corn), feeding damage (sweet corn), or when infestations reach threshold levels as defined by a cooperative extension service or other qualified professional authorities. Under heavy infestations, continuous moth flights, or rapid crop growth and development, reapply at 5- to 10-day re-treatment interval.	

## Root Vegetables (Subgroups 1A, 1B)<sup>1</sup> (Not registered for use in New York)

<sup>1</sup>Root vegetables (subgroups 1A, 1B) including black salsify, carrot, celeriac, chicory, edible burdock, garden beet, ginseng, horseradish, parsnip, oriental radish, radish, rutabaga, salsify, skirret, Spanish salsify, sugarbeet, turnip, turnip-rooted chervil, and turnip-rooted parsley

**Ground Application:** Apply in a minimum of 10 gpa by conventional ground equipment. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 10 gpa. Use a higher carrier volume for heavy infestations and in situations where thorough coverage is difficult to achieve.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
armyworms cabbageworms cutworm (suppression only) loopers saltmarsh caterpillar webworms	8 - 16 (0.12 – 0.25 lb ai/ acre)	Apply at egg hatch or when first signs of feeding occur. Use a higher rate for heavier infestations and under conditions in which thorough coverage is more difficult. Under heavy infestations, continuous moth flights and/or egg masses and larvae in all stages of development, reapply to protect new growth until moth flights and/or hits subside.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 1 day of harvest for all root vegetables except sugar beet. Do not apply within 7 days of sugarbeet harvest.</li> <li>• Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year for all crops except radish.</li> <li>• Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 32 fl oz of Thwartex (0.5 lb ai) per acre per year for radish.</li> <li>• <b>Minimum Re-treatment Interval:</b> 14 days</li> <li>• See Rotational Crop Restrictions.</li> </ul>



## Small Fruit Vine Climbing (Except Fuzzy Kiwifruit and Grape) (Crop Subgroup 13-07F)<sup>1</sup>

(Not registered for use in New York)

<sup>1</sup>Small fruit vine climbing (except fuzzy kiwifruit and grape) (crop subgroup 13-07F) including amur river grape, gooseberry, hardy kiwifruit, maypop, schisandra berry, cultivars, varieties, and/or hybrids of these

**Ground Application:** Apply in a minimum of 40 gallons per acre by conventional airblast or over the row sprayer. If using a type of sprayer not mentioned above, apply in sufficient carrier volume to ensure thorough, uniform cover of the crop. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 20 gallons per acre. This method should not be used if the density of the foliage prohibits thorough, uniform coverage of the entire vine canopy.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
grape berry moth	8 - 16 (0.12 – 0.25 lb ai/ acre)	For internal feeding lepidoptera larvae, apply at initiation of egg hatch for each generation. Reapply within 10 to 18 days to ensure complete coverage of rapidly expanding fruits or foliage.	<ul style="list-style-type: none"><li>Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or a total of 48 fl oz of Thwartex (0.75 lb ai) per acre per year.</li><li><b>Preharvest Interval:</b> Do not apply within 30 days of harvest.</li></ul>
grape leaf folder light brown apple moth omnivorous leafroller obliquebanded leafroller orange tortrix redbanded leafroller		<b>Spring generation:</b> Apply at first sign of larval infestation or to small larvae when threshold levels occur. <b>Summer generation:</b> For each generation, apply at first egg hatch. Reapply at 10- to 14-day intervals under high pressure or sustained moth flight.	

## Sorghum (Grain and Sweet)

(Not registered for use in New York)

**Ground Application:** Apply in a minimum of 15 gallons per acre by conventional ground equipment. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 10 gallons per acre.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
southwestern corn borer sugarcane borer	4 – 12 (0.06 – 0.19 lb ai/ acre)	Apply at first sign of egg hatch or when infestations reach threshold levels as defined by a cooperative extension service or other qualified professional authorities. Apply as broadcast or multi-nozzle over the row application to mid- and late-season infestations.	<ul style="list-style-type: none"><li>Do not apply more than 12 fl oz per acre (0.19 lb ai/A) per application or 48 fl oz of Thwartex (0.75 lb ai) per acre per year.</li><li><b>Preharvest Interval:</b> Do not apply within 21 days of grain or stover harvest, or within 3 days of forage or sweet sorghum stalk harvest.</li><li>See Rotational Crop Restrictions.</li></ul>

Pests (Cont.)	Application Rate (fl oz/acre)	Application Timing	Restrictions
beet armyworm fall armyworm	4 – 12 (0.06 – 0.19 lb ai/ acre)	Apply at first sign of egg hatch, feeding damage, or when infestations reach threshold levels as defined by a cooperative extension service or other qualified professional authorities.  Under heavy infestations, continuous moth flights, or rapid crop growth and development, reapply at 10-day re-treatment intervals.	<ul style="list-style-type: none"> <li>Do not apply more than 12 fl oz per acre (0.19 lb ai/A) per application or 48 fl oz of Thwartex (0.75 lb ai) per acre per year.</li> <li><b>Preharvest Interval:</b> Do not apply within 21 days of grain or stover harvest, or within 3 days of forage or sweet sorghum stalk harvest.</li> <li>See Rotational Crop Restrictions.</li> </ul>

## Soybean

(Not registered for use in New York)

**Ground Application:** Apply in a minimum spray volume of 10 gpa using calibrated ground application equipment that provides thorough coverage.

**Aerial Application:** Apply in a minimum spray volume of 5 gpa in equipment that has been properly patterned and calibrated for environmental conditions at the site. Use higher water volumes for heavy infestations and in situations where thorough coverage is difficult to achieve.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
armyworms green clover worm saltmarsh caterpillar soybean loopers velvet bean caterpillar	4 - 8 (0.06 – 0.12 lb ai/ acre)	Begin applications when first signs of feeding damage appear or when threshold levels of feeding damage occur.  Use a higher rate for heavier infestations and under conditions in which thorough coverage is more difficult.	<ul style="list-style-type: none"> <li><b>Preharvest Interval:</b> Do not apply within 7 days of harvest of hay and forage or within 14 days of harvest of seed.</li> <li>Do not apply more than 8 fl oz per acre (0.12 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> <li>Do not make more than 4 applications per year.</li> <li><b>Re-Planting Interval:</b> A 7-day re-planting interval is required for residues of methoxyfenozide.</li> </ul>

## Spearmint and Peppermint

(Not registered for use in New York)

**Ground Application:** Apply in a minimum of 10 gpa by conventional ground equipment to young crop or small plants. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 5 gpa. Calibrate aircraft to assure uniform coverage of the target crop.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
armyworms cutworms loopers	10 - 16 (0.16 – 0.25 lb ai/ acre)	Scout crops on a regular basis and treat as soon as economic thresholds have been met. Target small larvae and egg masses when possible. Use a higher rate in the rate range for high infestations and when extended residual is needed. Reapply at 14- to 21-day intervals when there are continuing infestations.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 14 days of harvest.</li> <li>• Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> </ul>

## Stone Fruits (Crop Group 12-12)<sup>1</sup>

(Not registered for use in New York)

<sup>1</sup>Stone fruits (crop group 12-12) including American plum, apricot, beach plum, black cherry, Canada plum, capulin, cherry plum, cherry (sweet, sour), cherry (tart) chickasaw plum, Chinese Jujube, Damson plum, Japanese apricot, Japanese plum, Klamath plum, Nanking cherry, nectarine, peach, plum, plumcot, prune plum, sloe, cultivars, varieties, and/or hybrids of these.

**Ground Application:** Apply in a minimum of 50 gpa by conventional ground equipment to trellised trees or trees 10 feet tall or less. For trees greater than 10 feet tall, use in a minimum of 100 gpa. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 20 gpa. This method should not be used if the size of the tree or density of the foliage prohibits thorough, uniform coverage of the entire tree canopy.

## Apricots, Nectarines, Peaches, Plums, Prunes and Their Hybrids

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
codling moth (suppression only) oriental fruit moth	10 - 16 (0.16 – 0.25 lb ai/ acre)	For control of light to moderate infestations, begin applications before egg hatch of each generation and before the larvae penetrate the fruit. The product provides 10 to 18 days of protection depending upon application rate and how rapidly fruit is expanding. Consult local spray timing advisories or follow biofix dates based upon pheromone trap catches to time sprays appropriately. For continuous moth flight and egg laying, use the highest labeled rate. Maintain coverage on the fruit surface with 10- to 18-day re-treatment intervals. Alternate or intersperse with other insecticides targeted at the same pest so long as the re-treatment interval does not exceed the period of effectiveness of the products being alternated and Thwartex is applied before larvae penetrate the fruit.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 7 days of harvest.</li> <li>• Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> </ul>

Pests (Cont.)	Application Rate (fl oz/acre)	Application Timing	Restrictions
peach twig borer	8 - 16 (0.12 - 0.25 lb ai/ acre)	For each generation, apply at initiation of egg hatch before larvae enter the fruit. Reapply in 10 to 14 days to ensure complete coverage of rapidly expanding fruits or foliage, or under conditions of high infestation or sustained moth flight.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 7 days of harvest.</li> <li>• Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> </ul>
obliquebanded leafroller pandemius leafroller		<p><b>Spring (overwintering) generation:</b> Make 1 to 2 applications during the pink to petal fall period depending upon infestation level.</p> <p><b>Summer generation:</b> Make the first application during the period of peak egg lay to early egg hatch (usually 200 to 400 DD following biofix). Reapply 10 to 18 days later (usually 500 to 700 DD).</p> <p>A higher rate in the rate range and additional applications at 10- to 18-day intervals may be required for heavy infestations, sustained moth flight, situations in which it is difficult to achieve thorough coverage, and for quicker knockdown of larvae.</p>	
European grapevine moth fruittree leafroller light brown apple moth omnivorous leafroller redbanded leafroller threelined leafroller tufted apple budmoth variegated leafroller		<p>For control of surface or foliar feeding leafroller larvae, apply when larvae are feeding. Most effective crop protection results from application made at the initiation of egg hatch.</p> <p>For heavy infestations, continuous moth flights, or extended egg hatch, use maximum specified rates. Maintain coverage with 10- to 18-day re-treatment intervals.</p>	
cherry fruitworm green fruitworm lesser appleworm	10 - 16 (0.16 - 0.25 lb ai/ acre)	Apply at initiation of egg hatch or at the first sign of larval infestation. Reapply in 10 to 14 days to ensure complete coverage of rapidly expanding fruits or foliage.	
redhumped caterpillar	8 - 16 (0.12 - 0.25 lb ai/ acre)	Apply at initiation of egg hatch or at the first sign of larval infestation. Reapply in 10 to 14 days to ensure complete coverage of rapidly expanding fruits or foliage.	

<sup>1</sup>Biofix is defined as first sustained adult catch in pheromone traps, typically five moths in three traps within a 7-day period. Consult state extension specialists or other qualified authorities for specific information regarding number, placement and management of pheromone traps.

## Cherries (Sweet and Sour)

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
obliquebanded leafroller pandemis leafroller	8 - 16 (0.12 - 0.25 lb ai/ acre)	<p><b>Spring (overwintering) generation:</b> Make 1 to 2 applications during the pink to petal fall period depending upon infestation level.</p> <p><b>Summer generation:</b> Make the first application during the period of peak egg lay to early egg hatch (usually 200 to 400 DD following biofix). Reapply 10 to 18 days later (usually 500 to 700 DD).</p> <p>A higher rate in the rate range and additional applications at 10- to 18-day intervals may be required for heavy infestations, sustained moth flight, situations in which it is difficult to achieve thorough coverage, and for quicker knockdown of larvae.</p>	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 7 days of harvest.</li> <li>• Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 58 fl oz of Thwartex (0.9 lb ai) per acre per year.</li> </ul>
eyespotted bud moth fruittree leafroller light brown apple moth omnivorous leafroller redbanded leafroller threelined leafroller tufted apple budmoth variegated leafroller		<p>For control of surface or foliar feeding leafroller larvae, apply when larvae are feeding.</p> <p>Most effective crop protection results from application made at the initiation of egg hatch.</p> <p>For heavy infestations, continuous moth flights, or extended egg hatch, use maximum specified rates. Maintain coverage with 10- to 18-day re-treatment intervals.</p>	
cherry fruitworm		Apply at initiation of egg hatch or at the first sign of larval infestation. Reapply in 10 to 14 days to ensure complete coverage of rapidly expanding fruits or foliage.	
redhumped caterpillar	8 - 16 (0.12 - 0.25 lb ai/ acre)		

<sup>1</sup>Biofix is defined as first sustained adult catch in pheromone traps, typically five moths in three traps within a 7-day period. Consult state extension specialists or other qualified authorities for specific information regarding number, placement and management of pheromone traps.

## Tree Nuts (Crop Group 14-12)<sup>1</sup>

(Not registered for use in New York)

<sup>1</sup>Tree nuts (crop group 14-12) including African nut-tree, almond, beech nut, Brazil nut, Brazilian pine, bunya, bur oak, butternut, Cajou nut, candlenut, cashew, chestnut, chinquapin, coconut, coquito nut, dika nut, filbert (hazelnut), ginkgo, Guiana chestnut, heartnut, hickory nut, Japanese horse chestnut, macadamia (bush) nut, mongongo nut, monkey-pot, monkey puzzle nut, Okari nut, Pachira nut, peach palm nut, pecan, pequi, Pili nut, pine nut, pistachio, Sapucaia nut, tropical almond, walnut (black and English), yellowhorn and cultivars, and varieties and/or hybrids of these.

**Ground Application:** Apply in a minimum of 50 gpa by conventional ground equipment to trees 10 feet tall or less. For trees greater than 10 feet tall, use in a minimum of 100 gpa. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 10 gpa. This method may result in reduced efficacy if the size of the tree or density of the foliage prohibits thorough, uniform coverage of the entire tree canopy.

### Almonds

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
peach twig borer	8 - 16 (0.12 - 0.25 lb ai/ acre)	<b>Spring (overwintering) generation:</b> Make 1 to 2 applications during the bloom to petal fall period depending upon infestation level.  <b>Summer generation:</b> Begin applications at peak moth flight (400 to 450 DD, base 50°F, following biofix). Reapply at 14- to 18-day intervals under high pressure or sustained moth flight.  A higher rate in the rate range may be required for extended residual effectiveness, high pest infestation levels, larger trees, or heavy dense foliage.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 7 days of harvest.</li> <li>• Do not apply more than 24 fl oz per acre (0.38 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> <li>• Do not make more than 4 applications per year.</li> <li>• <b>Minimum Re-treatment Interval:</b> 14 days</li> </ul>
navel orangeworm	12 - 24 (0.19 - 0.38 lb ai/ acre)	Make first application at the initiation of hull split (2 to 5% hull split). Reapply 14 days later. Under heavy infestation, reapply a third time 14 days later.	

### Hazelnuts

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
filbertworm	8 - 16 (0.12 - 0.25 lb ai/ acre)	Apply at initiation of egg hatch. Reapply at 14- to 21-day intervals under high pressure or sustained moth flight.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 7 days of harvest.</li> <li>• Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> <li>• Do not make more than 4 applications per year.</li> <li>• <b>Minimum Re-treatment Interval:</b> 14 days</li> </ul>

## Hazelnuts (Cont.)

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
obliquebanded leafroller	8 - 16 (0.12 – 0.25 lb ai/acre)	<p><b>Spring (overwintering) generation:</b> Make 1 to 2 applications depending upon infestation level.</p> <p><b>Summer generation:</b> Make the first application during the period of peak egg lay to early egg hatch (200 to 400 DD following biofix). Reapply 14 to 18 days later (usually 500 to 700 DD).</p>	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 7 days of harvest.</li> <li>• Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> <li>• Do not make more than 4 applications per year.</li> <li>• <b>Minimum Re-treatment Interval:</b> 14 days</li> </ul>
European grapevine moth filbert leafroller light brown apple moth omnivorous leaftier		For control of surface of foliar feeding leafroller larvae, apply when larvae are feeding. Most effective crop protection results from application made at the initiation of egg hatch.	

## Pecans

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
pecan nut casebearer	4 - 8 (0.06 – 0.12 lb ai/acre)	<p>For each generation, apply at initiation of egg hatch (first generation is approximately 8 to 15 days following biofix). Control of first generation may require second application to ensure complete coverage of rapidly expanding nuts and foliage, or under conditions or extended egg lay.</p> <p>A higher rate in the rate range may be required for extended residual effectiveness, higher pest infestations, low crop load, larger trees, or heavy dense foliage.</p>	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 7 days of harvest.</li> <li>• Do not apply more than 8 fl oz per acre (0.12 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> <li>• Do not make more than 4 applications per year.</li> <li>• <b>Minimum Re-treatment Interval:</b> 14 days</li> </ul>
hickory shuckworm		<p>For early- to mid-season infestations reaching threshold levels as defined by state extension specialists or other qualified authorities, make applications at the initiation of egg hatch.</p> <p>For late-season infestations, initiate applications at half-shell hardening. Reapply at 14-day intervals to shuck split or while nuts are susceptible to heavy infestations.</p>	
fall webworm walnut caterpillar		Apply at the first sign of larval infestation.	

## Walnuts

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
codling moth (suppression only)	12 - 24 (0.19 – 0.38 lb ai/ acre)	For each generation, apply at initiation of egg hatch (100 to 200 DD following biofox). Control of first generation may require second application (14- to 18-day re-treatment interval) to ensure complete coverage of rapidly expanding nuts and foliage. After nut growth and foliage expansion slows, a 14- to 21-day re-treatment interval may be required to provide control of extended moth flight. A higher rate in the rate range may be required for extended residual effectiveness, high pest infestation levels, larger trees, or heavy dense foliage.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 7 days of harvest.</li> <li>• Do not apply more than 24 fl oz per acre (0.38 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> <li>• Do not make more than 4 applications per year.</li> <li>• <b>Minimum Re-treatment Interval:</b> 14 days</li> </ul>
navel orangeworm	8 - 16 (0.12 – 0.25 lb ai/ acre)	Apply at initiation of egg hatch.	
fall webworm redhumped caterpillar		Apply at first sign of larval infestation.	

## Tree Nut Crops in Crop Group 14-12 not Specifically Listed Above

### Restrictions:

- **Preharvest Interval:** Do not apply within 7 days of harvest.
- Do not apply more than 24 fl oz per acre (0.38 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.
- Do not make more than 4 applications per year.
- **Minimum Re-treatment Interval:** 14 days

Performance of Thwartex against pests not listed on this label cannot be warranted nor can crop tolerance in all types and varieties of tree nuts be assured. If unsure, the user is advised to treat a few trees to observe for symptoms before treating large blocks of trees. Generally, optimum performance against lepidoptera pests (worms) is achieved when Thwartex is applied at the initiation of egg hatch. Reapplication intervals of 14 to 20 days may be required if the plant part(s) to be protected from insect damage is rapidly growing or expanding or if pest infestations are heavy or extended.

## Tropical Tree Fruits<sup>1</sup>

(Not registered for use in New York)

<sup>1</sup>Tropical tree fruits including acerola, atemoya, avocado, biriba, black sapote, canistel, cherimoya, custard apple, feijoa, guava, ilama, jaboticaba, longan, lychee, mamey sapote, mango, papaya, passionfruit, pulasan, rambutan, sapodilla, soursop, Spanish lime, star apple, starfruit, sugar apple, wax jambu

**Ground Application:** Apply in a minimum of 50 gpa by conventional ground equipment to trees 10 feet tall or less. For trees greater than 10 feet tall, apply in a minimum of 100 gpa by conventional group equipment. Use a higher carrier volume for heavy infestations and in situations where thorough coverage is difficult to achieve. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.



**Aerial Application:** Apply in a minimum of 10 gpa. Use a higher carrier volume for heavy infestations and in situations where thorough coverage is difficult to achieve.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
lepidopteran larvae including European grapevine moth guava moth ( <i>Argyresthia</i> ) leafrollers leafrollers light brown apple moth loopers orange tortrix spanworms webbing worms western tussock moth	10 - 16 (0.16 – 0.25 lb ai/ acre)	<p>Apply at egg hatch or when first signs of feeding occur. Use a higher rate for heavier infestations and under conditions in which thorough coverage is more difficult.</p> <p>Under heavy infestations, continuous moth flights and/or egg masses and larvae in all stages of development, reapply at a 6- to 10-day re-treatment interval to protect new growth until moth flights and/or hits subside.</p>	<ul style="list-style-type: none"> <li>Do not apply more than 16 fl oz per acre (0.25 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> <li>Do not make more than 5 applications per year.</li> <li><b>Acerola, Feijoa, Guava, Jaboticaba, Passionfruit, Starfruit, Wax Jambu</b>  <b>Preharvest Interval:</b> Do not apply within 3 days of harvest.  <b>Minimum Re-treatment Interval:</b> 6 days</li> <li><b>Atemoya, Avocado, Biriba, Cherimoya, Custard Apple, Ilama, Sourp, Sugar Apple</b>  <b>Preharvest Interval:</b> Do not apply within 2 days of harvest.  <b>Minimum Re-treatment Interval:</b> 6 days</li> <li><b>Black Sapote, Canistel, Mamey Sapote, Mango, Papaya, Sapodilla, Star Apple</b>  <b>Preharvest Interval:</b> Do not apply within 3 days of harvest.  <b>Minimum Re-treatment Interval:</b> 10 days</li> <li><b>Longan, Lychee, Pulasan, Rambutan, Spanish Lime</b>  <b>Preharvest Interval:</b> Do not apply within 14 days of harvest.  <b>Minimum Re-treatment Interval:</b> 10 days</li> </ul>

## **Tuberous and Corm Vegetables (Except Potato) (Subgroup 1D)<sup>1</sup>** **(Not registered for use in New York)**

<sup>1</sup>Tuberous and corm vegetables (except potato) (subgroup 1D) including arracacha, arrowroot, bitter cassava, chayote (root), Chinese artichoke, chufa, dasheen, edible canna, ginger, Jerusalem artichoke, leren, sweet cassava, sweet potato, tania, true yam, turmeric, yam bean

**Ground Application:** Apply in a minimum of 10 gpa by conventional ground equipment. Use a spray volume that assures uniform coverage of the infested portions of the treated crop. Calibrate equipment to the desired spray volume.

**Aerial Application:** Apply in a minimum of 10 gpa. Use a higher carrier volume for heavy infestations and in situations where thorough coverage is difficult to achieve.

Pests	Application Rate (fl oz/acre)	Application Timing	Restrictions
armyworms cabbageworms cutworm (suppression only) loopers saltmarsh caterpillar webworms	6 - 10 (0.09 – 0.16 lb ai/ acre)	Apply at egg hatch or when first signs of feeding occur. Use a higher rate for heavier infestations and under conditions in which thorough coverage is more difficult. Under heavy infestations, continuous moth flights and/or egg masses and larvae in all stages of development, reapply to protect new growth until moth flights and/or hits subside.	<ul style="list-style-type: none"> <li>• <b>Preharvest Interval:</b> Do not apply within 7 days of harvest.</li> <li>• Do not apply more than 10 fl oz per acre (0.16 lb ai/A) per application or more than a total of 64 fl oz of Thwartex (1 lb ai) per acre per year.</li> <li>• Do not make more than 3 applications per acre per year.</li> <li>• <b>Minimum Re-treatment Interval:</b> 14 days</li> <li>• See Rotational Crop Restrictions.</li> </ul>

## STORAGE AND DISPOSAL

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

**Pesticide Storage:** Store in a cool dry well-ventilated area, but not below 32°F.

**Pesticide Disposal:** Wastes resulting from the use of this product must be disposed of on site or at an approved waste disposal facility.

**Container Handling:** Nonrefillable container. Do not reuse or refill this container.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. **Pressure rinse** as follows: Empty the remaining contents into application equipment or a 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. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

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EPA accepted 10/21/2020

**Spec Number:** N/A

Component MID: 260243 2108

Product Name: AGSURF THWARTEX

Spec Type: Booklet Laminated

Component Size: 1 GAL

Country: UNITED STATES

Supersedes: A60002749

Reason for Revision: Regulatory Update

**Approvals**

Printer: NAA - CCL Label

EPA/PMRA Accepted Date: 10/21/2020

Notification Date: N/A

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**Base Label**

Template Master: 900-000364 (CCL6608)

Size: 5-1/2" H x 5-11/16" W

Image Area: 5-1/4" H x 4-1/4" W

Colors:



Process: Black



PMS: 364 C Green



Varnish



Laminate

DGT: Devan Date: 08/17/21

☒ 1st Proof

☐ 4th Proof

☐ 2nd Proof

☐ 5th Proof

☐ 3rd Proof

☐ 6th Proof

**RR DONNELLEY**

**Booklet**

Size: 5-1/2" H x 4-5/8" W

Page Count: 40

Colors:



Process: Black



PMS: 364 C Green

Core Size: US - Valdosta - 3 in.

Roll Size: US - Valdosta - 16 in. max

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**Print**