

62719-523

06-30-2011

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

OFFICE OF  
CHEMICAL SAFETY  
AND POLLUTION PREVENTION

Dr. Kenneth Racke  
Dow AgroSciences LLC  
9330 Zionsville Road  
Indianapolis, IN 46268

JUN 30 2011

Subject: Blackhawk, EPA Reg. No. 62719-523  
Date of Registrant Submission: April 22, 2011  
Decision: 448431

Dear Dr. Racke:

The labeling referred to above, submitted in connection with registration under the Federal insecticide, Fungicide, and Rodenticide Act, as amended, is acceptable.

Two (2) copies of the finished labeling must be submitted prior to releasing the product for shipment. A stamped copy of the label is enclosed for your records. If you have any questions regarding this letter, please contact Samantha Hulkower at (703) 603-0683.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark Suárez", with a large, stylized flourish at the end.

Mark Suárez  
Product Manager 13  
Insecticide Branch  
Registration Division (7505P)

Enclosure: Copy of Label Stamped "Accepted"

(Base label):

# Blackhawk™

## Naturalyte® Insect Control

For control of lepidopterous larvae (worms or caterpillars), leafminers, beetles, thrips and red imported fire ants.

<b>Group</b>	<b>5</b>	<b>INSECTICIDE</b>
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Active Ingredient:

spinosad

(a mixture of spinosyn A  
and spinosyn D)

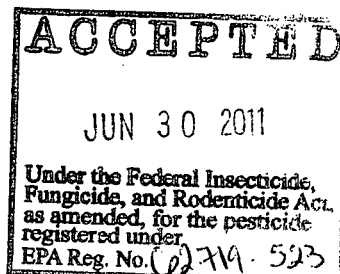
36%

Other Ingredients

64%

Total

100%



Contains 36% active ingredient on a weight basis.

Keep Out of Reach of Children

## CAUTION

### Precautionary Statements

#### Hazard to Humans and Domestic Animals

Causes Moderate Eye Irritation

Avoid contact with eyes or clothing.

#### Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks
- Chemical-resistant gloves (such as natural rubber, selection category A)

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

#### User Safety Recommendations

Users should:

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

#### First Aid

**If in eyes:** Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. 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. You may also contact 1-800-992-5994 for emergency medical treatment information.

**Environmental Hazards**

This product is toxic to bees exposed to treatment for 3 hours following treatment. Do not apply this pesticide to blooming, pollen-shedding or nectar-producing parts of plants if bees may forage on the plants during this time period. This product is toxic to aquatic invertebrates. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

**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.

**(Storage and Disposal for rigid containers 5 gal or less)**

**Storage and Disposal**

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

**Pesticide Storage:** Store in original container only.

**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. 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.

**(Storage and Disposal for nonrigid containers any size)**

**Storage and Disposal**

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

**Pesticide Storage:** Store in original container only.

**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. Completely empty bag into application equipment. Then offer for recycling if available, or dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

**(Storage and Disposal for refillable rigid containers greater than 5 gal)**

**Storage and Disposal**

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

**Pesticide Storage:** Store in original container only.

**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:** Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose.

Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water and, if possible, spray all sides while adding water. If practical, agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times. 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.

**(Storage and Disposal for nonrefillable rigid containers larger than 5 gal)**

**Storage and Disposal**

4  
37

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

**Pesticide Storage:** Store in original container only.

**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. 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.

**Refer to label booklet for Directions for Use.**

**Notice:** Read the entire label. Use only according to label directions. **Before using this product, read Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies at end of label booklet. If terms are unacceptable, return at once unopened.**

In case of emergency endangering health or the environment involving this product, call 1-800-992-5994.

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

EPA Reg. No. 62719-523

EPA Est. \_\_\_\_\_

™Trademark of Dow AgroSciences LLC

**Produced for  
Dow AgroSciences LLC  
9330 Zionsville Road  
Indianapolis, IN 46268**

**Net Weight** \_\_\_\_\_

5  
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(Cover, shipping container):

# Blackhawk™

## Naturalyte® Insect Control

For control of lepidopterous larvae (worms or caterpillars), leafminers, beetles, thrips and red imported fire ants.

<b>Group</b>	<b>5</b>	<b>INSECTICIDE</b>
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Active Ingredient:

spinosad

(a mixture of spinosyn A  
and spinosyn D) .....

36%

Other Ingredients.....

64%

Total .....

100%

Contains 36% active ingredient on a weight basis.

**Keep Out of Reach of Children**

### CAUTION

#### 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 inside of label booklet for additional precautionary information including Directions for Use.

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®™ Trademark of Dow AgroSciences LLC

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(Page 1 through end):

<b>Table of Contents</b>	<b>Page</b>
Precautionary Statements	-
Hazard to Humans and Domestic Animals	-
Personal Protective Equipment (PPE)	-
User Safety Recommendations	-
First Aid	-
Environmental Hazards	-
Directions for Use	-
Agricultural Use Requirements	-
Non-Agricultural Use Requirements	-
Storage and Disposal	-
Product Information	-
Use Precautions	-
Mixing Directions	-
Application Directions	-
Uses	-
Asparagus	-
<i>Brassica</i> (Cole) Leafy Vegetables (Crop Group 5)	-
Bushberries (Subgroup 13B)	-
Caneberries (Subgroup 13A)	-
Citrus (Crop Group 10)	-
Corn (Field, Sweet, Popcorn, Seed Corn) and Teosinte	-
Cotton	-
Cranberry	-
Cucurbit Vegetables (Crop Group 9)	-
Fig	-
Fruiting Vegetables (Crop Group 8) and Okra	-
Grape	-
Grass Crops, Grass Grown for Seed, Pastures, Rangeland and Sod Farms	-
Herbs (Subgroup 19A)	-
Leafy Vegetables (Except <i>Brassica</i> ) (Crop Group 4), Leaves of Root and Tuber Vegetables (Crop Group 2) and Leaves of Legume Vegetables (Crop Group 7A), Turnip Greens, and Watercress	-
Legume Vegetables (Succulent and Dried Beans and Peas) (Crop Group 6)	-
Peanut	-
Pome Fruits (Crop Group 11)	-
Root and Tuber Vegetables, and Artichoke	-
Small Cereal Grains and Grain Amaranth	-
Soybean	-
Stone Fruits (Crop Group 12)	-
Strawberry	-
Tobacco	-
Tree Farms or Plantations	-
Tree Nuts (Crop Group 14) and Pistachios	-
Tropical Tree Fruits	-
Fire Ants – Mound Application in Turfgrass and Ornamentals, in Greenhouses, and in Other Outdoor Areas	-
Terms and Conditions of Use	-
Warranty Disclaimer	-
Inherent Risks of Use	-
Limitation of Remedies	-

7  
37

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**Precautionary Statements**

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**Hazard to Humans and Domestic Animals****CAUTION****Causes Moderate Eye Irritation**

Avoid contact with eyes or clothing.

**Personal Protective Equipment (PPE)**

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks
- Chemical-resistant gloves (such as natural rubber, selection category A)

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

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Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
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**Directions for Use**

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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.

**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),

8  
37

restricted entry interval, and notification to workers (as applicable). 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.

For early entry into 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, wear:

- Coveralls
- Chemical-resistant gloves
- 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.

**Entry Restrictions for Non-WPS Uses:** Do not enter or allow others to enter the treated area until sprays have dried.

**Storage and Disposal**

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

**Pesticide Storage:** Store in original container only.

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

**Nonrefillable rigid containers 5 gallons or less:**

**Container Handling:** Nonrefillable container. Do not reuse or refill this container. Triple rinse or pressure rinse container (or equivalent) promptly after emptying. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

**Nonrefillable nonrigid containers:**

**Container Handling:** Nonrefillable container. Do not reuse or refill this container. Completely empty bag into application equipment. Then offer for recycling if available, or dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

**Refillable rigid containers larger than 5 gal:**

**Container Handling:** Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water and, if possible, spray all sides while adding water. If practical, agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times. 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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## Product Information

Blackhawk™ is a Naturalyte® insect control product for control of many foliage feeding pests infesting labeled crops. This product's active ingredient, spinosad, is biologically derived from the fermentation of *Saccharopolyspora spinosa*, a naturally occurring soil organism. Mix Blackhawk with water and apply as a foliar spray with aerial or ground equipment equipped for conventional insecticide spraying.

## Use Precautions

### Integrated Pest Management (IPM) Programs

Blackhawk is recommended for IPM programs in labeled crops. Apply Blackhawk when field scouting indicates target pest densities have reached the economic threshold, i.e., the point at which the insect population must be reduced to avoid economic losses beyond the cost of control. Other than reducing the target pest species as a food source, Blackhawk does not have a significant impact on certain parasitic insects or the natural predaceous arthropod complex in treated crops, including big-eyed bugs, ladybird beetles, flower bugs, lacewings, minute pirate bugs, damsel bugs, assassin bugs, predatory mites or spiders. The feeding activities of these beneficials will aid in natural control of other insects and reduce the likelihood of secondary pest outbreaks. If Blackhawk is tank mixed with any insecticide that reduces its selectivity in preserving beneficial predatory insects, the full benefit of Blackhawk in an IPM program may be reduced.

### Insecticide Resistance Management (IRM)

Blackhawk contains spinosad, a Group 5 insecticide. Insect/mite biotypes with acquired resistance to Group 5 insecticides may eventually dominate the insect/mite population if Group 5 insecticides are used repeatedly in the same field or area, or in successive years as the primary method of control for targeted species. This may result in partial or total loss of control of those species by Blackhawk or other Group 5 insecticides. Currently, only spinetoram and spinosad active ingredients are classified as Group 5 insecticides. These two insecticide active ingredients share a common mode of action and must not be rotated with each other for control of pests listed on this label. Spinetoram and spinosad may be rotated with all other labeled insecticide active ingredients.

To delay development of insecticide resistance:

- Carefully follow the specific label guidelines within the use directions sections of this label, especially in regard to IRM recommendations.
- Avoid use of the same active ingredient or mode of action (same insecticide group) on consecutive generations of insects. However, multiple applications to reduce a single generation are acceptable. Treat the next generation with a different active ingredient that has a different mode of action or use no treatment for the next generation.
- Avoid using less than labeled rates of any insecticide when applied alone or in tank mixtures.
- Target applications against early insect developmental stages whenever possible.
- Base insecticide use on comprehensive IPM programs including crop rotations.
- Monitor treated insect populations in the field for loss of effectiveness.
- Contact your local extension specialist, certified crop advisor, and or manufacturer for insecticide resistance management and/or IPM recommendations for the specific site and resistant pest problems.
- For further information or to report suspected resistance, contact your local Dow AgroSciences representative or by calling 800-258-3033.

## Mixing Directions

### Application Rate Reference Table

Application Rate of Blackhawk (oz/acre)	Active Ingredient Equivalent (lb ai/acre)	Acres per Pound of Blackhawk
0.8	0.018	20.0
1.1	0.025	14.5
1.7	0.038	9.4

Application Rate of Blackhawk (oz/acre)	Active Ingredient Equivalent (lb ai/acre)	Acres per Pound of Blackhawk
2.2	0.050	7.3
2.8	0.063	5.7
3.3	0.075	4.8
4.4	0.100	3.6
5.5	0.124	2.9

**Blackhawk - Alone:** Fill the spray tank with water to about one-half of the required spray volume. Start agitation and add the required amount of Blackhawk. Continue agitation while mixing and filling the spray tank to the required spray volume. Maintain sufficient agitation during application to ensure uniformity of the spray mix. Do not allow water or spray mixture to back-siphon into the water source.

**Blackhawk - Tank Mix:** When tank mixing Blackhawk with other materials, conduct a compatibility test (jar test) using relative proportions of the tank mix ingredients prior to mixing ingredients in the spray tank. If foliar fertilizers are used, repeat the jar test with each batch of fertilizer utilizing the mixing water source. Vigorous, continuous agitation during mixing, filling and throughout application is required for all tank mixes. Sparger pipe agitators generally provide the most effective agitation in spray tanks. To prevent foaming in the spray tank, avoid stirring or splashing air into the spray mixture.

**Mixing Order for Tank Mixes:** Fill the spray tank with water to 1/4 to 1/3 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. Blackhawk and other water dispersible granules
2. Wettable powders

Maintain agitation and fill spray tank to 3/4 of total spray volume. Then add:

3. Emulsifiable concentrates and water-based solutions
4. Spray adjuvants, surfactants and oils
5. 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.

**Premixing:** Dry and flowable formulations may be premixed with water (slurried) and added to the spray tank through a 20 to 35 mesh screen. This procedure assures good initial dispersion of these formulation types.

**Spray Tank pH:** A spray tank pH between 6.0 and 9.0 is suggested to achieve maximum performance of Blackhawk. If the water source is outside of this pH range, or tank mixing other pesticides, adjuvants, or foliar nutrients will cause the pH to fall outside this range, consider adjusting the spray tank pH to be between 6.0 and 9.0 before adding Blackhawk. To do this, add all other tank mix components first, then check the spray tank pH, adjust if desired, and then add Blackhawk. If you require additional information on how to adjust spray tank pH, contact your Dow AgroSciences representative.

**Use of Adjuvants:** Adjuvants may be used to improve the control of leafminers and thrips in situations where achieving uniform plant coverage is difficult (such as closed crop canopy or dense foliage), or penetration into waxy leaf surfaces is necessary for pest control.

- Use only adjuvant products labeled for agricultural use and follow the manufacturer's label directions. A nominal concentration of 1 to 2 quarts per 100 gallons (0.25 to 0.5% v/v) is generally sufficient.
- For leafminers and thrips, emulsified crop oils or methylated crop oil plus organosilicone combination products are recommended.
- When using adjuvants, always conduct a jar test to determine the compatibility of the various components in the mixture. Determine crop safety in a small area of the crop whenever there is a significant change in spray mixture ingredients or source of water for the spray mixture.
- Do not use diesel fuel or pure mineral oil.
- When an adjuvant is to be used with this product, Dow AgroSciences recommends the use of an appropriate Chemical Producers and Distributors Association certified adjuvant.

## Application Directions

Do not apply Blackhawk in greenhouses or other enclosed structures used for growing crops.

Proper application techniques help ensure thorough spray coverage and correct dosage for optimum insect control. The following directions are provided for ground and aerial application of Blackhawk. Attention should be given to sprayer speed and calibration, wind speed, and foliar canopy to ensure adequate spray coverage.

### Row Crop Application

Use calibrated power-operated ground spray equipment capable of providing uniform coverage of the target crop. Orient the boom and nozzles to obtain uniform crop coverage. Utilize a minimum of 5 to 10 gallons per acre, increasing volume with crop size and/or pest pressure. Use hollow cone, twin jet flat fan nozzles or other insecticide atomizer suitable for insecticide spraying to provide a fine to coarse spray quality (per ASABE S-572, see nozzle catalogs). Under certain conditions, drop nozzles may be required to obtain complete coverage of plant surfaces. Follow manufacturer's specifications for ideal nozzle spacing and spray pressure. Minimize boom height to optimize uniformity of coverage and maximize deposition (optimize on-target deposition) to reduce drift.

### Orchard Spraying Application

**Dilute Spray Application:** This application method is based upon the premise that all plant parts are thoroughly wetted, to the point of runoff, with spray solution. To determine the number of gallons of dilute spray required per acre, contact your state agricultural experiment station, certified pest control advisor, or extension specialist for assistance.

**Concentrate Spray Application:** Apply Blackhawk in a manner that achieves uniform coverage of the entire crop canopy, but not past the point of runoff. For optimum control of target pests, complete and uniform spray coverage is essential. The spray volume required to achieve complete and uniform coverage will depend upon tree size and shape, leaf size, and density, and the application equipment used. To determine the required spray volume per acre, contact your state agricultural experiment station, certified pest control advisor, or extension specialist for assistance. Use of tree row volume is appropriate.

### Aerial Application

Apply in a spray volume of 5 gallons or more per acre (10 gallons or more per acre for trees, vines or orchard crops). Nozzle configuration should provide a medium to fine droplet size per ASABE S-572 standard (see USDA-ARS or NAAA handbook). Guidance for ASABE S-572 nozzle configuration can be found at the following web site: [www.cproductsinc.com](http://www.cproductsinc.com). Boom length must be less than 75% of wing or 85% of rotor span and swath adjustment (offset) to compensate for crosswinds. Do not make applications more than 10 feet above the top of the target plants unless a greater height is required for aircraft safety. Use GPS equipment, swath markers or flagging to ensure proper application to the target area. Configure the boom nozzle used (e.g., at NAAA Fly-In) for both crosswind and near parallel winds. If application is made parallel to the wind direction, adjust swath width downward. Use swath adjustment (offset) to compensate for crosswinds. Do not apply under completely calm wind conditions. It is best to apply when wind speed is between 2 to 10 mph. Under conditions of low humidity and high temperatures, adjust

12  
37

spray volume and droplet size upward to compensate for evaporation of spray droplets. Insect control by aerial application may be less than control by ground application because of reduced coverage.

**Chemigation Application**

Blackhawk may be applied through properly equipped chemigation systems for insect control in corn, cranberry and potato. Follow use directions for these crops in the Uses section of this label. Do not apply Blackhawk by chemigation to other labeled crops except as specified in Dow AgroSciences supplemental labeling or product bulletins.

**General Directions for Sprinkler Chemigation:** Blackhawk may be applied through overhead sprinkler irrigation systems that will apply water uniformly, including center pivot, lateral move, end tow, side (wheel) roll, traveler, solid set, micro sprinkler, or hand move. Do not apply this product through any other type of irrigation system. Sprinkler systems that deliver a low coefficient of uniformity such as certain water drive units are not recommended.

For continuously moving systems, the mixture containing Blackhawk must be injected continuously and uniformly into the irrigation water line as the sprinkler is moving. If continuously moving irrigation equipment is used, apply in no more than 0.25 inch of water. For irrigation systems that do not move during operation, apply in no more than 0.25 inch of irrigation immediately before the end of the irrigation cycle.

**Chemigation Preparation:** The following use directions are to be followed when this product is applied through sprinkler irrigation systems. Thoroughly clean the chemigation system and tank of any fertilizer or chemical residues, and dispose of the residues according to state and federal laws. Flush the injection system with soap or a cleaning agent and water. Determine the amount of Blackhawk needed to cover the desired acreage. Mix according to instructions in the Mixing Directions section above. Continually agitate the mixture during mixing and application.

**Chemigation Equipment Calibration:** In order to calibrate the irrigation system and injector to apply the mixture containing Blackhawk, determine the following: 1) Calculate the number of acres irrigated by the system; 2) Calculate the amount of product required and premix; 3) Determine the irrigation rate and determine the number of minutes for the system to cover the intended treatment area; 4) Calculate the total gallons of insecticide mixture needed to cover the desired acreage. Divide the total gallons of insecticide mixture needed by the number of minutes (minus time to flush out) to cover the treatment area. This value equals the gallons per minute output that the injector or eductor must deliver. Convert the gallons per minute to milliliters or ounces per minute if needed. Calibrate the injector system with the system in operation at the desired irrigation rate. It is suggested that the injection pump/system be calibrated at least twice before operation, and the system should be monitored during operation.

**Chemigation Operation:** Start the water pump and irrigation system, and let the system achieve the desired pressure and speed before starting the injector. Check for leaks and uniformity and make repairs before any chemigation takes place. Start the injection system and calibrate according to manufacturer's specifications. This procedure is necessary to deliver the desired rate per acre in a uniform manner. When the application is finished, allow the entire irrigation and injection system to be thoroughly flushed clean before stopping the system.

**Chemigation Precautions:**

- 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 used for pesticide application (including greenhouse systems) to a public water system unless the pesticide label-prescribed safety devices for public water systems are in place with current certification. Specific local regulations may apply and must be followed.

13  
37

- A person knowledgeable of the chemigation system and responsible for its operation, or under the supervision of the responsible person, shall operate the system and make necessary adjustments should the need arise and continuously monitor the injection.
- Do not apply when wind speed favors drift beyond the area intended for treatment. End guns must be turned off during the application if they irrigate nontarget areas.
- Do not allow irrigation water to collect or run off and pose a hazard to livestock, wells, or adjoining crops.
- Do not enter treated area during the reentry interval specified in the Agricultural Use Requirements section of this label unless required PPE is worn.
- Do not apply through sprinkler systems that deliver a low coefficient of uniformity such as certain water drive units.

**Chemigation Specific Equipment Requirements:**

- The system must contain an air gap, or approved back flow prevention device, or approved functional check valve, vacuum relief valve (including inspection port), and low-pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from back flow. Refer to the American Society of Agricultural Engineer's Engineering Practice 409 for more information or state specific regulations.
- The pesticide injection line must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection chemical supply.
- A pesticide injection pump must also contain a functional interlock, e.g., mechanical or electrical, to shut off chemical supply 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 when the water pressure drops too low or water flow stops.
- Use of public water supply requires approval of a back flow prevention device or air gap (preferred) by both state and local authorities.
- Systems must use a metering pump, such as a positive displacement injection pump (or flow meter on eductor) effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock. An electric powered pump must meet Section 675 for "Electrically Driven or Controlled Irrigation Machines" NEC 70.
- To insure uniform mixing of the insecticide into the water line, inject the mixture in the center of the pipe diameter or just ahead of an elbow or tee in the irrigation line so that the turbulence created at those points will assist in mixing. The injection point must be located after all back flow prevention devices on the water line.
- The tank holding the insecticide mixture should be free of rust, fertilizer, sediment, and foreign material, and equipped with an in-line strainer situated between the tank and the injection point.

**Uses**

**Asparagus**

(Post Harvest Protection of Ferns Only)

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
asparagus beetle	2.2 – 3.3

**Application Timing:** For determining when to treat, scout with enough regularity to monitor the population size of the labeled pest. Make applications **only to asparagus ferns**. Treat when pests appear, targeting eggs at hatch or small larvae. Consult your Dow AgroSciences representative, extension specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

**Application Rate:** Apply Blackhawk as a foliar spray at the rate indicated to control asparagus beetle in asparagus fern. Use a higher rate in the rate range for heavy infestations or advanced growth stages of

the beetle. Heavy infestations may require repeat applications, but follow resistance management guidelines.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

**Restrictions:**

- **Preharvest Interval:** This use is only for asparagus ferns; do not apply within 60 days of spear harvest.
- **Minimum Treatment Interval:** Do not make applications less than 4 days apart.
- Do not apply more than a total of 12.4 oz of Blackhawk (0.28 lb ai of spinosad) per acre per crop.
- **Maximum Number of Applications:** Do not make more than three applications per crop.
- Do not feed treated ferns to meat or dairy animals.

**Brassica (Cole) Leafy Vegetables (Crop Group 5)<sup>1</sup>**

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

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
diamondback moth	1.67 - 2.2
cabbage looper imported cabbageworm	1.7 - 3.3
armyworms, including beet armyworm leafminers <sup>1</sup> thrips <sup>1</sup>	2.2 - 5.5

<sup>1</sup>Control of leafminers and thrips may be improved by addition of an adjuvant to the spray mixture. See Use of Adjuvants section.

**Application Timing:** Treat when pests appear, targeting eggs at hatch or small larvae. Heavy infestations may require repeat applications, but follow resistance management guidelines. Consult your Dow AgroSciences representative, extension service specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

**Application Rate:** Apply as a foliar spray at the rate indicated for target pest. Use a higher rate in the rate range for heavy infestations or advanced growth stages of target pests.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. For **diamondback moth**, if additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least two applications. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area. Make treatment decisions for the entire farm and consider area wide programs if other growers are in close proximity. Do not make more than 6 applications of Blackhawk per calendar year for diamondback moth over an entire farm (an area of abutting or nearby fields).

**Restrictions:**

15  
37

- **Preharvest Interval:** Do not apply within 1 day of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 4 days apart.
- Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per crop.
- **Maximum Number of Applications:** Do not make more than six applications per calendar year.
- Do not apply to seedling cole crops grown for transplant within a greenhouse, shade house, or field plot.

**Bushberries (Subgroup 13B)<sup>1</sup>**

**(Insect Suppression)**

<sup>1</sup>Bushberries (subgroup 13B) blueberry, currant, elderberry, gooseberry, huckleberry, juneberry, lingonberry, salal

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
armyworms	2.2 – 3.3
cherry fruitworm	
cranberry fruitworm	
currant fruitfly	
fireworms	
leafrollers	
light brown apple moth	
loopers	
thrips <sup>1</sup>	

<sup>1</sup>Control of thrips may be improved by addition of an adjuvant to the spray mixture. See Use of Adjuvants section.

**Application Timing:** Treat when pests appear, targeting eggs at hatch or small larvae. Heavy infestations may require repeat applications but follow resistance management guidelines. Consult your Dow AgroSciences representative, extension service specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

**Application Rate:** The amount of Blackhawk per acre will depend upon plant size and volume of foliage present and pest pressure. Use a lower rate in the rate range for light infestations and/or small plants and a higher rate in the rate range for heavy infestations and/or larger plants.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

**Restrictions:**

- **Preharvest Interval:** Do not apply within 3 days of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 6 days apart.
- Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per crop.
- **Maximum Number of Applications:** Do not make more than six applications per calendar year or more than three applications per crop.

**Caneberries (Subgroup 13A)<sup>1</sup>**

<sup>1</sup>Caneberries (subgroup 13A) blackberry, loganberry, red and black raspberry, cultivars and/or hybrids of these

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
beet armyworm bertha armyworm green fruitworm leafrollers light brown apple moth looper sawfly western raspberry fruitworm	2.2 – 3.3

**Application Timing:** Treat when pests appear, targeting eggs at hatch or small larvae. Heavy infestations may require repeat application, but follow resistance management guidelines. Consult your Dow AgroSciences representative, extension service specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

**Application Rate:** The amount of Blackhawk applied per acre will depend upon plant size and volume of foliage present and pest pressure. Use a higher rate in the rate range for larger larvae or moderate to severe infestations and/or larger plant volume.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

**Restrictions:**

- **Preharvest Interval:** Do not apply within 1 day of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 5 days apart.
- Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per crop.
- **Maximum Number of Applications:** Do not make more than six applications per calendar year.

**Citrus (Crop Group 10)<sup>1</sup>**

<sup>1</sup>Citrus (crop group 10) grapefruit, lemons, limes, oranges, tangerines

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
citrus leafminer citrus orangedog citrus peelminer citrus thrips <sup>1</sup> light brown apple moth	2.2 – 5.5

<sup>1</sup>Control of thrips may be improved by addition of an adjuvant to the spray mixture. See Use of Adjuvants section.

**Application Timing:** Treat when pests appear or in accordance with local economic thresholds. Consult your Dow AgroSciences representative, extension service specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

**Application Rate:** The amount of Blackhawk applied per acre will depend upon tree size and pest pressure. Use a lower rate in the rate range for light infestations and/or small trees and a higher rate in the rate range for heavy infestations and/or large trees.



17  
37

**Resistance Management:** Citrus thrips are present most of the time on the crop during the growing season and have demonstrated a high potential to develop resistance to insect control products. Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. For **citrus thrips**, rotate to another class of effective product for the next two applications after using two applications of Blackhawk within a season. Consult your Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

**Restrictions:**

- **Preharvest Interval:** Do not apply within 1 day of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 6 days apart.
- Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per crop.
- **Maximum Number of Applications:** Do not make more than three applications per calendar year.
- Do not apply to citrus nurseries or citrus in greenhouses.

**Corn (Field, Sweet, Popcorn, Seed Corn) and Teosinte**

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
European corn borer fall armyworm true armyworm	1.67 – 3.3
beet armyworm corn earworm southwestern corn borer western bean cutworm	2.2 – 3.3

**Application Timing:** Scout for **European corn borer** and **armyworms** with enough regularity to monitor egg laying and egg hatch. Time applications of Blackhawk to coincide with peak egg hatch of each generation. Frequent treatments may be necessary when the crop is growing rapidly, during silking or under heavy pest pressure. For **corn earworm** control, a 1- to 2-day re-treatment schedule may be necessary at silking. For control of all other pests, a 5- to 7-day re-treatment schedule may be necessary if the crop is growing rapidly or if there is heavy pest pressure.

**Application Rate:** Apply as a foliar spray at the rate indicated for target pest. Use a higher rate in the rate range for heavy infestations or advanced growth stages of target pests.

**Spray Delivery:** For control of first generation **European corn borer** and **armyworms**, apply broadcast or as a directed spray into the leaf whorls. For control of second generation **European corn borer**, apply as a broadcast spray. For control of **corn earworm**, apply broadcast or direct spray to ear zone. Use sufficient spray volume and nozzle pressure to ensure thorough wetting of the silks.

**Chemigation:** Blackhawk may be applied to corn by chemigation at labeled rates. Refer to the Chemigation Application section.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

**Restrictions:**

**Sweet Corn, Popcorn, Seed Corn**

18  
37

- **Preharvest Interval:** Do not apply within 28 days of fodder harvest, 1 day of grain harvest or 7 days of forage harvest.
- Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per year.
- **Maximum Number of Applications:** Do not make more than six applications per calendar year.

**Field Corn and Teosinte**

- **Preharvest Interval:** Do not apply within 28 days of grain or fodder harvest or 7 days of forage harvest.
- Do not apply more than a total of 8.3 oz of Blackhawk (0.188 lb ai of spinosad) per acre per year.
- **Maximum Number of Applications:** Do not make more than three applications per calendar year.

**Cotton**

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
cotton bollworm (pre-bloom) cotton leafperforator European corn borer tobacco budworm	1.6 – 3.2
armyworms, including beet armyworm fall armyworm cotton bollworm (post-bloom) leafminers loopers, including cabbage looper soybean looper saltmarsh caterpillar thrips <sup>1</sup>	2.4 – 3.2

<sup>1</sup>Control of thrips may be improved by addition of an adjuvant to the spray mixture. See Use of Adjuvants section.

**Application Timing:**

**Tobacco Budworm and/or Cotton Bollworm:** For the most effective control, scout fields twice per week and apply Blackhawk when the majority of the population is within the time of blackhead egg stage to 1/8-inch larval length. The following table illustrates the size of worms in relation to age and stage of development (instar) as a guide to timing treatments for optimum control:

Age (Days)	Average Size (Inches)	Instar <sup>1</sup>
Hatch	1/16	1st
3	1/4	2nd
5	1/2	3rd
8	7/8	4th
10	1	5th

<sup>1</sup>**Note:** A scouting schedule of only once per week is risky since hatching worms will have grown to 3rd instar before the next scouting observation has determined the need to spray.

**Beet Armyworm:** Economic thresholds vary with local conditions and sampling methods. The following is an example of one such method: apply Blackhawk when field scouting reveals three or more occurrences of egg hatch or larval feeding per 100 feet of row.

**Loopers:** Economic thresholds vary with local conditions and sampling methods. The following is an example of one such method: apply Blackhawk when field scouting reveals four larvae per 1 foot of row or 25% defoliation.

19  
37

**Application Rate:** Use a higher rate in the rate range and higher spray volume when one or more of the following is true: tobacco budworms or bollworms are more than 1/4 inch in length; target pest population is 2X above state threshold level; or foliage canopy is tall/dense and worms are present in the lower part of the canopy. Heavy infestations may require repeat applications, but follow resistance management guidelines.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area. For **tobacco budworm** and/or **cotton bollworm** where early season conservation of beneficial insects is practical, use Blackhawk to control the 1st and 3rd generations of tobacco budworm and/or cotton bollworm. Where conservation of beneficial insects is not as critical (for example, fields have received non-selective early season treatments for boll weevil or lygus bugs), use Blackhawk to control either the 2nd or 3rd generation of tobacco budworm and/or cotton bollworm.

**Restrictions:**

- **Preharvest Interval:** Do not apply within 28 days of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 5 days apart for high rates of application.
- Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per growing season.

**Cranberry**

**(Insect Suppression)**

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
armyworms	2.2 – 5.5
currant fruitfly	
European grapevine moth	
fireworms	
leafrollers	
light brown apple moth	
loopers	
sparganothis fruitworm	
thrips <sup>1</sup>	

<sup>1</sup>Control of thrips may be improved by addition of an adjuvant to the spray mixture. See Use of Adjuvants section.

**Application Timing:** 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 Dow AgroSciences representative, extension specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

**Application Rate:** Application rate within the rate range will depend upon plant size and volume of foliage present and pest pressure. Use a higher rate in the rate range for larger larvae or moderate to severe infestations and/or larger plant volume.

**Chemigation:** Blackhawk may be applied to cranberry by chemigation at labeled rates. Refer to the Chemigation Application section.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

**Restrictions:**

- **Preharvest Interval:** Do not apply within 21 days of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 7 days apart.
- Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per crop.
- **Maximum Number of Applications:** Do not make more than six applications per calendar year.

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

<sup>1</sup>Cucurbit vegetables (crop group 9) cucumber, edible gourds, muskmelons (cantaloupe, honeydew, etc.), pumpkin, summer squash, watermelon, winter squash

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
armyworm cabbage looper melon worm pickleworm rindworm	2.2 – 4.4
leafminers <sup>1</sup> thrips <sup>1</sup>	3.3 – 4.4

<sup>1</sup>Control of leafminers and thrips may be improved by addition of an adjuvant to the spray mixture. See Use of Adjuvants section.

**Application Timing:** Treat when pests appear, targeting eggs at hatch or small larvae. Heavy infestations may require repeat applications, but follow resistance management guidelines. Consult your Dow AgroSciences representative, extension service specialist, certified crop advisor or your state agricultural experiment station for any additional area use recommendations for your area.

**Application Rate:** Apply as a foliar spray at the rate specified to control target pest. Use a higher rate in the rate range for heavy infestations or advanced growth stages of target pests.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

**Restrictions:**

- **Preharvest Interval:** Do not apply within 3 days of harvest for all crops except cucumbers. Do not apply within 1 day of harvest for cucumbers.
- **Minimum Treatment Interval:** Do not make applications less than 5 days apart.
- Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per season (includes foliar plus soil plus seed).
- **Maximum Number of Applications:** Do not make more than six applications per crop.

**Fig**

**Pests and Application Rates:**

21  
37

Pests	Blackhawk	
	(oz/acre)	Dilute Spray (oz/100 gal)
light brown apple moth navel orangeworm	2.2 – 5.5	0.55 – 1.38

**Application Timing:** Apply Blackhawk as a foliar spray when pests appear or in accordance with local conditions. Apply as a concentrate or dilute spray using conventional, power operated spray equipment (see Orchard Spraying Application section). Consult your Dow AgroSciences representative, extension service specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

**Application Rate:** The amount of Blackhawk applied per acre will depend upon tree size and volume of foliage present and pest pressure. Use a higher rate in the rate range for large trees or heavy infestations.

**Spray Volume:** Dilute sprays are sprayed to the point of runoff. The application rate range for dilute sprays in the table is based upon a spray volume of 400 gallons per acre. Gallonage of dilute sprays will vary depending upon tree size, density of canopy, stage of seasonal growth, and spacing in the orchard.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

**Restrictions:**

- **Preharvest Interval:** Do not apply within 7 days of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 7 days apart.
- Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per crop.
- **Maximum Number of Applications:** Do not make more than four applications per calendar year.

**Fruiting Vegetables (Crop Group 8)<sup>1</sup> and Okra**

<sup>1</sup>Fruiting vegetables (crop group 8) eggplant, ground cherry, pepino, pepper (except black), tomatillo, tomato

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
lepidopterous larvae (maintenance only)	0.8 – 1.7
Colorado potato beetle European corn borer hornworms loopers tomato fruitworm	1.7 – 3.3
armyworms, including beet armyworm flower thrips <sup>1,2</sup> light brown apple moth thrips palmi <sup>1,2</sup> tomato pinworm	2.2 – 4.4
leafminers <sup>1</sup> ( <i>Liriomyza</i> spp.)	3.3 – 5.5

<sup>1</sup>Control of leafminers and thrips may be improved by addition of an adjuvant to the spray mixture. See

Use of Adjuvants section.

<sup>2</sup>For thrips, if additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least two applications.

**Application Timing:** Scout weekly throughout the season to monitor and track populations of **leafminers** and **thrips** to determine when economic thresholds are exceeded. Scout weekly throughout the season to monitor and track pest and beneficial populations. For tracking **lepidopterous larvae**, scout with enough regularity to monitor the population size of each of the labeled pests. Time applications of Blackhawk to coincide with peak egg hatch in species without overlapping generations. Consult current pest management recommendations for specific guidelines.

**Application Rate:** Apply as a foliar spray at the rate specified to control target pests. Use a higher rate in the rate range for heavy infestations or advanced growth stages of target pests.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. For **thrips**, if additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least two applications. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area. Do not apply Group 5 insecticides to consecutive generations of **Colorado potato beetle** and do not make more than two applications per single generation of Colorado potato beetle.

**Restrictions:**

- **Preharvest Interval:** Do not apply within 1 day of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 4 days apart.
- Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per crop.
- **Maximum Number of Applications:** Do not make more than six applications per calendar year.
- Do not apply to seedling fruiting vegetables and okra grown for transplant within a greenhouse, shade house, or field plot.

## Grape

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
climbing cutworms	2.2 – 4.4
grape berry moth	
grape leaffolder	
grape leaf skeletonizer	
light brown apple moth	
omnivorous leafroller	
orange tortrix	
thrips <sup>1</sup>	

<sup>1</sup>Control of thrips may be improved by addition of an adjuvant to the spray mixture. See Use of Adjuvants section.

**Application Timing:** Treat when pests appear, targeting eggs at hatch or small larvae. Heavy infestations may require repeat applications, but follow resistance management guidelines. Consult your Dow AgroSciences representative, extension service specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

**Application Rate:** Carefully adjust equipment and spray volume to assure thorough uniform coverage of infested parts of the crop. Use a higher rate in the rate range for larger larvae or moderate to severe

infestations and/or larger plant volume.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

**Restrictions:**

- **Preharvest Interval:** Do not apply within 7 days of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 5 days apart.
- Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per season west of the Rocky Mountains, and no more than 16 oz of Blackhawk (0.36 lb ai spinosad) per acre per season east of the Rocky Mountains.
- **Maximum Number of Applications:** Do not make more than five applications per calendar year.

**Grass Crops, Grass Grown for Seed, Pastures, Rangeland and Sod Farms**

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
beet armyworm fall armyworm sod webworms southern armyworm true armyworm other lepidopterous species	1.1 – 2.2

**Application Timing:** Scout at least weekly and consider the impact of both pests and beneficials. Treat when economic thresholds are exceeded, targeting eggs at hatch or small larvae. Heavy infestations may require repeat applications, but follow resistance management guidelines. Consult your Dow AgroSciences representative, extension service specialist, certified crop advisor or your state agricultural experiment station for any additional recommendations applicable to your area.

**Application Rate:** Use a higher rate in the rate range for heavy infestations or advanced growth stages of target pests.

**Resistance Management:** Do not apply more than three times in any 21-day period. Whenever Blackhawk is applied up to three times in succession, this should be followed by no use of Blackhawk for a 21-day period or rotation to another insecticide class.

**Restrictions:**

- **Preharvest Interval:** Do not apply within 3 days of harvest for hay or fodder. There is no preharvest interval for forage.
- Do not apply more than a total of 8.3 oz of Blackhawk (0.186 lb ai spinosad) per acre per season.
- **Maximum Number of Applications:** Do not make more than six applications per season.

**Herbs (Subgroup 19A)<sup>1</sup>**

**(Insect Suppression)**

Herbs (subgroup 19A) angelica, balm, basil, borage, burnet, camomile, catnip, chervil (dried), chive, chive (Chinese), cilantro, cilantro (leaf), clary, coriander (leaf), costmary, curry (leaf), dillweed, horehound, hyssop, lavender, lemongrass, lovage (leaf), marigold, marjoram, nasturtium, parsley (dried), pennyroyal, rosemary, rue, sage, savory (summer and winter), sweet bay, tansy, tarragon, thyme, wintergreen, woodruff, wormwood.

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
armyworms loopers thrips <sup>1</sup>	2.2 – 3.3

<sup>1</sup>Control of thrips may be improved by addition of an adjuvant to the spray mixture. See Use of Adjuvants section.

**Application Timing:** 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 Dow AgroSciences representative, extension specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

**Application Rate:** Apply as a foliar spray at the rate specified to control target pests. Use a higher rate in the rate range for larger larvae or high infestations and/or larger plant volume. Heavy infestations may require repeat applications, but follow resistance management guidelines.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

**Restrictions:**

- **Preharvest Interval:** Do not apply within 1 day of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 5 days apart.
- Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per crop.
- **Maximum Number of Applications:** Do not make more than five applications per calendar year or more than three applications per crop.

**Leafy Vegetables (Except *Brassica*) (Crop Group 4)<sup>1</sup>, Leaves of Root and Tuber Vegetables (Crop Group 2)<sup>2</sup> and Leaves of Legume Vegetables (Crop Group 7A)<sup>3</sup>, Turnip Greens, and Watercress**

<sup>1</sup>Leafy vegetables (except *Brassica*) (crop group 4) amaranth, arugula, cardoon, celery, celtuce, chervil, Chinese celery, Chinese spinach, corn salad, dandelion, dock, edible-leaved chrysanthemum, endive (escarole), Florence fennel, garden cress, garden purslane, garland chrysanthemum, head lettuce, leaf lettuce, leafy amaranth, New Zealand spinach, orach, parsley, radicchio (red chicory), rhubarb, spinach, Swiss chard, tampala, upland cress, vine spinach, winter cress, winter purslane, yellow rocket

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

<sup>3</sup>Leaves of legume vegetables (crop group 7A) any cultivar of bean and field pea (except soybean)

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
diamondback moth	0.8 – 1.7
cabbage looper imported cabbage worm	1.7 – 3.3
armyworms, including beet armyworm	2.2 – 4.4
leafminers <sup>1</sup>	3.3 – 5.5



25  
37

Pests	Blackhawk (oz/acre)
thrips <sup>1</sup>	

<sup>1</sup>Control of leafminers and thrips may be improved by addition of an adjuvant to the spray mixture. See Use of Adjuvants section.

**Application Timing:** Scout at least weekly and consider the impact of both pests and beneficials. Treat when economic thresholds are exceeded, targeting eggs at hatch or small larvae. Heavy infestations may require repeat applications, but follow resistance management guidelines. Consult your Dow AgroSciences representative, extension service specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

**Application Rate:** Apply as a foliar spray at the rate specified to control target pests. Use a higher rate in the rate range for heavy infestations or advanced growth stages of target pests.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

**Restrictions:**

• **Preharvest Intervals:**

**Leafy vegetables (including watercress):** Do not apply within 1 day of harvest.

**Leaves of root, tuber and legume vegetables:** Do not apply within 3 days of harvest.

• **Minimum Treatment Interval:** Do not make applications less than 4 days apart.

• Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per crop (includes foliar plus soil plus seed).

• **Maximum Number of Applications:** Do not make more than six applications per year.

• Do not apply to seedling leafy crops grown for transplant within a greenhouse or shade house.

**Legume Vegetables (Succulent and Dried Beans and Peas) (Crop Group 6)<sup>1</sup>**

<sup>1</sup>Legume vegetables (succulent and dried beans and peas) (crop group 6) adzuki bean, blackeyed pea, chickpea, cowpea, crowder pea, edible-pod pea, English pea, fava bean, field bean, field pea, garbanzo bean, garden pea, green pea, kidney bean, lentil, lima bean, lupins, mungbean, navy bean, pigeon pea, pinto bean, runner bean, snap bean, snow pea, sugar snap pea, tepary bean, wax bean, yardlong bean

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
European corn borer (eggs and larvae)	1.7 – 3.3
armyworms corn earworm loopers	2.2 – 3.3
leafminers <sup>1</sup> thrips <sup>1</sup>	2.5 – 3.3

<sup>1</sup>Control of leafminers and thrips may be improved by addition of an adjuvant to the spray mixture. See Use of Adjuvants section.

**Application Timing:** For determining when to treat, scout with enough regularity to monitor the population size of each of the labeled pests. Heavy infestations may require repeat applications, but follow resistance management guidelines. Treat when pests appear, targeting eggs at hatch or small larvae. For **European corn borer**, initiate when moth flights first appear and use a lower rate in the rate range to control eggs and larvae every three days before they enter the plant. Consult your Dow AgroSciences

representative, extension service specialist, certified crop advisor or your state agricultural experiment station for any additional recommendations for your area.

**Application Rate:** Apply as a foliar spray at the rate specified to control target pests. Use a higher rate in the rate range for heavy infestations or advanced growth stages of target pests.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

**Restrictions:**

- **Minimum Treatment Interval:** Do not make applications less than 5 days apart.
- **Maximum Number of Applications:** Do not make more than six applications per crop.
- **Succulent Beans and Peas:**
  - Preharvest Interval:** Do not apply within 3 days of harvest.
  - Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per season (includes foliar plus soil plus seed).
- **Dried Beans and Peas:**
  - Preharvest Interval:** Do not apply within 28 days of harvest.
  - Do not apply more than a total of 8.3 oz of Blackhawk (0.188 lb ai of spinosad) per acre per season (includes foliar plus soil plus seed).
  - Do not feed treated forage or hay to meat or dairy animals.

**Peanut**

(Not for Use in California)

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
armyworms, including: beet armyworm fall armyworm true armyworm yellowstriped armyworm cabbage looper corn earworm European corn borer green cloverleaf worm red-necked peanut worm saltmarsh caterpillar soybean looper velvetbean caterpillar	1.7 – 3.3

**Application Timing:** Regularly monitor the population size of each of the labeled pests. Treat when pests appear, targeting eggs at hatch or small larvae. Consult your Dow AgroSciences representative, extension specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

**Application Rate:** Use a higher rate in the rate range for larger larvae or moderate to severe infestations and/or larger plant volume.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of

Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

**Restrictions:**

- **Preharvest Interval:** Do not apply within 3 days of nut harvest or within 14 days of forage.
- **Minimum Treatment Interval:** Do not make applications less than 7 days apart.
- Do not apply more than a total of 12.4 oz of Blackhawk (0.28 lb ai of spinosad) per acre per crop.
- **Maximum Number of Applications:** Do not make more than three applications per calendar year.
- **Grazing Restrictions:** Do not allow grazing of crop residue or harvest of crop residue for hay until 14 days after the last application.

**Pome Fruits (Crop Group 11)<sup>1</sup>**

<sup>1</sup>Pome fruits (crop group 11) apples, crabapple, loquat, mayhaw, pears, quince

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
leafminers <sup>1</sup> spotted tentiform western tentiform	2.2 – 5.5
apple maggot (suppression) codling moth European grapevine moth leafrollers oblique-banded pandemis light brown apple moth oriental fruit moth thrips <sup>1</sup> tufted apple budmoth	3.3 – 5.5

<sup>1</sup>Control of leafminers and thrips may be improved by addition of an adjuvant to the spray mixture. See Use of Adjuvants section.

**Application Timing:** Optimal timing for **leafminers** and **leafrollers** may vary between species and geographic location. For **leafminers**, monitor the moth flights and infestation densities of both the sap-feeding and tissue-feeding stage. For optimum control, treat at first appearance of leaf mining activity. For **leafrollers**, monitor the moth flights and the infestation densities of the larval stages. Repeat application as necessary to maintain control. Closely follow regional spray recommendations for **codling moth** and **oriental fruit moth** treatments based upon biofix dates and pheromone trap catches. **Codling moth** and **oriental fruit moth** larvae must be controlled before they penetrate the fruit. **Codling moth** and **oriental fruit moth** applications will provide control for no more than 10 days. Repeat application as necessary to maintain control. Consult with your Dow AgroSciences representative, state agricultural experiment station, certified pest control advisor or extension specialist for specific application timings in your area.

**Application Rate:** The amount of Blackhawk applied per acre will depend upon tree size and pest pressure. Use a lower rate in the rate range for light infestations and/or small trees and a higher rate in the rate range for heavy infestations and/or larger trees.

**Spray Volume:** Dilute sprays are sprayed to the point of runoff. The application rate range in the table is based upon a spray volume of 300 gallons per acre. Gallonage of dilute sprays will vary depending upon tree size, density of canopy, stage of seasonal growth, and spacing in the orchard.

**Resistance Management:** Do not make more than three consecutive applications of Group 5 insecticides (spinetoram and spinosad) within a crop season. If additional treatments are required after three consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area. Do not treat consecutive generations of codling moth, oriental fruit moth, and leafrollers.

**Restrictions:**

- **Preharvest Interval:** Do not apply within 7 days of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 10 days apart.
- Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per crop.
- Do not apply more than three sprays targeted at leafrollers per season.
- **Maximum Number of Applications:** Do not make more than four applications per calendar year.

**Root and Tuber Vegetables (Crop Group 1)<sup>1</sup>, and Artichoke**

<sup>1</sup>Root and tuber vegetables (crop group 1) arracacha, arrowroot, bitter cassava, black salsify, carrot, celeriac, chayote root, chicory, Chinese artichoke, chufa, dasheen, edible burdock, edible canna, garden beet, ginger, ginseng, horseradish, Jerusalem artichoke, leren, oriental radish, parsnip, potato, radish, rutabaga, salsify, skirret, Spanish salsify, sugar beet, sweet cassava, sweet potato, tanager, true yam, tumeric, turnip, turnip-rooted chervil, turnip-rooted parsley, yam bean

**Pests and Application Rates:**

Crop	Pests	Blackhawk (oz/acre)
black salsify carrot chicory ginseng horseradish parsnip salsify skirret Spanish salsify turnip-rooted chervil turnip-rooted parsley	armyworms dipteran leafminers European corn borer fleabeetle loopers thrips <sup>1</sup>	1.7 – 3.3
celeriac edible burdock oriental radish radish rutabaga turnip		
arracacha arrowroot	Colorado potato beetle European corn borer	1.7 – 3.3

Crop	Pests	Blackhawk (oz/acre)
artichoke	armyworms	2.25 – 3.5
bitter cassava	artichoke plume moth	
chayote root	dipteran leafminers	
Chinese artichoke	( <i>Liriomyza</i> )	
chufa	loopers	
dasheen	thrips <sup>1</sup>	
edible canna		
garden beet		
ginger		
Jerusalem artichoke		
leren		
potato		
sugar beet		
sweet cassava		
sweet potato		
tanier		
true yam		
turmeric		
yam bean		

<sup>1</sup>Control of leafminers and thrips may be improved by addition of an adjuvant to the spray mixture. See Use of Adjuvants section.

**Application Timing:** 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. When plants are growing rapidly, repeat applications may be necessary to protect new foliage. Consult your Dow AgroSciences representative, extension service specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

**Application Rate:** Apply as a foliar spray at the rate specified to control target pest. Use a higher rate in the rate range for larger larvae or heavier infestations. Heavy infestations may require repeat applications but follow resistance management guidelines.

**Chemigation:** Blackhawk may be applied to potatoes by chemigation at labeled rates. Refer to the Chemigation Application section.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area. Do not apply Blackhawk to consecutive generations of **Colorado potato beetle** and do not make more than two applications per single generation of Colorado potato beetle.

**Restrictions:**

• **Garden beet, sugar beet**

**Preharvest Interval:** Do not apply within 3 days of harvest.

**Minimum Treatment Interval:** Do not make applications less than 7 days apart.

Do not apply more than a total of 14.4 oz of Blackhawk (0.33 lb ai spinosad) per crop.

**Maximum Number of Applications:** Do not make more than four applications per crop.

• **Black salsify, carrot, chicory, ginseng, horseradish, parsnip, salsify, skirret, Spanish salsify, turnip-rooted chervil, turnip-rooted parsley:**

**Preharvest Interval:** Do not apply within 3 days of harvest.

3.0  
37

**Minimum Treatment Interval:** Do not make applications less than 5 days apart.  
Do not apply more than a total of 14.4 oz of Blackhawk (0.3 lb ai spinosad) per acre per crop.  
**Maximum Number of Applications:** Do not make more than four applications per calendar year.

- **Arracacha, arrowroot, bitter cassava, chayote root, Chinese artichoke, chufa, dasheen, edible canna, ginger, Jerusalem artichoke, leren, potato, sweet cassava, sweet potato, taniel, true yam, turmeric, yam bean**

**Preharvest Interval:** Do not apply within 7 days of harvest.  
**Minimum Treatment Interval:** Do not make applications less than 7 days apart.  
Do not apply more than a total of 14.4 oz of Blackhawk (0.33 lb ai spinosad) per crop.  
**Maximum Number of Applications:** Do not make more than four applications per crop.

- **Artichoke**

**Preharvest Interval:** Do not apply within 2 days of harvest.  
**Minimum Treatment Interval:** Do not make applications less than 7 days apart.  
Do not apply more than a total of 16.7 oz of Blackhawk (0.33 lb ai spinosad) per crop.  
**Maximum Number of Applications:** Do not make more than four applications per crop.

- **Celeriac, edible burdock, Oriental radish, radish, rutabaga, turnip and other root vegetables not specifically listed:**

**Preharvest Interval:** Do not apply within 3 days of harvest.  
**Minimum Treatment Interval:** Do not make applications less than 5 days apart.  
Do not apply more than a total of 12 oz of Blackhawk (0.28 lb ai spinosad) per acre per crop.  
**Maximum Number of Applications:** Do not make more than three applications per calendar year.

**Small Cereal Grains<sup>1</sup> and Grain Amaranth**

<sup>1</sup>Small cereal grains barley, buckwheat, milo, oats, pearl millet, proso millet, rye, sorghum, triticale, wheat

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
cereal leaf beetle true armyworm	1.1 – 3.3
armyworms, such as: fall yellowstriped corn earworm (headworm) grasshopper (suppression) southwestern corn borer webworms	1.7 – 3.3

**Application Timing:** Scout for **armyworms** and **headworms** with enough regularity to monitor egg laying and egg hatch and treat when thresholds are reached. Time applications of Blackhawk to coincide with peak egg hatch and/or small larval stage of growth of each generation.

**Application Rate:** Apply as a foliar spray at the rate specified to control target pests. Use a higher rate in the rate range for heavy infestations, advanced growth stages of target pests, or difficult spray coverage situations.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

**Restrictions:**

- **Preharvest Interval:** Do not apply within 21 days of grain or straw harvest or within 3 days of forage, fodder or hay harvest.
- **Minimum Treatment Interval:** Do not make applications less than 4 days apart.
- Do not apply more than a total of 12.4 oz of Blackhawk (0.28 lb ai of spinosad) per acre per year.
- **Maximum Number of Applications:** Do not make more than three applications per calendar year.
- Do not allow cattle to graze treated area until spray has dried.

**Soybean**

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
green clover worm soybean looper true armyworm velvet bean caterpillar	1.1 – 2.2
armyworms, such as: beet armyworm fall armyworm yellowstriped armyworm corn earworm (podworm) saltmarsh caterpillar	1.7 – 2.2

**Application Timing:** Treat when field counts or crop injury indicates damaging pest populations are present or developing. Time applications to treat small larvae and use sufficient spray volume to ensure good coverage.

**Application Rate:** Use a higher rate in the rate range for heavy infestations and/or difficult spray coverage situations.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

**Restrictions:**

- **Preharvest Interval:** Do not apply within 28 days of harvest.
- Do not apply more than a total of 8.3 oz of Blackhawk (0.188 lb ai of spinosad) per acre per year.
- Do not feed treated forage or hay to meat or dairy animals.

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

<sup>1</sup>Stone fruits (crop group 12) apricot, chickasaw plum, damson plum, fresh prune, Japanese plum, nectarine, peach, plum, plumcot, sweet cherry, tart cherry

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
cherry fruit fly (suppression) European grapevine moth green fruitworm leafminers, such as: spotted tentiform, western	2.2 – 4.4

32  
37

Pests	Blackhawk (oz/acre)
tentiform <sup>1</sup> leafrollers, such as: fruit tree oblique-banded pandemis redbanded variegated light brown apple moth oriental fruit moth peach twig borer thrips <sup>1</sup> western cherry fruit fly	

<sup>1</sup>Control of leafminers and thrips may be improved by addition of an adjuvant to the spray mixture. See Use of Adjuvants section.

**Application Timing:** Peach twig borer applications can be made dormant, delayed dormant or as summer sprays. Optimal timing for **lepidopteran leafminers** and **leafrollers** may vary between species and geographic location. For **lepidopteran leafminers**, monitor the moth flights and the infestation densities of both the sap-feeding and tissue-feeding stage, but for optimal control, treat before significant tissue-feeding mines are observed. For **leafrollers**, monitor the moth flights and the infestation densities of the larval stages and re-treat as necessary to maintain control, thorough coverage is necessary for optimal control. For **cherry fruit fly, western cherry fruit fly, and other related species**, maintain protective sprays at 7-day intervals while adults are present and fruit is susceptible to attack. For **oriental fruit moth**, no more than 10 days of residual control can be expected. If longer residual is required, make a second application of Blackhawk or other insecticide labeled for **oriental fruit moth**. For **thrips** – A 3- to 4-day re-treatment schedule may be necessary at flowering. After flowering, a 5- to 7-day re-treatment schedule may be followed. For all pests, consult with your Dow AgroSciences representative, state agricultural experiment station, certified pest control advisor or extension specialist for specific application timings in your area.

**Application Rate:** Use a higher rate in the rate range for large trees, heavy infestations, or advanced growth stages of target pest, especially if spray volume or coverage is marginal.

**Spray Volume:** Dilute sprays are sprayed to the point of runoff. The application rate range in the table is based upon a spray volume of 300 gallons per acre. Gallonage of dilute sprays will vary depending upon tree size, density of canopy, stage of seasonal growth, and spacing in the orchard.

**Resistance Management:** Do not make more than three consecutive applications of Group 5 insecticides (spinetoram and spinosad) within a crop season. If additional treatments are required after three consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area. Avoid treating consecutive generations of oriental fruit moth and leafrollers. Do not apply more than three sprays targeted at leafrollers per season.

**Restrictions:**

- **Preharvest Interval:** Do not apply within 14 days of harvest for apricots, within 7 days of harvest for cherries, plums, prunes and other stone fruit crops, or within 1 day of harvest for nectarines and peaches.
- **Minimum Treatment Interval:** Do not make applications less than 7 days apart.
- Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per year.
- **Maximum Number of Applications:** Do not make more than three sprays targeted at leafrollers per season.



## Strawberry

### Pests and Application Rates:

Pests	Blackhawk (oz/acre)
armyworms, including beet armyworms European grapevine moth leafrollers light brown apple moth thrips <sup>1</sup>	2.2 – 3.3

<sup>1</sup>For thrips, if additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least two applications.

**Application Timing:** Treat when pests appear, targeting eggs at hatch or small larvae. For **thrips**, a 3- to 4-day re-treatment schedule may be necessary if there is heavy pest pressure or if the pest population is increasing rapidly. For control of all other pests, a 5- to 7-day re-treatment schedule may be necessary if the crop is growing rapidly or if there is heavy pest pressure. Consult your Dow AgroSciences representative, extension service specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

**Application Rate:** Apply as a foliar spray at the rate specified to control target pests. Use a higher rate in the rate range for larger larvae or moderate to severe pest infestations. Heavy infestations may require repeat applications, but follow resistance management guidelines.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. For **thrips**, if additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least two applications. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

### Restrictions:

- **Preharvest Interval:** Do not apply within 1 day of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 5 days apart.
- Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per crop.
- **Maximum Number of Applications:** Do not make more than five applications per year.

## Tobacco

### Pests and Application Rates:

Pests	Blackhawk (oz/acre)
thrips tobacco budworm tobacco hornworm	1.6 – 3.2

**Application Timing:** Scout for **lepidopterous larvae** with enough regularity to monitor egg laying and egg hatch and treat when thresholds are reached. Applications of Blackhawk perform best when timed to coincide with peak egg hatch of each generation.

**Application Rate:** Apply as a foliar spray at the rate indicated for target pest. Use a higher rate in the rate range for heavy infestations and/or difficult spray coverage situations.

**Spray Volume:** Use a minimum of 20 gallons of water per acre to obtain full coverage of foliage, increasing volume and nozzles per row as necessary with crop maturity.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

**Restrictions:**

- **Preharvest Interval:** Do not apply within 3 days of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 7 days apart.
- Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai spinosad) per acre per year or make more than 3 applications per 30 days or 6 applications per crop.

**Tree Farms or Plantations**

**Conifers, including Christmas trees, and deciduous trees**

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
European grapevine moth lepidopterous larvae, such as: bagworm fall webworm gypsy moth hemlock looper jackpine budworm pine tip moth redhumped caterpillar spruce budworm tent caterpillar tussock moths light brown apple moth sawfly larvae, such as: European pine pear redheaded pine	1.1 – 4.4

**Application Timing:** Time applications to reach larvae when small or just hatching. Repeat application as necessary to maintain control, but follow resistance management guidelines. Consult with your Dow AgroSciences representative, state agricultural experiment station, certified pest control advisor or extension specialist for information on application timing for specific pests in your area.

**Application Rates:** The rate of Blackhawk applied per acre will depend upon tree size and severity of infestation. Use a higher rate in the rate range for large trees or heavy infestations. Apply in sufficient volume to ensure thorough coverage.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

35  
37

**Restrictions:**

- Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per year.

**Tree Nuts (Crop Group 14)<sup>1</sup> and Pistachios**

<sup>1</sup>Tree nuts (crop group 14) almonds, cashew, chestnut, filbert (hazelnut), macadamia nut, pecan, walnut

**Pests and Application Rates:**

Pests	Blackhawk	
	(oz/acre)	Dilute Spray (oz/100 gal)
codling moth	2.2 – 5.5	0.55 – 1.38
fall webworm		
filbert worm		
hickory shuckworm		
light brown apple moth		
navel orangeworm		
oblique banded leafroller		
peach twig borer		
pecan nut casebearer		
redhumped caterpillar		
walnut husk fly		

**Application Timing:** Apply Blackhawk as either a dormant or a foliar spray when pests appear or in accordance with local conditions. Apply as a concentrate or dilute spray using conventional, power operated spray equipment (see Orchard Spraying Application section). Consult your Dow AgroSciences representative, extension service specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

**Use of Crop Oils:** Crop oils labeled for agricultural use may be added to the dormant spray solution for suppression of overwintering mites and scale insects. Consult specific oil labels and University of California recommendations for precautions and restrictions regarding the use of oils in nut and fruit trees.

**Application Rate:** The amount of Blackhawk applied per acre will depend upon tree size and volume of foliage present and pest pressure. Use a higher rate in the rate range for large trees or heavy infestations.

**Spray Volume:** Dilute sprays are sprayed to the point of runoff. The application rate range in the table is based upon a spray volume of 400 gallons per acre. Gallonage of dilute sprays will vary depending upon tree size, density of canopy, stage of seasonal growth, and spacing in the orchard.

**Resistance Management:** Do not make more than three consecutive applications of Group 5 insecticides (spinetoram and spinosad) within a crop season. If additional treatments are required after three consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

**Restrictions:**

- **Preharvest Interval:** Do not apply within 1 day of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 7 days apart.
- Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per crop.
- **Maximum Number of Applications:** Do not apply more than three sprays targeted at leafrollers per season.

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

**(Insect Suppression)**

Tropical tree fruits 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, ti leaves, wax jambu (wax apple), white sapote

**Pests and Application Rates:**

Pests	Blackhawk (oz/acre)
European grapevine moth	2.2 – 5.5
katydids	
lepidopterous larvae	
avocado leafroller	
citrus peelminer	
cutworms	
fruit tree leafroller	
orange tortrix	
western tussock moth	
light brown apple moth	
thrips <sup>1</sup>	

<sup>1</sup>Control of thrips may be improved by addition of an adjuvant to the spray mixture. See Use of Adjuvants section.

**Application Timing:** Treat when pests appear or in accordance with local economic thresholds. Consult your Dow AgroSciences representative, extension service specialist, certified crop advisor or your state agricultural experiment station for any additional local use recommendations for your area.

**Application Rate:** The amount of Blackhawk applied per acre will depend upon tree size and pest pressure. Use a lower rate in the rate range for light infestations and/or small trees and a higher rate in the rate range for heavy infestations and/or large trees.

**Resistance Management:** Do not make more than two consecutive applications of Group 5 insecticides (spinetoram and spinosad). If additional treatments are required after two consecutive applications of Group 5 insecticides, rotate to another class of effective insecticides for at least one application. Consult your local Dow AgroSciences representative, extension specialist, certified crop advisor, or state agricultural experiment station for information on alternative effective products to use in your area.

**Restrictions:**

- **Preharvest Interval:** Do not apply within 1 day of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 7 days apart.
- Do not apply more than a total of 20 oz of Blackhawk (0.45 lb ai of spinosad) per acre per crop.
- **Maximum Number of Applications:** In order to prevent or delay resistance development in thrips, do not apply Blackhawk more than two times per year.
- For resistance management purposes, do not apply to tropical tree fruits grown in nurseries or in greenhouses.

**Fire Ants – Mound Application in Turfgrass and Ornamentals, in Greenhouses, and in Other Outdoor Areas**

Dilution Rate	
Blackhawk per 1 gallon (oz)	Blackhawk per 10 gallons (oz)
0.035 (1 gm)	0.35 (10 gm)

**Fire ants such as red imported:** Apply diluted Blackhawk to individual fire ant mounds as a drench application. Use 1 to 2 gallons per mound depending upon the mound size. For mounds less than 8 inches in diameter, use 1 gallon of dilution per mound. Use a higher volume, up to 2 gallons, on mounds 8 inches or larger in diameter. Apply approximately 10% of the dilution volume around the perimeter of the mound out to about 12 inches and pour the remaining volume directly on the mound. Do not disturb mounds prior to application. If possible, apply following a recent rainfall. For best results, apply in cool weather, 65 to 85°F, or in early morning or late evening hours. Treat new mounds as they appear. Pressurized sprays should not be used as they may disturb the ants and cause migration, reducing control.

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1. Refund of purchase price paid by buyer or user for product bought, or
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