

# Heligen

Biological insecticide for the integrated control of  
*Helicoverpa zea* (corn earworm, cotton bollworm, tomato fruitworm) and  
*Heliothis virescens* (tobacco budworm) on specified food and non-food crops

GROUP	31	INSECTICIDE
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Active Ingredient\*:

*Helicoverpa zea* Nucleopolyhedrovirus  
strain ABA-NPV-U: ..... 32.7%

Other Ingredients: ..... 67.3%

Total: ..... 100.00%

\*Contains a minimum of  $1 \times 10^{11}$  occlusion bodies per Liter of product

EPA Registration Number: 87978-2

EPA Est. Number: 87978-TX-001

**Net Contents: 1 Gallon**

## KEEP OUT OF REACH OF CHILDREN

See additional precautionary  
statements on the back panel

Manufactured for:

AgBiTech Pty Ltd  
8 Roda Court Glenvale  
Queensland Australia 4350  
Product of USA



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## PRECAUTIONARY STATEMENTS

### PERSONAL PROTECTIVE EQUIPMENT (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks

Mixers/loaders and applicators must wear a minimum of a NIOSH-approved particulate filtering facepiece respirator with any R or P filter; OR a NIOSH-approved elastomeric particulate respirator with any R or P filter; OR a NIOSH approved powered air-purifying respirator with an HE filter. Repeated exposures to high concentrations of microbial proteins can cause allergic sensitization. Follow the manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

## USER SAFETY RECOMMENDATIONS

Users should:

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

## ENVIRONMENTAL HAZARDS

For terrestrial uses: Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark.

Do not contaminate water when disposing of equipment wash water or rinsate.

## DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Do not use this product until you have read the entire label. 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 State or Tribal agency responsible for pesticide regulation.

## STORAGE AND DISPOSAL

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

### PESTICIDE STORAGE

Care must be taken to avoid exposure of Heligen to high temperatures (above 104°F). Packaged, sealed product can be exposed to direct sunlight for brief periods of time (< 2 hours), but must be stored out of direct sunlight.

• Heligen stored in refrigerators/cool rooms (at ≤ 39°F/4°C) will be viable for at least 60 months.

### PESTICIDE DISPOSAL

To avoid waste, use material in this container by application according to label directions. If wastes cannot be avoided, offer remaining product to a waste disposal facility or pesticide disposal program (often such programs are run by state or local governments or by industry).

### CONTAINER HANDLING

Plastic containers with capacities equal to or less than 5 gallons: Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. **Triple rinse as follows:** Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration. Do not burn, unless allowed by state and local ordinance. If burned, stay out of smoke.

## AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farm, 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 exemptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box apply only to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 4 hours.

PPE required for early entry to treated areas (that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water) is:

- Coveralls
- Shoes plus socks
- Chemical-resistant gloves (made of any waterproof material)

## PRODUCT INFORMATION

This product contains a biological insecticide for the control of the following moth larvae on a wide range of crops, as specified in the table below:

**Corn earworm *Helicoverpa zea***

**Tobacco budworm *Heliothis virescens***

## INSTRUCTIONS FOR USE

Heligen (active ingredient: Polyhedral occlusion bodies of *Helicoverpa zea* Nucleopolyhedrovirus strain ABA-NPV-U; HzNPV) is a highly specific pathogen of *Helicoverpa* spp. and *Heliothis* spp. The effectiveness of Heligen is dependent on a number of important factors: larval size, environmental conditions, application and the feeding behavior of the pest. Because of the requirement for adequate timing of application, coverage, and weather conditions, the performance of Heligen may be variable. Once infected, larvae can take up to 8 days to die, although feeding activity is greatly reduced within 1 to 3 days post infection, dependent on larvae size. Daytime temperatures of 65°F to 95°F are ideal for the infectivity by Heligen. Infected larvae will amplify the virus, and following death will release large amounts of viral occlusion bodies that can result in ongoing control, particularly under environmental conditions suitable for the virus in Heligen (warm and humid conditions).

## *Helicoverpa* growth stage identification

Showing the actual size of *H. zea* larvae at a given age (days since egg hatch) when reared at 77°F.

Instar	Age (days)	Size category	Length (inches)	Actual size	Heligen timing
1st	0 - 2	Very Small	1/8"		✓✓
2nd	2 - 4	Small	1/4"		✓✓
3rd	4 - 8	Medium (small)	1/2"		✓
4th	8 - 11	Medium (large)	3/4"		✗
5th	11 - 14	Large	1"		✗
6th	14 - 18+	Large (snake)	1 1/4"		✗



## CROPS, APPLICATION RATES AND CROP SPECIFIC INFORMATION

Crops	Rate of Heligen per acre	Additional Information
<b>Sorghum (milo)</b>	0.7 to 1.4 fl. oz.	Use lower application rates when targeting larvae smaller than 0.3 inches in length (1st and 2nd instar) and in mixtures with sprays for midge control (not ULV). Use higher application rates when targeting larvae larger than 0.3 inches in length (3rd instar) or under high pressure situations. Applications that are targeted when 50% of heads have reached 100% flowering will provide good control.
<b>Grain Cereal (Crop Group 15 excluding Sweet corn) including: Corn (maize), Popcorn, Rice<sup>1</sup></b> <b>Alfalfa (hay and seed)</b> <b>Oilseeds (Crop Group 20) including:</b> Flax seed, Canola, Safflower, Sunflower <b>Peanuts</b> <b>Legume Vegetables (Succulent or Dried) (Crop Group 6) including:</b> Adzuki bean, Broad bean, Chickpeas, Cowpea, Fava bean, Field pea, Kidney bean, Lablab bean, Lentil, Lima bean, Sweet Lupin, White Lupin, Mung bean, Navy bean, Pigeon pea <b>Vetch</b>	1.0 to 1.6 fl. oz.	Use lower application rates as a preventive measure in vegetative crop stages. Use higher application rates when the pest population has reached economic threshold.
<b>Soybean, including Edamame (immature soybean)</b>	1.0 to 1.6 fl. oz.	Use lower application rates as a preventive measure in vegetative crop stages. Use the high application rate when the pest population has reached economic threshold.
<b>Sweet corn</b>	1.2 to 2.4 fl. oz.	Application should be made from the vegetative stages until silking. Applications during silking must employ a high rate and be in conjunction with other control measures. Using lower application rates at regular (3 to 5 day) intervals, particularly via overhead irrigation water, is an effective strategy from vegetative stages, through row tassel to silking.
<b>Root and Tuber Vegetables (Crop Group 1) including: Carrot, Sweet potato, Sugar beet, Potato</b> <b>Brassica (Cole) Leafy Vegetables (Crop Group 5) including: Broccoli, Brussels sprouts, Cabbage, Cauliflower, Chinese broccoli, Kale, Mustard greens, Mustard spinach, Rape greens</b> <b>Leafy Vegetables (Except Brassica Vegetables) (Crop Group 4) including: Celery, Endive, Lettuce, Roquette, Silver beet, Spinach</b> <b>Fruiting Vegetables (Crop Group 8 - 10) including: Chili, Eggplant, Okra, Pepper, Tomato</b> <b>Legume Vegetables (Succulent or Dried) (Crop Group 6) including: Green bean, Green pea, Snow pea, Sugar snap pea</b> <b>Cucurbit Vegetables (Crop Group 9) including: Cucumber, Melon, Pumpkin, Summer and winter Squash, Watermelon, Zucchini</b> <b>Berry and Small Fruit Group (Crop Group 13 - 07) including: Blackberry, Blueberry, Boysenberry, Cranberry<sup>2</sup>, Currant, Gooseberry, Raspberry, Strawberry</b> <b>Pome Fruit (Crop Group 11 - 10) including: Apple, Nashi, Pear</b> <b>Ornamental Flowers and Plants</b> <b>Avocado</b> <b>Asparagus</b>	1.2 to 2.4 fl. oz.	Use a higher application rate when flowers, fruit or economic parts of the crop are present, under high pest pressure conditions or to control 3rd instar larvae. Using lower application rate during vegetative stages of crop production. Using lower application rates at regular (3 to 5 day) intervals, particularly via overhead irrigation water, is an effective strategy in horticultural crops.
<b>Cotton</b>	2.0 to 2.4 fl. oz.	High leaf pH in cotton causes rapid NPV deactivation, giving Heligen very short residual activity and resulting in highly variable performance in this crop. Heligen should not be solely relied upon when larvae numbers are above economic threshold in cotton.
<b>Tobacco, Hemp</b>	1.2 to 2.4 fl. oz.	Use a higher application rate under high pest pressure conditions or to control 3rd instar larvae. Using lower application rate at regular intervals is an effective strategy in tobacco.

<sup>1</sup> Do not apply to flooded fields. <sup>2</sup> Do not apply to flooded fields. <sup>3</sup> Do not apply to flooded fields. <sup>4</sup> Rice - Do not apply to flooded fields.

Good coverage of the feeding sites of the larvae is essential, as the product needs to be ingested to be effective. If larvae are feeding low down in a heavy crop canopy, and application of Heligen does not reach these areas, initial control from the spray will be sub-optimal. However, larvae that die from the Heligen spray will release large amounts of HzNPV, which will spread throughout the crop canopy.

Heligen will provide between 60 and 90% control, with greater control expected on smaller larvae under ideal application conditions. Heligen should only be used to target small larvae (1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> instars). Larvae at the higher end of the recommended size spectrum will take longer to die and cause more significant damage prior to death.

Under high pest pressure or sub-optimal application conditions, or when immediate protection against damage is required, additional control options should be considered. Do not apply Heligen if heavy rain (greater than 0.4 inches per hour) is expected within 1 hour after application.

## MIXING INSTRUCTIONS

Shake the container well before use. Spray water pH should be neutral (pH 7.0) - spray water pH above 8 may damage the virus and performance will be reduced. If needed, use a suitable buffer or acidifier. If mixing with other pesticides or foliar fertilizers in water, add Heligen to the spray tank after the other products are thoroughly diluted. Apply Heligen within 10 hours after mixing. Do not let stand overnight.

## Compatibility:

**In water:** Heligen is highly compatible with the majority of herbicides, insecticides, fungicides and foliar fertilizers when mixed in water. Ensure that the mixture has a pH of 8 or less before adding Heligen as higher pH levels will damage the virus.

**In oil (ultra low volume):** For ULV application in oil, Heligen is not compatible with other pesticides, since the undiluted solvents in these products can damage the virus.

## APPLICATION INSTRUCTIONS

Use application parameters (nozzles, swath width, pressure, boom height, speed, volume, etc.) to ensure thorough coverage of the target area.

**I. Legume Vegetables (Succulent and Dried) Group (Crop Group 6 excluding Soybean), Root and Tuber Vegetables Group (Crop Group 1) including:** Carrot, Sweet potato, Sugar beet, Potato; **Brassica (Cole) Leafy Vegetables Group (Crop Group 5) including:** Broccoli, Brussels sprouts, Cabbage, Cauliflower, Chinese broccoli, Kale, Mustard greens, Mustard spinach, Rape greens; **Leafy Vegetables (except Brassica Vegetables) Group (Crop Group 4) including:** Celery, Endive, Lettuce, Roquette, Silver beet, Spinach; **Fruiting Vegetables (Crop Group 8 - 10) including:** Chili, Eggplant, Okra, Pepper, Tomato; **Cucurbit Vegetables (Crop Group 9) including:** Cucumber, Melon, Pumpkin, Summer and winter Squash, Watermelon, Zucchini; **Berries Group (Crop Group 13 - 07) including:** Blackberry, Blueberry, Boysenberry, Cranberry<sup>3</sup>, Currant, Gooseberry, Raspberry, Strawberry; **Pome Fruit Group (Crop Group 11 - 10) including:** Apple, Nashi, Pear; **Ornamental Flowers and Plants**; **Avocado**; **Asparagus**.

## Ground Rig

Apply Heligen by ground rig or hand-held equipment in a minimum of 40 gallons of water per acre.

**II. Sorghum, Cereal Grains Group<sup>4</sup>, Alfalfa, Oilseed Group, Peanut, Soybean, Sweet Corn, Cotton**

## Ground Rig

Apply Heligen in a minimum of 10 gallons of water per acre.

#### **Aerial – High Volume**

Apply Heligen in a minimum of 3 gallons of water per acre. This application method is particularly susceptible to droplet evaporation, especially during hot and dry conditions (temperature greater than 85°F and relative humidity less than 40%). Droplet evaporation will reduce coverage, which can have a detrimental impact on performance. During hot and dry conditions avoid using this application method - wait until conditions favor good coverage or apply in ULV (see below). Alternatively, if application in water by air during hot and dry conditions cannot be avoided, increase application volume and/or use an anti-evaporation additive (such as an emulsifiable oil) to improve coverage.

#### **Aerial – Low Volume (Sorghum Only)**

Apply Heligen in a minimum of 1 gallon of water per acre and include an anti-evaporation additive (such as 2% emulsifiable oil).

#### **Aerial – Ultra-Low Volume (ULV)**

Use an approved oil carrier and apply in a minimum volume of 1 quart per acre using micronair nozzles. When applying Heligen in ULV, DO NOT tank mix with other pesticides or fertilizers (refer to Compatibility).

#### **Chemigation (via overhead irrigation water):**

Heligen can be effectively applied to crops in overhead irrigation water. Introduce the product to the irrigation water at the appropriate rate using irrigation equipment. If the product is diluted in water prior to injection into the irrigation water, ensure that the dilution water is clean and not silty with a pH of 7 or less and ensure there is constant agitation. Preferably, rainwater should be used for dilution. Use diluted Heligen within 10 hours of mixing.

For one-pass mobile irrigators (such as: center-pivot, lateral-move, end-tow, side-roll, traveler, big-gun), continuously and evenly introduce the required quantity of Heligen into the irrigation water over the course of irrigation. Apply Heligen in no more than 0.5 inches of irrigation water. For static irrigators (such as: solid-set or hand-move), introduce the required amount of Heligen into the irrigation water just prior to completion of the irrigation period, to maximize the concentration of Heligen applied and the amount that remains on the crop. See the CHEMIGATION section (following) for additional information.

## **CHEMIGATION**

#### **General Requirements:**

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

#### **Requirements for Chemigation Systems Connected to Public Water Systems:**

1. Public water supply means a system for the provision to the public of piped water for human consumption if such system has at least 15 service connections or regularly serves an average of 25 individuals daily at least 60 days throughout the year.
2. Chemigation systems connected to the public water systems must contain a functional, reduced-pressure zone (RPZ), backflow

preventer or the functional equivalent in the water supply upstream from the point of pesticide introduction. As an option to the RPZ, the water from the public water system should be discharged into a reservoir tank prior to pesticide introduction. There shall be a complete physical break (air gap) between the flow outlet end of the fill pipe and the top or the overflow rim of the reservoir tank of at least twice the inside diameter of the fill pipe.

3. The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump.
4. The pesticide injection pipeline must contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
5. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops, or in cases where there is no water pump, when the water pressure decreases to the point where pesticide distribution is adversely affected.
6. Systems must use a metering pump, such as a positive displacement injection pump (e.g., diaphragm pump), effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.
7. Do not apply when wind speed favors drift beyond the area intended for treatment.

#### **Requirements for Sprinkler Chemigation:**

1. The system must contain a functional check valve, vacuum relief valve, and low pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from back flow.
2. The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump.
3. The pesticide injection pipeline must also contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
4. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops.
5. The irrigation line or water pump must include a functional pressure switch, which will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected.
6. Systems must use a metering pump, such as a positive displacement injection pump (e.g., diaphragm pump), effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.
7. Do not apply when wind speed favors drift beyond the area intended for treatment.

## **RAIN FASTNESS**

The majority of virus uptake by larvae occurs within 1-hour post-application. For this reason, it is best to avoid applying Heligen if heavy rain is expected within one hour following application. However, do not delay application if only moderate rain is expected, or heavy rain (greater than 0.4 inches per hour) is not imminent.

## **DAYS TO HARVEST**

There are no restrictions on applying Heligen up to the time of harvest.

## **WARRANTY**

This product is warranted to contain the amount of active ingredients as described in this label and that the product will be as effective as intended if properly transported, used, and applied per the label instructions. The effectiveness of this product may be degraded by improper storage, transportation or handling and may be subject to environmental factors out of AgBiTech Pty Ltd's control. The user must monitor the performance of the product as climatic, geographical or biological variables and/or developed resistance may affect the results obtained. To the extent consistent with applicable law, AgBiTech Pty Ltd and its subsidiaries makes no other warranties, express or implied, of merchantability or of fitness for a particular purpose or otherwise, that extend beyond the statements made on this label or accepts no responsibility in respect of this product. To the extent consistent with applicable law, AgBiTech Pty Ltd and its subsidiaries disclaim any liability whatsoever for special, incidental or consequential damages resulting from the use or handling of this product.

**Manufactured for AgBiTech Pty Ltd,  
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LIFT  
HERE

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