

# Coragen<sup>®</sup> Insect Control

Powered by Rynaxypyr<sup>®</sup> active



## At-plant insecticide soil applications: best management practices

**For use on selected vegetables for control of labeled Lepidoptera worm pests and leaf miner larvae<sup>1</sup>, plus suppression of whitefly nymphs**

Coragen<sup>®</sup> insect control powered by Rynaxypyr<sup>®</sup> active, soil applied at plant, is a flexible alternative application method that delivers excellent pest control and crop safety with an excellent environmental profile.

Coragen insect control is a suspension concentrate that controls many important insects. For maximum flexibility, it can be applied to selected vegetable crops using any of the following methods:

- In-furrow spray at planting.
- Transplant water treatment.
- Hill drench at planting.
- Surface band at planting.
- Soil-shank injection at planting.
- Drip chemigation.
- Foliar spray.

Coragen insect control is mixed with water for application.



### TECHNICAL UPDATE

#### Considerations for soil-applied application

When using at-plant soil application, consider these important factors:

- Determine target pests to be controlled.
- Consider root types. Root systems at crop establishment occupy a smaller soil volume, requiring more precise product placement. Fibrous roots occupy a larger soil volume allowing more flexibility in product placement.
- Make at-plant soil applications of Coragen insect control prior to pest population build-up.
- Apply Coragen insect control in a manner that ensures the product is in the root zone.

#### Considerations for foliar applications

Foliar applications of Coragen insect control are highly effective and may be preferred to soil applications in situations where:

- Soil applications may not be optimal to ensure placement in the root zone as described in this technical update.
- Damaging pest populations exist above the treatment threshold. A foliar application provides immediate coverage and contact activity to quickly protect fruit and plant material from feeding damage.
- A drip application should not be used as a rescue treatment.
- Protection of fruit is required, such as vining crops. A foliar spray should be applied to prevent feeding damage and/or scarring.

<sup>1</sup> Control of *Liriomyza* species except suppression only for *L. huidabrensis* and *L. langei*.

## Target pests

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Systemic products used in soil applications control target pests when they feed on the above-ground plant tissue. The movement and distribution of products from the roots to the aerial plant parts ensure control of chewing pests and improve product availability for control of sucking pests and leaf miners.

## Crops

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Optimal performance is obtained when the product is delivered to the roots. Therefore, crop growth stage and root type must be considered.

### Growth stage

Root systems at crop establishment occupy a smaller soil volume, requiring more precise product placement. Application close to the root system is important to obtain efficacy at this stage. Later in the crop cycle, as roots develop and occupy a larger soil volume, placement becomes less critical, similar to drip chemigation.

### Root type

Fibrous roots occupy a larger soil volume than tap roots. Therefore, there is more application flexibility in a crop with fibrous roots e.g., tomatoes than in a crop with tap roots e.g., cabbage.

### Flexible application timing

Soil applications can start at crop establishment and continue through harvest. The time needed between root uptake and effective control should be carefully considered.

## Soils

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Water management is key to product delivery and effectiveness. The practices listed below can further improve product availability and distribution.

- Minimize soil compaction i.e., enhance infiltration, ensure proper aeration.
- Provide sufficient water for plant growth while minimizing runoff, puddling and movement outside the root zone.
- Match placement with root distribution and product properties to ensure delivery to root zone.
- Build soil moisture before planting.
- Maintain soil moisture through effective water management.

## Advantages of soil applications:

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- Minimal risk to pollinators and other beneficial insects and organisms.
- Very good product distribution and coverage of hard-to-reach plant parts.
- Reduced potential for loss of activity from weathering, such as rain, washoff and photo degradation.
- Excellent residual control when Coragen® insect control powered by Rynaxypyr® active is in the plant.
- Root systems of selected vegetables will take up Coragen insect control when it is in the root zone and redistribute it throughout the aerial portions of the plant.

### Soil texture

Coarsely textured, sandy soils have low water-holding capacity and a higher infiltration rate, resulting in less lateral movement of product. These soils may require more frequent and shorter duration irrigation events. The leaching potential of moderately mobile insecticides, such as Coragen insect control, is greater in coarsely textured soils than in finely textured soils. Excessive watering increases the potential for downward movement of the products to groundwater.

Finely textured clay and loam soils have higher water retention, requiring less frequent but longer irrigation events. Greater lateral movement can be obtained in finely textured soils due to reduced downward water movement.

### Soil organic matter

Soils with higher organic matter content can reduce product availability for plant uptake.



## Soil-application requirements

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- Coragen® insect control powered by Rynaxypyr® active is most effective when it is applied so the roots are at or near the site of application.
- Coragen insect control is stable at pH 1.5–9 and at temperatures up to 104 F for 72 hours.
- Coragen insect control applied in the soil and delivered to the plant systemically will not move into the fruit in high enough concentrations to protect fruit from labeled pest insect damage.

## Crop water management

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- Coragen insect control binds moderately to soil OM; thus bioavailability can be improved with frequent irrigation events.
- Manage irrigation so significant quantities of Coragen insect control remain in root zone where it is most effective.
- Use minimum of 10 gallons per acre (GPA) of water for all crops.

## Application rates for soil applications of Coragen insect control

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- 3.5-5.0 fl. oz./A for lepidopterous targeted pests listed. See Targeted Pests section below.
- 5.0-7.5 fl. oz./A for control of leaf miner larvae except suppression only of *L. huidabrensis* and *L. langei* and silver leaf whitefly nymphs (suppression only; use with effective adult whitefly control program).
- Product formulations may be changed and new ones introduced. Premix a small quantity of a desired tank mix and observe for possible adverse changes settling out, flocculation, etc. Do not mix products with a label prohibition against such mixing. Follow the most restrictive of the labeling limitations and precautions of all products used in mixtures.

Note: Coragen insect control should be agitated continuously in the injection tank.

If Coragen insect control is used with an at-plant soil application, only one subsequent drip chemigation application can be made. Use a minimum of 10 GPA of water for all crops.

## Resistance management

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To prevent insecticide resistance, it is important to avoid consecutive applications of insecticides with the same mode of action on successive generations of the same pest. See crops on label for recommended treatment rates and additional use information.

## Labeled crops:

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Coragen insect control can be soil applied to the following crop groups<sup>†</sup>:

- Brassica (cole) leafy vegetables.
- Cucurbit vegetables.
- Fruiting vegetables.
- Leafy vegetables.

For details, please refer to the supplemental label, *Coragen Insect Control At-plant Soil Application on Vegetables*.

- REI 4 hours.
- PHI for various vegetables:
  - Brassica (cole), 3-day PHI.
  - Cucurbit, 1-day PHI.
  - Fruiting vegetables, 1-day PHI.
  - Leafy vegetables, 1-day PHI.

<sup>†</sup> Coragen insect control does not control all of the pests mentioned for all of the listed crops. You must refer to the product label for a complete listing of crop/pest combinations controlled or suppressed.

## Crop rotation

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Immediately following harvest, you may plant crops on this label and the following crops or crop groups: bananas/plantains; cacao; berries and small fruits (crop group 13-07); citrus (crop group 10); coffee; figs; grapes; olives; persimmons; pome fruits (crop group 11); pineapples; pomegranates; prickly pear cactus; rice; stone fruits (crop group 12); tree nuts and pistachios (crop group 14); and tropical fruits (acerola, atemoya, avocado, biriba, black sapote, canistel, cherimoya, custard apple, ilama, feijoa, guava, jaboticaba, longan, lychee, mamey sapote, mango, papaya, passion fruit, pulasan, rambutan, sapodilla, soursop, Spanish lime, star apple, starfruit, sugar apple, wax jambu, and white sapote (casimiroa), and and/or hybrids of these).

Thirty days following the last application of Coragen insect control, you may plant the following crops: leeks, green onions, Welsh onions and peanuts. All other crops cannot be planted until 12 months after the last application of Coragen insect control.



## Types of soil applications

Coragen® insect control powered by Rynaxypyr® active must be in the root zone to provide effective control of target pests. The methods of soil application listed below are intended to deliver Coragen insect control into the root zone or near the root zone where the roots will grow into the Coragen insect control treated area.

### Transplant water treatment or hill drench

Plants must be adequately watered before transplanting. Apply Coragen insect control at transplanting in a minimum of 2 ounces of treatment solution per transplant. Ensure water volume is sufficient to thoroughly wet the root zone. Refer to the label for rate and volume measurements, plus calculations.

### Soil-shank injection

Use soil-shank injection at planting. Applications must be incorporated using sufficient irrigation, usually 0.5–1.0 inches of water, to reach the root zone. Place shank injection in the seed row or just below the seed line, within 1–2 inches.

### Surface band at planting

At planting, apply as a narrow, 2–4 inches or less, surface band spray above the seed line. Incorporate surface-band application within 24 hours of application using sufficient overhead irrigation, usually 0.5–1.0 inch of water, to reach the seeding depth. This application method is most effective on shallow-seeded crops.

### In-furrow spray at planting

Apply as a narrow band spray into the furrow at the seeding depth in front of press wheel. Overhead irrigation required after planting.

### Drip (trickle) chemigation

Surface drip needs to be located close to the base of the plant. Buried drip needs to be directly under the seed line and in contact with the root system. Unless directed otherwise in the specific crop sections of the product label, a total of two applications can be made per crop season. Any subsequent Coragen insect control treatments must be foliar applications.

## Targeted pests:

Applied as directed, Coragen insect control can be used to control the following pests:

- Beet armyworms
- Cabbage loopers
- Corn earworms
- Cross-striped cabbageworms
- Diamondback moths
- Fall armyworms
- Hawaiian beet webworms
- Imported cabbageworms
- Leaf miner larvae<sup>2</sup>
- Loopers
- Silverleaf whitefly nymphs<sup>3</sup>
- Southern armyworms
- Tomato fruitworms
- Tomato pinworms
- Western yellow-striped armyworms

<sup>1</sup> Coragen insect control does not control all of the pests mentioned for all of the listed crops. You must refer to the product label for a complete listing of crop/pest combinations controlled or suppressed.

<sup>2</sup> Control of *Liriomyza* species except suppression only for *L. huidabrensis* and *L. langei*.

<sup>3</sup> Suppression only. Use in conjunction with an effective adult whitefly control program.



**For more information, contact your local FMC retailer or representative about Coragen insect control from FMC and visit us at [FMCCrop.com](http://FMCCrop.com).**

Always read and follow label directions and precautions for use. Some products may not be registered for sale or use in all states. As of November 1, 2017, the USEPA registration for DuPont™ Coragen® insect control powered by Rynaxypyr® active was sold to FMC by DuPont. FMC, Coragen and Rynaxypyr are trademarks of FMC Corporation or an affiliate. ©2018 FMC Corporation. All rights reserved. 17-FMC-0972 07/18