



Introduction

Weed Control



Plant Growth Regulator

Foliar Fungicides

Seed Treatments

# 2026 GUIDE TO CROP PROTECTION

For the chemical management of weeds, plant diseases and insects

**This publication is only a guide intended for the use of Saskatchewan growers. Always refer to the product label for application details and precautions. If information in this publication conflicts with the label, use the label directions.**

[saskatchewan.ca/agriculture](http://saskatchewan.ca/agriculture)



Insect Control

# Insect Control

## Additional Resources

For additional information on monitoring, economic thresholds and biological control of insects in field crops, as well as information on insect management in commodities other than those covered in this guide, see the WCCP Guide to Integrated Control of Insect Pests of Crops at <https://www.westernforum.org/wccp-control-guidelines/>.

## Insect Management Decisions

Crop rotations, cultivar selections, and seeding dates can be chosen to reduce the risk of injury from some insects that may be of higher risk to a crop. Management of insects with insecticides should only be considered when numbers or damage exceed economic thresholds. To select an insecticide, verify the registered products for the insect and field crop in the following insect management charts. Consideration should then be given to the preharvest intervals, beneficial insects that may be present, how the product will be applied, restrictions, precautions and the hazard rating.

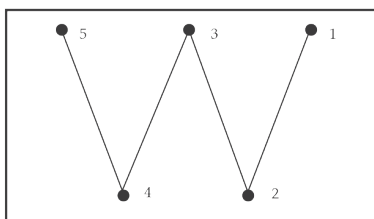
## Pre-harvest Interval

The **pre-harvest interval** is the number of days that must pass between the last application of a pesticide and harvest. Harvest is the cutting of the crop or removal of the produce from the plant. It includes direct-combining, cutting (swathing) or grazing; it does not include swath-combining or baling for hay.

## Field Scouting

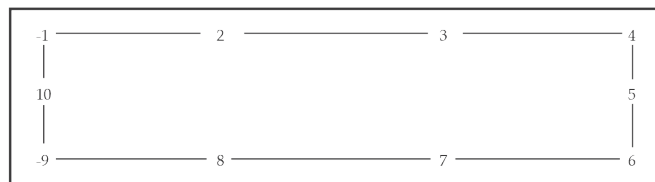
Field scouting is the regular examination of fields to accurately assess the kind and the number of insects, plant pathogens and weeds present and the amount of damage being done. Scouting should be done weekly during the growing season and more frequently when infestations approach economic levels or when weather conditions favour the rapid development of specific pests.

To properly scout for insects that feed on crops or are beneficial, you must know when they occur, where they live, what they look like, and how to find and count them. The number of locations to assess in a field will depend on the field size, and any specific pests that may be of concern. Generally a minimum of 5 sites should be sampled; however, some insects may require more sites to be sampled to accurately make management decisions.



There are several possible scouting patterns that can be used when checking fields. These options are based on insect distribution and field configuration.

- **Pattern 1:** Used when insects are uniformly distributed.
  - This scouting pattern typically looks like an X, Z or W, excluding field edges. Insects that fit this pattern include aphids, bertha armyworm and diamondback moth.



- **Pattern 2:** Used when insects are generally more abundant at the edges of fields.
  - Scout by walking along field edges, fence lines or ditches. Some examples of when you would include more focused scouting along field edges are to estimate early-season populations of flea beetles, Colorado potato beetles and grasshoppers.

In each area examined, use of a sweep net, if possible, is a good way to determine what potential crop feeding and beneficial insects may be present. This should be followed by examining some plants and the soil surface. More specific counts of a particular type of insect or plant damage may be necessary if they are abundant during the more general scouting.

## Economic Thresholds

Monitoring methods, typical symptoms, and economic thresholds or nominal thresholds for the more common crop pests are described in the field scouting section for each commodity. The smallest number of insects (or level of injury) that cause damage equal to the pest management costs is called the **economic injury level**. The **economic threshold** is the density of insects (or level of injury) at which control measures should be applied to prevent an increasing population from reaching the economic injury level. Note that factors such as moisture, temperature conditions and stage of crop growth, can increase or decrease the impact of insects on crop production. In some instances, nominal thresholds are presented; these decision guidelines are based on experience rather than research quantifying the impact of the insects on the crop.

## Estimating Percent Defoliation

Many economic thresholds for insects are based on percent defoliation of the plants they are feeding on. The following figure may assist in determining the percent defoliation. Although the following photo is of sunflower leaves, this figure can be used to estimate percent defoliation for many crops.

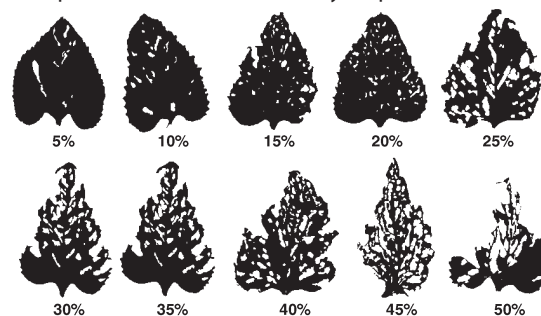


Photo courtesy of North Dakota State University Extension

## Hazard Ratings and Residual Times of Insecticides to Bees

The following table can be used to assist in selecting an insecticide to apply to fields where either the crop or weeds may be flowering at the time of application. Residual time indicates the length of time the residue of the product remains toxic to bees after application. **These times are to be used as general guidelines only.** Environmental conditions influence the rate at which pesticides degrade.

INSECTICIDE	HAZARD RATING <sup>a</sup>		RESIDUE HAZARD (DAYS) <sup>b</sup>
	HONEY BEE	LEAFCUTTER BEE	
<b>Least Hazardous Insecticides to Bees (no label precautions for bees)</b>			
<i>Dipel</i>	3	3	none
<i>Eco bran</i>	3	3	N/A
<i>Coragen MaX/Shenzi/Cosayr/Vermis/Rorvik/Maxunitech Chlorantraniliprole</i>	3	-	<3 hours
<i>Carbine/Beleaf</i>	3	-	<1
<b>Moderately to Highly Hazardous to Bees (see label for precautions to bees)</b>			
<i>Assail/Aceta</i>	1 to 2	-	<1
<i>Delegate</i>	1 to 2	1	3 hours
<i>Closer</i>	-	-	3 hours
<i>Decis/Poleci/Advantage Deltamethrin 5 EC/Decimate/Rauma</i>	1 to 2	1 to 2	<8 hours
<i>Rimon</i>	1 to 2	2	1
<i>Success/Entrust</i>	1 to 2	1	<1 to >1
<i>Admire</i>	1	1 to 2	<1 to >1
<i>Matador/Silencer/Labamba/Zivata</i>	1	1	>1
<i>Oberon</i>	1 to 2	1	-
<i>Movento</i>	1	-	-
<i>Cimegra</i>	1	1	-
<i>Agri-mek</i>	1 to 3	2	<1 to 3
<i>UP-Cyde/Ship</i>	1	1	<1 to >3
<i>Ambush/Pounce/Perm-UP/IPCO Syncro</i>	1	1	<1 to 5
<i>Imidan</i>	1	1	1 to 5
<i>Malathion</i>	1 to 2	1	2 (honey bee), 6 (leafcutter bee)
<i>Sevin</i>	1 to 2	1 to 2	>1 to 7
<i>Cygon/Lagon/Diamante 4</i>	1	1	3 to 7

<sup>a</sup> HAZARD RATING 1 = Very poisonous to bees; DO NOT apply to crops or weeds in bloom unless bees are kept off for the period that residue on the crop is a hazard. 2 = Moderately poisonous to bees; avoid direct application to bees, but may be applied with minimum hazard in late evening when bees are not foraging. 3 = Not very poisonous to bees; may be applied with minimum hazard to bees.

<sup>b</sup> Residue hazard represents the average time in days that residues poisonous to honey bees will remain on foliage (may vary with formulation and weather). Unusually low temperatures following spray application may cause residues to remain toxic longer than under warmer conditions. Morning dew can also make residues more toxic to foraging bees. A more extensive list of hazard ratings of insecticides to bees and duration of toxicity can be found at the Western Committee on Crop Pests website at: <https://www.westernforum.org/WCCP%20Guidelines.html>.

## Reducing Bee Losses from Insecticides

Careless use of insecticides can kill bees and other beneficial insects such as pollinators, predatory and parasitic biological control insects. Help to reduce insecticide poisoning of bees by:

- 1. Avoid applying insecticides that are toxic to bees when crops are in bloom.** Any field with even a small amount of bloom, whether it is the main crop, cover crop, or weeds will probably have foraging bees visiting the flowers. If at all possible, apply insecticides before or after the crop has gone into bloom. Control all flowering weeds prior to insecticide application.
- 2. Apply insecticides when bees are least active.** The highest level of bee activity occurs during the day. Apply insecticides in late evening or early morning when the bees are not foraging. As a general rule, evening applications are less hazardous to bees than morning applications. DO NOT apply insecticides if unusually low temperatures or heavy dew are forecast following application, because residuals typically remain toxic to bees longer under these conditions.
- 3. Minimize insecticide drift.** To avoid insecticides drifting into non-target locations, DO NOT apply insecticides during windy conditions. Choose nozzles with a low drift rating. As a general rule, ground applications of insecticide are less prone to drift than aerial applications. When planting insecticide treated seeds, reduce the movement of dust from the seeding equipment to flowering crops, weeds and water sources that are in or adjacent to the field being seeded. If seeding equipment may potentially generate dust, controlling flowering weeds in the field prior to seeding may reduce pollinators being attracted to the field.
- 4. Contact the beekeeper before spraying.** Communication and cooperation between the insecticide applicator and the beekeeper can usually prevent bee losses. Notifying the beekeeper in advance (e.g. 48 hours) of applying insecticides will allow the beekeeper to move or protect the colonies from insecticide damage. The web-based mapping tool FieldWatch (<https://fieldwatch.com>) can be used to facilitate communication between farmers, beekeepers and pesticide applicators. FieldWatch enables beekeepers and crop producers (organic and conventional) to use a secure online registry to identify and map the locations of apiaries and crop fields that pesticide applicators should avoid.
- 5. If possible, use insecticides and/or insecticide formulations which are the least hazardous to bees.** The table "Hazard Ratings of Insecticides to Bees" will help in selecting the least hazardous insecticide. In general, dusts are more hazardous to bees than sprays. Wettable powders are more hazardous than emulsifiable concentrates (EC) or water-soluble formulations. Granular insecticides and spreadable bran bait insecticides are generally the least hazardous to bees.

## Insecticide Poisoning in Humans

Organophosphate (OP) and carbamate insecticides (identified on the Insecticide Groups chart) can pose a serious risk to unprotected persons. Poisonings can occur while mixing, loading and/or during the application of these products without the appropriate protective equipment or measures. These pesticides are readily absorbed through the skin or the lungs, and can act as nervous system toxins. Overexposure can produce symptoms such as headache, nausea, pupil dilation and excessive sweating and salivation. Higher doses may cause breathing difficulties, muscle twitching, weakness and spasms. Very high doses have caused respiratory failure and death.

Both OP and carbamate pesticides inhibit an enzyme called cholinesterase. Measurements of cholinesterase in the blood before and during the application season can indicate harmful exposures to OPs and carbamates. **Persons who intend to mix, load and/or apply these types of pesticides repeatedly during a season, need a baseline and repeat measurements. Consult your doctor before the spraying season to arrange for these measurements.**

### Degree of Risk and Hazard Rating:

(see introduction for full description on symbols and ratings)

## Resistance of Insects to Insecticides

Repeated use of the same insecticide, or insecticides with the same mode of action, against a particular insect in a given area may result in the effectiveness of the insecticide being reduced. To delay or prevent resistance of insects to insecticides:

1. Integrate different control methods (cultural, biological, chemical) into insect control programs whenever possible,
2. Use insecticides only when the economic threshold for a pest has been surpassed and natural controls fail to limit economic damage,
3. Rotate between insecticides with different modes of action, particularly if several applications are made in a season, and
4. Keep accurate records of insecticides used for each of your fields.

Insecticides can be classified according to their similarity in chemical structure (chemical group in the table below), and by mode of action (the process by which the insecticide kills the insect). The "Group" column in the following table separates insecticides based on their mode of action. By selecting products with different modes of action for an insecticide rotation program, risk of insecticide resistance can be reduced.

## Insecticide Groups Based on Modes of Action

GROUP	CHEMICAL GROUP	TRADE NAME	ACTIVE INGREDIENT	MODE OF ENTRY
1A	Carbamates	<i>Sevin XLR, Eco Bran</i>	carbaryl	contact/ingestion ( <i>Sevin XLR</i> ) ingestion ( <i>Eco Bran</i> )
1B	Organophosphates	<i>Malathion</i>	malathion	contact
		<i>Imidan</i>	phosmet	contact/ingestion
		<i>Lagon, Cygon, Diamante 4</i>	dimethoate	contact/ingestion
		<i>Thimet 20-G</i>	phorate	ingestion
3A	Pyrethroids	<i>Decis, Poleci, Advantage Deltamethrin 5 EC, Decimate, Rauma, Concept* (3A + 4A), Sivanto Energy* (3A + 4D)</i>	deltamethrin	contact/ingestion
		<i>UP-Cyde, Ship</i>	cypermethrin	contact/ingestion
		<i>Matador, Silencer, Labamba, Zivata, Voliam Xpress* (3A + 28)</i>	lambda-cyhalothrin	contact/ingestion
		<i>Ambush, Pounce, Perm-UP, IPCO Syncro</i>	permethrin	contact/ingestion
4A	Neonicotinoids	<i>Helix, Cruiser Actara 240SC Actara 25WG, Minecto Duo* (4A + 28)</i>	thiamethoxam	ingestion ingestion contact/ingestion
		<i>Admire, Raxil PRO Shield, Trilex EverGol Shield, Concept* (3A + 4A)</i>	imidacloprid	contact/ingestion (flowable formulations), ingestion (seed treatments)
		<i>Assail, Aceta, Cormoran* (4A + 15)</i>	acetamiprid	contact/ingestion
		<i>Prosper, Modalex 600, Poncho, NipsIt, Titan</i>	clothianidin	ingestion
4C	Sulfoximines	<i>Closer</i>	sulfoxaflor	contact/ingestion
4D	Butenolides	<i>Sivanto Prime, BUTEO start, Sivanto Energy* (3A + 4D)</i>	flupyradifurone	contact/ingestion
5	Spinosyns	<i>Success, Entrust, Scorpio Ant and Insect Bait</i>	spinosad	contact/ingestion ( <i>Success, Entrust</i> ), ingestion ( <i>Scorpio Ant and Insect Bait</i> )
		<i>Delegate</i>	spinetoram	contact/ingestion
6	Avermectins, Milbemycins	<i>Agri-mek, Minecto Pro* (6 + 28)</i>	abamectin	contact/ingestion
9D	Pyropenes	<i>Sefina</i>	Afidopyropen	contact
11A	Microbial disruptors of insect midgut membranes	<i>Dipel, Bioprotec</i>	<i>Bacillus thuringiensis var. Kurstaki</i>	ingestion
15	Benzoylureas	<i>Rimon, Cormoran* (4A + 15)</i>	novaluron	ingestion/contact
18	Ecdysone receptor agonists	<i>Intrepid</i>	methoxyfenozide	
23	Tetronic and tetramic acid derivatives	<i>Movento</i>	spirotetramat	
		<i>Oberon</i>	spiromesifen	contact
24A	Phosphides	<i>Phostoxin, Fumitoxin</i>	aluminum phosphide	inhalation (fumigant)
28	Diamides	<i>Coragen MaX, Shenzi, Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole, Lumivia CPL, Lumivia, Voliam Xpress* (3A + 28)</i>	chlorantraniliprole	ingestion mainly
		<i>Lumiderm, Verimark, Fortenza, Exirel, Minecto Duo* (4A + 28), Minecto Pro* (6+ 28)</i>	cyantraniliprole	ingestion
		<i>Harvanta</i>	cyclaniliprole	contact/ingestion
		<i>Vayego</i>	tetraniliprole	contact/ingestion

GROUP	CHEMICAL GROUP	TRADE NAME	ACTIVE INGREDIENT	MODE OF ENTRY
29	Flonicamid	<i>Carbine, Beleaf</i>	flonicamid	contact/ingestion
30	Meta-diamides, isoxazolines	<i>Teraxxa F4, Cimegra</i>	broflanilide	
31	Baculoviruses	<i>Plutex</i>	Plutella xylostella granulovirus	ingestion
UNF	Fungal Agents of unknown or uncertain MOA	BioTitan	Beauveria bassiana	
UNM	Non-specific mechanical and physical disruptors	<i>Protect-it</i>	diatomaceous earth	
		Superior 70 Oil	mineral oil	

A more detailed table showing insecticides organized by mode (site) of action, and specific information on the mode (site) of action for the different groups can be found on the Insecticide Resistance Action Committee website at: <https://irac-online.org/mode-of-action/>.

\*Product contains more than one active ingredient and appears in more than one group.

## Field Scouting and Insect Management Charts

### Field Scouting in Alfalfa

#### Sap Or Fluid Feeders

- **Lygus bugs/Alfalfa plant bug**
  - **Typical Damage:** Field blooms poorly or not at all. Flower buds blasted, whitish, and dry; flowers dropping off before fully open. Collapsed seed.
  - **When and How to Monitor:** Look for plant bugs when monitoring alfalfa in June through mid-August. Make five 180° sweeps with a 15 inch (40 cm) insect net through alfalfa canopy at each sampling site. Record total number of plant and lygus bugs (both nymphs and adults) captured. Calculate average number per sweep.
  - **Economic Threshold:** Hay: Control not recommended. Seed alfalfa at bud and early bloom: 8 lygus bugs per sweep (40 in 5 sweeps); 4 alfalfa plant bugs per sweep; or 5 bugs if the plant bug population is a combination of lygus bugs and alfalfa plant bug. If insecticides are used, attempt to spray before the onset of bloom. Protecting insect pollinators in seed production fields is very important.
- **Potato Leafhopper**
  - Leafhoppers are most severe in new seedings and in regrowth under hot dry weather.
  - **When and How to Monitor:** Take 20, 180° sweeps from 5 areas of the field. Avoid field edges. Determine the average number of potato leafhoppers per sweep.
  - **Economic Threshold:** For 9 cm stem height = 0.2 adult leafhoppers per sweep; 15 cm stem height = 0.5 adults per sweep; 25 cm stem height = 1 adult or nymph per sweep; 36 cm stem height = 2 adults or nymphs per sweep.
- **Pea Aphid**
  - **Typical Damage:** Suck juices from plants; stunt growth; cause premature drying.
  - **When and How to Monitor:** Look for when monitoring in July through August. Take 5 sweeps at each location. Monitor fields closely during periods of slow plant growth.
  - **Economic Threshold:** 100 to 200 aphids per 180° sweep when crop is moisture stressed, or until mid-August.

#### Defoliators

- **Alfalfa Weevil**
  - **Typical Damage:** Feed on developing buds and leaves. Stunt growth.
  - **When and How to Monitor:** Start scouting fields in mid-May. Look for shot holes initially, then clipping along the edges of leaves and pinhole damage. For determining if levels are at threshold in hay crops, collect 30 stems in an M-shaped pattern, place them inside a white pail and beat them against the side to knock off larvae. DO NOT include younger first and second instar larvae (3 mm or less) in the counts. Determine the average height of the crop as well.
  - **Economic Threshold:**
    - **Alfalfa Hay:** One of the best control strategies is to cut fields for hay early. If early cutting of the hay crop is not possible, treatment thresholds are based on the following measurements of plant height and levels of larvae: <30 cm to 1 larva per stem; <40 cm to 2 larvae per stem; 3 larvae per stem is generally economical to control regardless of height of crop. On regrowth for second crop, 2 or more active larvae per crown (4 to 8 larvae per square feet) will require insecticide application.
    - **Alfalfa Seed:** 20 to 30 3<sup>rd</sup> or 4<sup>th</sup> instar larvae per sweep (90° = straight sweep) or 35 to 50 percent of foliage tips showing damage. In some instances it may be practical to just treat hotspots and not entire fields.

## Alfalfa Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (Days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Belowground and Surface Feeders</b>					
Cutworms	<i>Coragen MaX</i>	34 mL	0	G	>5,000
<b>Sap or Fluid Feeders</b>					
Lygus bugs	<i>Carbine/Beleaf 50SG</i> (F)	81 to 121 g	7	G	>2000
	<i>Rimon</i> (seed production only) (SB)	338 mL	14	G	3,914 to >5000
	<i>Cormoran</i> (seed production only) (SB + N)	304 to 364 mL	14	G	>2000
	<i>Assail/Aceta</i> (seed production only) (N)	35 to 69 g	1	G	1064
	<i>Matador/Silencer/Labamba/Zivata</i> (seed production only) (P)	34 mL	DO NOT cut treated fields for hay or forage; do not graze treated fields.	A or G (Matador/ <i>Labamba</i> ) G ( <i>Silencer/ Zivata</i> )	56 to 98
	<i>Decis 100 EC/ Advantage Deltamethrin 5 EC/Poleci</i> (seed production only) (P)	41 to 51 mL ( <i>Decis 100 EC</i> ) 81 to 101 mL ( <i>Advantage Delta...5 EC</i> ) 162 to 202 mL ( <i>Poleci</i> )	20	G	>300 to 2000
	<i>Malathion 85E</i> (OP)	0.445 to 0.544 L	7	A or G	>550
	<i>Cygon 400EC/Cygon 480-AG/ Diamante 4</i> (OP) (seed and forage production)	206 mL ( <i>Cygon 400EC</i> ) 170 mL ( <i>Cygon 480-AG, Diamante 4</i> )	2 ( <i>Cygon 400-AG</i> ) 10 ( <i>Cygon 400, Diamante 4</i> )	A or G	245 to 550
<i>Lagon/Cygon 400EC/Cygon 480-AG/ Diamante 4</i> (OP) (seed production only)	440 mL ( <i>Lagon, Cygon 480-AG, Diamante 4</i> ) 534 mL ( <i>Cygon 400EC</i> )	28	A or G	245 to 550	
Alfalfa plant bug	<i>Cormoran</i> (seed production only) (SB + N)	304 to 364 mL	14	G	>2000
	<i>Assail/Aceta</i> (seed production only) (N)	35 to 69 g	1	G	1064
	<i>Lagon/Cygon 400EC/Cygon 480-AG/ Diamante 4</i> (OP) (seed production only)	440 mL ( <i>Lagon, Cygon 480-AG, Diamante 4</i> ) 534 mL ( <i>Cygon 400EC</i> )	28	A or G	245 to 550
Potato leafhopper	<i>Sefina</i> (PP) (suppression only)	81 to 162 ml	0	A or G	>2,000
	<i>Sivanto Prime</i> (B)	202 to 304 mL	7	G	>2000
	<i>Matador/Silencer/Labamba/Zivata</i> (seed production only) (P)	34 mL	DO NOT cut treated fields for hay or forage; do not graze treated fields.	A or G ( <i>Matador/ Labamba</i> ) G ( <i>Silencer/Zivata</i> )	56 to 98
	<i>Malathion 85E</i> (OP)	0.445 to 0.544 L	7	A or G	>550
	<i>Lagon/Cygon 400EC/Cygon 480-AG/ Diamante 4</i> (OP)	170 mL ( <i>Lagon, Cygon 480-AG, Diamante 4</i> ) 206 mL ( <i>Cygon 400EC</i> )	2 ( <i>Cygon 480-AG</i> ) 10 ( <i>Lagon, Cygon 400 EC, Diamante 4</i> )	A or G	245 to 550
Spittlebugs	<i>Malathion 85E</i> (OP) (adults)	0.445 to 0.544 L	7	A or G	>550

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (Days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
Pea aphid	<i>Sefina</i> (PP)	81 ml	0	A or G	>2,000
	<i>Carbine/Beleaf 50SG</i> (F)	49 to 65 g	7	G	>2000
	<i>Sivanto Prime</i> (B)	202 to 304 mL	7	G	>2000
	<i>Matador/Silencer/Labamba/Zivata</i> (seed production only) (P)	34 mL	DO NOT cut treated fields for hay or forage; do not graze treated fields.	A or G ( <i>Matador/ Labamba</i> ) G ( <i>Silencer/Zivata</i> )	56 to 98
	<i>Malathion 85E</i> (OP)	0.445 to 0.544 L	7	A or G	>550
	<i>Lagon/Cygon 400EC/Cygon 480-AG/ Diamante 4</i> (OP)	170 mL ( <i>Lagon, Cygon 480-AG, Diamante 4</i> ) 206 mL ( <i>Cygon 400EC</i> )	2 ( <i>Cygon 480-AG</i> ) 10 ( <i>Lagon, Diamante 4, Cygon 400 EC</i> )	A or G	245 to 550
Spider mites	<i>Malathion 85E</i> (OP)	0.445 to 0.544 L	7	A or G	>550
	<i>Oberon</i> (TT)	0.202 to 0.405 L		A or G	>2000
<b>Defoliators</b>					
Grasshoppers	<i>Coragen MaX Shenzi Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole</i> (D)	17 to 33.5 mL 25.5 to 50.6 mL 51 to 101 mL	0	G	>5000
	<i>Matador/Silencer/Labamba/Zivata</i> (seed production only) (P)	25 to 34 mL (ground) 34 mL (air)	DO NOT cut treated fields for hay or forage; do not graze treated fields.	A or G	56 to 98
	<i>Decis 100 EC</i> (seed production only) (P)	20 to 30 mL	20	G	633
	<i>Malathion 85E</i> (OP)	0.445 to 0.544 L	7	A or G	>550
	<i>Lagon/Cygon 400EC/Cygon 480-AG/ Diamante 4</i> (OP)	Nymphs: 220 mL ( <i>Lagon, Cygon 480-AG, Diamante 4</i> ), 267 mL ( <i>Cygon 400EC</i> ). Adults: 340 to 360 mL ( <i>Lagon, Cygon 480-AG, Diamante 4</i> ), 413 to 437 mL ( <i>Cygon 400EC</i> ).	10 (nymphs) 28 (adults)	A or G	245 to 550
Alfalfa weevil	If alfalfa has reached the bud or early bloom stage, immediate <b>cutting</b> will kill many alfalfa weevil larvae.				
	<i>Coragen Max Shenzi Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole</i> (suppression only) (D)	50.5 to 67.5 mL 76 to 101 mL 152 to 202 mL	0	G	>5000
	<i>Assail</i> (seed production only) (N)	69 g	1	G	1064
	<i>Matador/Silencer/Labamba/ Zivata</i> (seed production only) (P)	34 mL	DO NOT cut treated fields for hay or forage; do not graze treated fields.	A or G ( <i>Matador/ Labamba</i> ) G ( <i>Silencer/Zivata</i> )	56 to 98

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (Days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
Alfalfa weevil, <i>continued</i>	<i>Decis 100 EC/ Advantage Deltamethrin 5 EC/ Poleci (seed crops only) (P)</i>	41 to 51 mL ( <i>Decis 100 EC</i> ) 81 to 101 mL ( <i>Advantage Delta...5 EC</i> ) 162 to 202 mL ( <i>Poleci</i> )	20	G	>300 to 2000
	<i>Malathion 85E (larvae only) (OP)</i>	0.445 to 0.544 L	7	A or G	>550
	<i>Lagon/Cygon 400EC/Cygon 480-AG/ Diamante 4 (OP) (reduction only)</i>	170 mL ( <i>Lagon, Cygon 480-AG, Diamante 4</i> ) 206 mL ( <i>Cygon 400EC</i> )	2 ( <i>Cygon 480-AG</i> ) 10 ( <i>Lagon, Diamante 4, Cygon 400 EC</i> )	A or G	245 to 550
<b>Leafminers</b>					
Alfalfa blotch leafminer	<i>Malathion 85E (OP)</i>	0.544 L	7	A or G	>550
	<i>Lagon/Cygon 400EC/Cygon 480-AG/ Diamante 4 (OP)</i>	220 mL ( <i>Lagon, Cygon 480-AG, Diamante 4</i> ) 267 mL ( <i>Cygon 400EC</i> )	10	A or G	245 to 550

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

<sup>1</sup> Insecticide Group: M=microbials, SB=substituted benzoylurea, B=butenolides, F=flonicamid, N=neonicotinoids, P=pyrethroids, PP=pyropenes, C=carbarnates, OP=organophosphates, TT=tetronic and tetramic acid derivatives.

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

## Barley – See Small Grain Cereals

### Scouting for insects in Beans (Dry Beans)

#### Belowground Feeders and Cutworm

- **Seedcorn Maggot**
  - **Typical Damage:** Seedcorn maggot attacks bean seed, preventing sprouting or weakening seedlings. The yellowish white maggot is found burrowing in the seeds or emerging stem. Seedcorn maggots are usually most severe in wet, cold seasons and on high organic matter soils.
- **Cutworm**
  - **When and How to Monitor:** To find cutworm, dig in the soil to a depth of 2.5 to 5 cm at the base of recently damaged plants.
  - **Nominal Threshold:** Treatment is warranted when one cutworm or more is found per metre of row and the larvae are still small (less than 2 cm long).

#### Sap Feeders

- **Leafhoppers**
  - **Typical Damage:** Foliage becomes dwarfed, crinkled, and curled. Small triangular brown areas appear at the tips of leaves, gradually spreading around the entire leaf margin.
  - **When and How to Monitor:** Leafhopper adults are quick and can be observed by running your hand over the top of the plants as you approach them and observing adults that fly off the plants. On the same plants, turn over each leaf to determine the number of nymphs per trifoliolate.
  - **Economic Threshold:** Unifoliolate stage – 0.25 leafhoppers per trifoliolate; second trifoliolate stage – 0.5 leafhoppers per trifoliolate; fourth trifoliolate stage – 1.0 leafhopper per trifoliolate; first bloom – 2.0 leafhoppers per trifoliolate.

#### Defoliators

- **Grasshoppers**
  - **Economic Threshold:** Substantial yield loss does not occur until up to 35 percent defoliation occurs before bloom and 15 percent after bloom.

## Beans (Dry) Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate/Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Belowground and Surface Feeders</b>					
Wireworms	<i>Cruiser 5FS</i> (N)	83 mL/100 kg seed	Must be applied in commercial seed treatment facilities.		
	<i>Trilex EverGol Shield</i>	A seed treatment containing <i>Stress Shield 600</i> and 3 fungicides.			
	<i>Scorpio Ant and Insect Bait</i> (suppression) (Sp)	10 to 20 kg	Incorporate into the soil at planting to a depth of 10 to 20 cm.		
Seedcorn maggot	Sow seeds as shallow as possible in a warm, well-prepared seedbed. If manure is used, apply and plow it under the previous fall.				
	<i>Cruiser 5FS</i> (N)	50 to 83 mL/100 kg seed	Must be applied in commercial seed treatment facilities.		
Cutworms	<i>Lumivia CPL</i> (D) <sup>3</sup>	32 to 64 mL/100 kg seed	Seed treatment		>5000
	<i>Scorpio Ant and Insect Bait</i> (black cutworm) (Sp)	10 to 20 kg	28	G	
	<i>Coragen MaX</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech Chlorantraniliprole</i> (D)	33.5 mL 50.6 mL 101 mL	1	A or G	>5000
	<i>Matador/Silencer/Labamba/Zivata</i> (P)	34 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> )	A or G	56 to 98
	<i>Decis 100 EC</i> (P)	41 mL	7	A or G	633
<b>Sap or Fluid Feeders</b>					
Lygus bugs	<i>Carbine</i> (F)	81 g	7	G	>2000
	<i>Matador/Silencer/Labamba/Zivata</i> (P)	34 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> )	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 mL	14. Do not feed treated crop to livestock.	A or G	98
	<i>Decis 100 EC</i> (P)	41 mL	7	A or G	633
	<i>Sevin XLR</i> (C)	2.12 to 2.59 L	5	G	699
	<i>Cygon 400EC/Cygon 480-AG/Diamante 4</i> (OP)	280 to 400 mL ( <i>Cygon 480-AG, Diamante 4</i> ) 340 to 486 mL ( <i>Cygon 400EC</i> )	7	G	245 to 550
Potato leafhopper	<i>Sivanto Prime</i> (B)	202 to 304 mL	7	A or G	>2000
	<i>Matador/Silencer/Labamba/Zivata</i> (P)	34 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> )	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 mL	14. Do not feed treated crop to livestock.	A or G	98
	<i>Sevin XLR</i> (C)	1.01 L	5	G	699
	<i>Cygon 400EC/Cygon 480-AG/Diamante 4</i> (OP)	280 to 400 mL ( <i>Cygon 480-AG, Diamante 4</i> ) 340 to 486 mL ( <i>Cygon 400EC</i> )	7	G	245 to 550
Aphids	<i>Carbine</i> (F)	49 to 65 g	7	G	>2000
	<i>Movento</i> (TT)	75 to 111 mL	7	G	>2000
	<i>Sivanto Prime</i> (B)	202 to 304 mL	7	A or G	>2000

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate/Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Aphids, continued</b>	<i>Matador/Silencer/Labamba/Zivata</i> (P)	34 to 94 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> )	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 to 223 mL	14. Do not feed treated crop to livestock.	A or G	98
	<i>Silencer Duo</i> (D+P) <i>Silencer Duo A</i> <i>Silencer Duo B</i>	51 to 116 mL 34 to 76 mL	21 days	A or G	N/A
	<i>Malathion 85E</i> (OP)	0.297 to 0.544 L	3	G	>550
	<i>Cygon 400EC/Cygon 480-AG/ Diamante 4</i> (OP)	280 to 400 mL ( <i>Cygon 480-AG, Diamante 4</i> ) 340 to 486 mL ( <i>Cygon 400EC</i> )	7	G	245 to 550
<b>Spider mites</b>	<i>Oberon</i> (TT)	202 to 243 mL	10	A or G	>2000
	<i>Cygon 400EC/Cygon 480-AG/ Diamante 4</i> (OP)	280 to 400 mL ( <i>Cygon 480-AG, Diamante 4</i> ) 340 to 486 mL ( <i>Cygon 400EC</i> )	7	G	245 to 550
<b>Defoliators and Borers</b>					
<b>Grasshoppers</b>	<b>Spreadable Bran Baits</b>				
	<i>Eco bran</i> (C)	0.8 to 1.6 kg	5	G	N/A
	<b>Sprays</b>				
	<i>Coragen MaX Shenzi Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole</i> (D)	17 to 33.5 mL 25.5 to 50.6 mL 51 to 101 mL	1	A or G	>5000
	<i>Voliam Xpress</i> (D+P)	91 mL	14. Do not feed treated crop to livestock	A or G	98
	<i>Silencer Duo</i> (D+P) <i>Silencer Duo A</i> <i>Silencer Duo B</i>	51 mL 34 mL	21 days	A or G	N/A
	<i>Decis 100 EC</i> (P)	20 to 30 mL	7	A or G	633
<b>European corn borer</b>	<i>Coragen MaX Shenzi Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole</i> (D)	33.5 to 50.5 mL 50.6 to 76.1 mL 101 to 152 mL	1	A or G	>5000
	<i>Intrepid</i> (E)	121 to 243 mL	7	G	>5000
	<i>Matador/Silencer/Labamba/Zivata</i> (P)	34 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> )	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	202 mL	14. Do not feed treated crop to livestock.	A or G	98

**ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.**

<sup>1</sup> Insecticide Group: F=flonicamid, D=diamides, E=ecdysone receptor agonists, N=neonicotinoids, P=pyrethroids, C=carbamates, OP=organophosphates, TT= tetronic and tetramic acid derivatives.

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

<sup>3</sup> Do not make a subsequent foliar application of any group 28 insecticide for a minimum of 60 days after planting seed treated with Lumivia CPL.

## Buckwheat Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Belowground and Surface Feeders</b>					
Cutworms	<i>Fortenza</i>	33-50 mL/100 kg seed		Seed Treatment	>5,000
	<i>Coragen MaX</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole (D)</i>	33.5 mL 50.6 mL 101 mL	1	A or G	>5000
<b>Defoliators</b>					
Grasshoppers	<i>Coragen MaX</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole (D)</i>	17.0 to 33.5 mL 25.5 to 50.6 mL 51 to 101 mL	1	A or G	>5000

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

<sup>1</sup> Insecticide Group: D=diamides

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

## Scouting for insects in Canaryseed

Sap Feeders

- **Aphids**

- **When and How to Monitor:** Start checking for aphids when monitoring during the early heading stage of canaryseed. The head should be bent and closely inspected for aphids hiding along the small stem inside the canaryseed head. Also check the stems, underside of leaves, and in the canaryseed boot.
- **Nominal Threshold:** 10 to 20 aphids on 50 percent of the stems prior to the soft dough stage.

## Canaryseed Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Sap Feeders</b>					
Aphids	<i>Lagon/Cygon 400EC/Cygon 480-AG/ Diamante 4 (OP)</i>	200 mL ( <i>Lagon,</i> <i>Cygon 480-AG,</i> <i>Diamante 4</i> ) 242 mL ( <i>Cygon 400EC</i> )	21	A or G	245 to 550
	<i>Malathion 85E (OP)</i>	0.277 L	14	A or G	>550

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

<sup>1</sup> Insecticide Group: OP=organophosphates

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

## Field Scouting in Canola

### Scouting Calendar

**Early-season:** Flea beetles, cutworm, red turnip beetle, diamondback moth

**Mid-season:** Diamondback moth, cabbage seedpod weevil, grasshoppers

**Late season:** Bertha armyworm, diamondback moth, Lygus bugs, grasshoppers, alfalfa looper

- **Cutworm**

- **Typical Damage:** Notched, wilted, dead, or cut-off plants (weed or crop seedlings). Plants missing from rows, bare

patches appearing in field.

- **When and How to Monitor:** Look for cutworm, and evidence of cutworm feeding, when monitoring canola in May and June. Often cutworms will be close to the cut or shriveled plants that they have just damaged. Cutworm will sometimes be most abundant in patches or a specific area of a field.
- **Nominal Threshold:** 25 to 30 percent stand reduction. Sometimes it is most economical to just treat infested patches, and not whole fields.

## Sap Or Fluid Feeders

- **Lygus bugs**

- **Typical Damage:** Attacked buds appear shrunken and bleached white. Damaged seeds appear dark brown and shriveled.
- **When and How to Monitor:** Monitor from when flowering is complete until seeds within the pod have become firm. Make 10 sweeps with a 38 cm diameter insect net at each of at least 5 sampling site. If while doing these samples populations appear to be of concern, take additional samples; a minimum of 15 samples is needed to accurately determine whether controls are economical. Sample canola for lygus bugs on a sunny day when the temperature is above 20°C and the crop canopy is dry.
- **Economic Threshold:** A threshold of 20 to 30 per 10 sweeps is suitable for good growing conditions. Using the lower end of the threshold (about 20 per 10 sweeps) may be appropriate for stressed canola with less ability to compensate for feeding. When most pods become leathery and when seeds inside are firm, lygus bugs can no longer penetrate the pods or seeds with their mouthparts and are no longer an economic threat. When precipitation is greater than 100 mm from the onset of bud formation to the end of flowering, the crop may partially compensate for plant bug damage.

- **Aphids**

- **Economic Threshold:** Control aphids in canola if densities exceed 25 aphids per 10 cm shoot tip after flowering.

## Defoliators

- **Flea beetles**

- **Typical Damage:** Shot-holes in leaves to complete destruction of seedling plants in late May through June. Holes chewed in pods in August (occasional).
- **When and How to Monitor:** Look for when monitoring in May through June when crop is in seedling stage. Examine 10 plants at random at each stop. Estimate overall percentage leaf loss.
- **Economic Threshold:** When 25 percent of leaf surface is destroyed and flea beetles are present. If damage is only along the field margins and beetles are still congregated there, then control measures should be applied to the damaged areas only.

- **Cabbage Seedpod Weevil**

- **When and How to Monitor:** Sample at 10 to 20 percent flower. Do 10 sweeps (180°) at a minimum of 4 locations; field edge, 50 metres into the field, and repeat the 2 sets at the opposite end of the field. If weevil numbers are close to the threshold the estimate may be improved by taking additional samples.
- **Economic Threshold:** 25 to 40 weevils per 10 sweeps.

- **Diamondback moth**

- **Typical Damage:** Flowers clipped or chewed, outer layers of stem and pods chewed, holes chewed in pods.

- **When and How to Monitor:** Look for when monitoring in late May through early September. Observing for adults and larvae while taking sweep net samples can determine the presence and relative abundance of diamondback moth in the field. If levels appear to be of concern, shake plants within a 50 cm x 50 cm area and count larvae on the ground or surface (such as a sweep net) that plants were shaken over. Another alternative is to clip or pull the plants and knock over a light colored surface (such as a sweep net, jacket, hood of a car, etc.). Multiply by 4 to get the number of larvae per square metre. Do this in at least 5 areas of the field.
- **Nominal Threshold:** 100 to 150 larvae per square metre in immature to flowering plants. 200 to 300 larvae per square metre in plants with flowers and pods.
  - Note that these threshold numbers are based on stands averaging 150 to 200 plants per square metre. In areas where stands are thinner, the economic threshold should be lowered accordingly. A nominal threshold of 25 to 33 percent defoliation with larvae still present can be applied for canola at seedling stage.

- **Bertha Armyworm**

- **Typical Damage:** Outer layers of stems and pods chewed resulting in whitish appearance, holes chewed in pods.
- **When and How to Monitor:** Look for larvae when monitoring fields in late July through early August. At each stop, shake plants in a 1/4 square metre (50 cm x 50 cm) area and carefully check soil surface for dislodged larvae. During heat of the day, larvae will often be found under leaves on soil surface.
- **Economic Threshold:** A loss of 0.058 bushels per acre for each larva per square metre can be expected. Multiplying 0.058 x average number of larvae per square metre x expected seed value (dollars per bushel) will determine the economic loss (in dollars per acre) due to the larvae. Only if control costs (insecticide plus application costs) can be applied for less than this economic loss will insecticide applications be economical. Yield loss may be greater for canola under moisture stress.
  - At an expected seed value of \$12.00 per bushel, the economic threshold will be between about 14 and 28 larvae per square metre, depending on control costs. At an expected seed value of \$16 per bushel, the economic threshold will be between about 11 and 21 larvae per square metre, depending on control costs. Tables showing specific economic thresholds at various expected seed values and control costs can be found at: <https://www.gov.mb.ca/agriculture/crops/insects/pubs/bertha-armyworm-factsheet.pdf>.

## Canola Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Belowground and Surface Feeders</b>					
Root maggots	<ul style="list-style-type: none"> <li>• <b>Increased seeding rates and increased row spacing</b> (to about 25 to 30 cm) can reduce damage to the roots by root maggots.</li> <li>• <b>Cultivating</b> prior to seeding reduces adult emergence from overwintered pupae. Root maggot infestations are greater under zero-till systems than under conventional tillage, but yields under zero tillage usually still exceed those with conventional tillage.</li> </ul>				
Cutworms	<b>Seed treatments</b>				
	<i>Fortenza Advanced</i> (D) <sup>3</sup>	A co-pack of <i>Fortenza</i> and <i>Rascendo</i> (sulfoxaflor) that can be combined with neonicotinoid-based seed treatments.			
	<i>Lumiderm</i> (D) <sup>4</sup>	A seed treatment that can be combined with a neonicotinoid-based seed treatment.			>5000
	<b>Foliar Sprays</b>				
	<i>Coragen MaX</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole</i> (D)	33.5 mL 50.6 ml 101 mL	1	A or G	>5000
	<i>Matador/Labamba</i> (P)	34 mL	7	A or G	56 to 93
	<i>Decis 100 EC</i> (P)	40 mL	7	A or G	633
<i>Pounce/Perm-UP/IPCO Syncro</i> (P) <i>Ambush</i> (P)	73 to 158 mL 57 to 121 mL	Treat up to 5-leaf stage	A or G (see labels)	789 to 1030	
<b>Sap and Fluid Feeders</b>					
Lygus bugs	<i>Decis 100 EC/Advantage</i> <i>Deltamethrin 5 EC/Poleci</i> (P)	30 mL ( <i>Decis 100 EC</i> ) 60 mL ( <i>Advantage</i> <i>Delta..5EC</i> ) 121 mL ( <i>Poleci</i> )	7	A or G	>300 to 2000
	<i>Matador/Silencer/Labamba/</i> <i>Zivata</i> (P)	34 mL	7	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 mL	7. Do not feed treated crop to livestock.	A or G	98
	<i>Silencer Duo</i> (D+P) <i>Silencer Duo A</i> <i>Silencer Duo B</i>	51 mL 34 mL	7 days	A or G	N/A
	<i>Cygon 400EC/Cygon 480-AG</i> (OP)	219 to 437 mL ( <i>Cygon 400EC</i> ) 182 to 364 mL ( <i>Cygon 480-AG</i> )	21	A or G	450 to 550
Turnip aphid	<i>Lagon/Cygon 400EC/</i> <i>Cygon 480-AG/Diamante 4</i> (OP)	340 to 360 mL ( <i>Lagon, Cygon 480-AG,</i> <i>Diamante 4</i> ) 413 to 437 mL ( <i>Cygon 400EC</i> )	21	A or G	245 to 550
Aster leafhopper	<i>Lagon/Cygon 400EC/</i> <i>Cygon 480-AG/Diamante 4</i> (OP)	340 to 360 mL ( <i>Lagon, Cygon 480-AG,</i> <i>Diamante 4</i> ) 413 to 437 mL ( <i>Cygon 400EC</i> )	21	A or G	245 to 550

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Defoliators</b>					
Flea beetles (crucifer and/or striped)	<b>Seed treatments</b>				
	<i>Lumiderm</i> (D) <sup>4</sup>	Applied combined with a neonicotinoid-based seed treatment.			
	<i>Fortenza Advanced</i> (D) <sup>3</sup>	A co-pack of <i>Fortenza</i> and <i>Rascendo</i> (sulfoxaflor) that can be combined with neonicotinoid-based seed treatments.			
	<i>BUTEO start</i> (B)	625 to 1042 mL/ 100 kg seed	Seed treatment containing flupyradifurone – applied combined with a neonicotinoid- based seed treatment		1,030
	<i>Helix Vibrance</i> (N)	A seed treatment containing <i>Helix Xtra</i> and <i>Vibrance 500FS</i> .			
	<i>Prosper EverGol</i> (N)	A seed treatment containing the insecticide clothianidin and 3 fungicides.			
	<i>NipsIt INSIDE</i> (N)	250, 333, or 666 mL/ 100 kg seed.	Seed treatment		3044
	<i>Modalex 600</i>	250, 333, or 666 mL/ 100 kg seed	Seed Treatment		2,000
	<b>Foliar Sprays</b>				
	<i>Sivanto Energy</i> (B+P)	304 mL	Do not apply after 6-leaf stage	A or G	N/A
	<i>Decis 100 EC/Advantage Deltamethrin 5 EC/Decimate/ Rauma/Poleci</i> (P)	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 60 mL ( <i>Advantage Delta..5EC/ Decimate/Rauma</i> ) 81 to 121 mL ( <i>Poleci</i> )	7	A or G	>300 to 2000
	<i>Pounce/Perm-Up/IPCO Syncro</i> (P) <i>Ambush</i> (P)	36 to 73 mL 28 to 57 mL	Treat up to 5-leaf stage	A or G	789 to 1030
	<i>UP-Cyde/Ship</i> (P)	56.6 mL	30	A or G	355
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 mL	7	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 mL	7. Do not feed treated crop to livestock	A or G	98
	<i>Silencer Duo</i> (D+P) <i>Silencer Duo A</i> <i>Silencer Duo B</i>	51 mL 34 mL	7 days	A or G	N/A
<i>Malathion 85E</i> (OP)	0.217 to 0.346 L	7	A or G	>550	
<i>Sevin XLR</i> (C)	0.202 L	Seedling application only	A or G	699	
Cabbage seedpod weevil	<b>Trap crops</b> of earlier-flowering canola can be used to concentrate cabbage seedpod weevils, which can be managed with an insecticide if needed.				
	<i>Decis 100 EC/Advantage Deltamethrin 5 EC/Poleci</i> (for control of adults only) (P)	40 mL ( <i>Decis 100 EC</i> ) 80 mL ( <i>Advantage Delta..5EC</i> ) 162 mL ( <i>Poleci</i> )	7	A or G	>300 to 2000
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 mL	7	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 mL	7. Do not feed treated crop to livestock	A or G	98
	<i>Silencer Duo</i> (D+P) <i>Silencer Duo A</i> <i>Silencer Duo B</i>	51 mL 34 mL	7 days	A or G	N/A

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
Diamondback moth	<i>Plutex</i>	20 to 81 mL	0	G	
	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole (D)</i>	17 mL 25.5 mL 51 mL	1	A or G	>5000
	<i>Decis 100 EC/Advantage</i> <i>Deltamethrin 5 EC/ Poleci (P)</i>	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 60 mL ( <i>Advantage</i> <i>Delta..5EC</i> ) 81 to 121 mL ( <i>Poleci</i> )	7	A or G	>300 to 2000
	<i>Matador/ Silencer/Labamba/</i> <i>Zivata (P)</i>	34 mL	7	A or G	56 to 98
	<i>Voliam Xpress (D+P)</i>	91 mL	7. Do not feed treated crop to livestock.	A or G	98
	<i>Silencer Duo (D+P)</i> <i>Silencer Duo A</i> <i>Silencer Duo B</i>	51 mL 34 mL	7 days	A or G	N/A
	<i>Malathion 85E (OP)</i>	0.109 to 0.168 L	7	A or G	>550
	Bertha armyworm	<b>Seeding as early as possible and choosing early maturing varieties of canola may help minimize damage in years when outbreaks are forecasted.</b>			
<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole (D)</i>		17 to 50.5 mL 25.5 to 76.1 mL 51 to 152 mL	1	A or G	>5000
<i>Decis 100 EC/Advantage</i> <i>Deltamethrin 5 EC/ Poleci (P)</i>		20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 60 mL ( <i>Advantage</i> <i>Delta..5EC</i> ) 81 to 121 mL ( <i>Poleci</i> )	7	A or G	>300 to 2000
<i>UP-Cyde/Ship (P)</i>		81 to 113 mL	30	A or G	355
<i>Matador/Silencer/Labamba/</i> <i>Zivata (P)</i>		34 mL	7	A or G	56 to 98
<i>Voliam Xpress (D+P)</i>		91 mL	7. Do not feed treated crop to livestock	A or G	98
<i>Silencer Duo (D+P)</i> <i>Silencer Duo A</i> <i>Silencer Duo B</i>		51 mL 34 mL	7 days	A or G	N/A
Cabbage looper	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole (D)</i>	33.5 mL 50.6 mL 101 mL	1	A or G	>5000
Beet webworm	<i>Decis 100 EC/ Advantage</i> <i>Deltamethrin 5 EC/ Poleci (P)</i>	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 60 mL ( <i>Advantage</i> <i>Delta..5EC</i> ) 81 to 121 mL ( <i>Poleci</i> )	7	G	>300 to 2000
Clover cutworm	<i>Decis 100 EC/ Advantage</i> <i>Deltamethrin 5 EC/ Poleci (P)</i>	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 60 mL ( <i>Advantage</i> <i>Delta..5EC</i> ) 81 to 121 mL ( <i>Poleci</i> )	7	A or G	>300 to 2000

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
Imported cabbageworm	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole (D)</i>	33.5 mL 50.6 mL 101 mL	1	A or G	>5000
	<i>Matador/Silencer/Labamba/ Zivata (P)</i>	34 mL	7	A or G	56 to 98
	<i>Voliam Xpress (D+P)</i>	91 mL	7. Do not feed treated crop to livestock	A or G	98
Grasshoppers	<b>Spreadable Bran Baits</b>				
	<i>Eco bran (C)</i>	0.8 to 1.6 kg	Treat only seedlings	G	N/A
	<b>Sprays</b>				
	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole (D)</i>	17 to 33.5 mL 25.5 to 50.6 mL 51 to 101 mL	1	A or G	>5000
	<i>Decis 100 EC/Advantage</i> <i>Deltamethrin 5 EC/Poleci (P)</i>	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 61 mL ( <i>Advantage</i> <i>Delta..5EC</i> ) <i>Poleci</i> : 81 to 121 mL (ground), 121 mL (air)	7	A or G	>300 to 2000
	<i>UP-Cyde/Ship (P)</i> (young grasshoppers only)	33 to 46 mL	30	G	355
	<i>Matador/Silencer/Labamba/ Zivata</i> (young grasshoppers only) (P)	25 to 34 mL (ground), 34 mL (air)	7	A or G	56 to 98
	<i>Voliam Xpress (D+P)</i>	91 mL	7. Do not feed treated crop to livestock	A or G	98
	<i>Silencer Duo (D+P)</i> <i>Silencer Duo A</i> <i>Silencer Duo B</i>	51 mL 34 mL	7 days	A or G	N/A
	<i>Malathion 85E (OP)</i>	0.217 to 0.346 L	7	A or G	>550
<i>Lagon/Cygon 400EC/ Cygon 480-AG/Diamante 4 (OP)</i>	340 to 360 mL ( <i>Lagon, Cygon 480-AG,</i> <i>Diamante 4</i> ) 413 to 437 mL ( <i>Cygon 400EC</i> )	21	A or G	245 to 550	
Slugs	<i>Sluggo Professional</i>	10 to 20 kg		G	>5000

**ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.**

<sup>1</sup> Insecticide Group: D=diamides, B=butenolides, N=neonicotinoids, S=sulfoximines, P=pyrethroids, C=carbamates, OP=organophosphates.

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

<sup>3</sup> DO NOT apply any subsequent applications of a group 28 insecticide (such as *Coragen*) after planting seed treated with *Fortenza*.

<sup>4</sup> DO NOT apply any subsequent applications of a group 28 insecticide (such as *Coragen*) for a minimum of 60 days after planting seed treated with *Lumiderm*.

## Chickpea Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Belowground and Surface Feeders</b>					
Wireworms	<i>Cruiser 5FS</i> (N)	17 to 50 mL/100 kg seed	May be applied on-farm or by commercial seed treaters.		
	<i>Trilex EverGol Shield</i> (N)	A seed treatment containing <i>Stress Shield 600</i> and 3 fungicides.			
	<i>Scorpio Ant and Insect Bait</i> (suppression) (Sp)	10 to 20 kg	Incorporate into the soil at planting to a depth of 10 to 20 cm		
Cutworms	<i>Lumivia CPL</i> (D) <sup>3</sup>	32 to 64 mL/100 kg seed	Seed treatment		>5000
	<i>Scorpio Ant and Insect Bait</i> (black cutworm) (Sp)	10 to 20 kg	28	G	
	<i>CoragenMax</i> <i>Shenzi</i> (D)	33.5 mL 50.6 mL	1	A or G	>5000
	<i>Matador/Silencer/Labamba/Zivata</i> (P)	34 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> )	A or G	56 to 98
	<i>Decis 100 EC</i> (P)	41 mL	7	A or G	633
<b>Sap Feeders</b>					
Pea aphid	<i>Carbine</i> (F)	49 to 65 g	7	G	>2000
	<i>Movento</i> (TT)	75 to 111 mL	7	G	>2000
	<i>Sivanto Prime</i> (B)	202 to 304 mL	7	A or G	>2000
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 to 94 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> )	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 to 223 mL	14. Do not feed treated crop to livestock	A or G	98
	<i>Silencer Duo</i> (D+P) <i>Silencer Duo A</i> <i>Silencer Duo B</i>	51 to 116 mL 34 to 76 mL	21 days	A or G	N/A
Potato leafhopper	<i>Sivanto Prime</i> (B)	202 to 304 mL	7	A or G	>2000
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> )	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 mL	14. Do not feed treated crop to livestock	A or G	98
<b>Defoliators</b>					
Grasshoppers	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rovvik,</i> <i>Maxunitech Chlorantraniliprole</i> (D)	17 to 33.5 mL 25.5 to 50.6 mL 51 to 101 mL	1	A or G	>5000
	<i>Decis 100 EC</i> (P)	20 to 30 mL	7	A or G	633
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> )	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 mL	14. Do not feed treated crop to livestock	A or G	98
	<i>Silencer Duo</i> (D+P) <i>Silencer Duo A</i> <i>Silencer Duo B</i>	51 mL 34 mL	21 days	A or G	N/A

**ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.**

<sup>1</sup> Insecticide Group: F=flonicamid, D=diamides, P=pyrethroids, N=neonicotinoids, TT= tetronic and tetramic acid derivatives.

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

<sup>3</sup> Do not make a subsequent foliar application of any group 28 insecticide for a minimum of 60 days after planting seed treated with Lumivia CPL.

## Field Scouting in Clovers

### Defoliators

- **Sweetclover Weevil**
  - **Typical Damage:** Adults chew crescent-shaped and jagged notches in leaves and can completely defoliate plants.
  - **When and How to Monitor:** Inspect clover seedlings for weevil damage in spring as the seedlings emerge. In midsummer and throughout August, inspect first-year clover stands for damage along crop margins. Invading

weevils move into these stands only as far as necessary to satisfy their food requirements, so an insecticide application to affected field margins is usually all that is required. Visually estimating the number of weevils per plant must be done carefully because weevils fall from plants easily and are difficult to see on the ground.

- **Economic Threshold:** 1<sup>st</sup> year stands: 1 weevil adult per 3 seedlings (1 per 5 seedlings under dry conditions). 2<sup>nd</sup> year stands: 9 to 12 weevil adults per plant.

## Clovers (sweet, red, alsike) Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Belowground and Surface Feeders</b>					
Cutworms	<i>Coragen MaX</i>	34 mL	0	G	>5000
<b>Defoliators</b>					
Grasshoppers	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech Chlorantraniliprole (D)</i>	17 to 33.5 mL 25.5 to 50.6 mL 51 to 101 mL	0	G	>5000
	<i>Malathion 85E (OP)</i>	0.445 to 0.544 L	7	A or G	>550
	<i>Lagon/Diamante 4 (OP)</i>	172 to 405 mL	2 to 28 (see label)	A or G	245 to 425
Sweetclover Weevil	Locate new seedlings as far as possible from 2 <sup>nd</sup> year clover. Cultivating 2 <sup>nd</sup> year stands of sweet clover silage and hay as soon as possible after the crop is taken kills the new generation weevil larvae in the soil.				
	<i>Malathion 85E (OP)</i> (sweet clover only)	0.445 to 0.544 L	7 (cattle may be returned immediately after spraying)	A or G	>550
	<i>Lagon/Cygon 400EC/</i> <i>Cygon 480-AG/Diamante 4 (OP)</i>	340 to 450 mL ( <i>Lagon, Cygon 480-AG,</i> <i>Diamante 4)</i> 413 to 534 mL ( <i>Cygon 400EC</i> )	28	A or G	245 to 550
Alfalfa weevil	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech Chlorantraniliprole (D)</i>	50.5 to 67.5 mL 76.1 to 101.2 mL 152 to 202 mL	0	G	>5000
Lesser clover leaf weevil	<i>Decis 100 EC/Advantage Deltamethrin 5 EC/ Poleci (P)</i> (suppression only/red clover seed production only)	51 mL ( <i>Decis 100 EC</i> ) 101 mL ( <i>Advantage Delta..5EC</i> ) 202 mL ( <i>Poleci</i> )		G	>300 to 2000
<b>Sap or Fluid Feeders</b>					
Lygus bugs	<i>Carbine/Beleaf 50SG (F)</i>	81 to 121 g	7	G	>2000
	<i>Lagon/Diamante 4 (OP)</i>	172 ml	2	A or G	245 to 425
Leafhoppers	<i>Sefina (PP)</i> (suppression only)	81 to 162 mL	0	A or G	>2000
	<i>Malathion 85E (OP)</i>	0.445 to 0.544 L	7	A or G	>550
Aphids	<i>Sefina (PP)</i>	81 mL	0	A or G	>2,000
	<i>Carbine/Beleaf 50SG (F)</i>	49 to 65 g	7	G	>2000
	<i>Malathion 85E (OP)</i>	0.445 to 0.544 L	7	A or G	>550

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

<sup>1</sup> Insecticide Group: D=diamides, F=flonicamid, P=pyrethroids, C=carbamates, OP=organophosphates.

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

## Field Scouting in Corn (Field Corn)

### • Cutworm

- **Typical Damage:** Notched, wilted, dead, or cut-off plants (weed or crop seedlings). Plants missing from rows, bare patches appearing in field.
- **When and How to Monitor:** Look for cutworm, and evidence of cutworm feeding, when monitoring corn in May and June. Often cutworms will be close to the cut or shriveled plants that they have just damaged. Cutworm will sometimes be most abundant in patches or a specific area of a field. At each stop, examine 100 plants in a row. Calculate percentage of plants cut off or showing leaf feeding.
- **Economic Threshold:** When 2 to 4 percent of plants are cut below the ground or when 6 to 8 percent of plants are cut above the soil surface, and cutworms less than 1 inch long are present. Sometimes it is most economical to just treat infested patches, and not whole fields.

### • European corn borer

- **Typical Damage:** Shot-holes in leaves. Holes in stalk, tassels and ears. Damage may cause stalk breakage prior to harvest or cobs to fall to the ground. Nutrient flow in the plant may be restricted, resulting in smaller cobs.

**When and How to Monitor:** Begin looking for European corn borer when field scouting in early July. At 5 locations, examine 10 plants for young larvae and egg masses. Calculate percentage of plants infested. Scout every 5 to 7 days until the end of July or larvae start to tunnel into the stalks.

- **Economic Threshold:** The level of European corn borer where control becomes economical depends on the value of the crop, and cost of control. Information on determining specific economic thresholds for European corn borer in grain and silage corn can be found at <https://www.gov.mb.ca/agriculture/crops/insects/pubs/european-corn-borer-factsheet.pdf>. If the majority of larvae have bored into the stalk, DO NOT apply insecticide, as they are ineffective once the larvae have entered the stalk.

### • Armyworm

**Economic Threshold:** For corn past the 6-leaf stage, if 50 percent of the plants are showing damage and have larvae smaller than 2.5 cm (1 inch), insecticide treatment may be warranted. As long as the growing point of the plant is not damaged, the corn plant is usually able to recover from moderate feeding.

## Corn (Field Corn) Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Belowground and Surface Feeders</b>					
Cutworms	<b>Seed treatments</b>				
	<i>Lumivia</i> (D) <sup>3</sup>	64 mL/unit (80,000 seed unit)	Seed treatment – by commercial treaters with closed transfer systems only		>5000
	<i>Fortenza</i> (D) <sup>4</sup>	83 to 167 mL/ 100 kg seed	Seed treatment – by commercial treaters with closed transfer systems only		>5000
	<b>Foliar Sprays</b>				
	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole</i> (D)	33.5 mL 50.6 mL 101 mL	14 (field corn) 1 (seed corn or sweet corn)	A or G	>5000
	<i>Vayego</i> (D)	61 mL	14	G	>2000
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 mL	DO NOT cut treated fields for silage/ forage, do not graze treated fields.	A or G	56 to 98
	<i>UP-Cyde/Ship</i> (P)	115 mL	21	G	355
	<i>Pounce/Perm-UP/PCO Syncro</i> (P) <i>Ambush</i> (P)	73 to 158 mL 57 to 121 mL	30	A or G (see labels)	789 to 1030
	Wireworms	<i>Cimegra</i>	250 mL/ha in furrow	In-furrow application	
<i>Fortenza</i> (D) <sup>4</sup>		Seed treatment			
<i>Lumivia</i> (D) <sup>3</sup>		64 mL/unit (80,000 seed unit)	Seed treatment – by commercial treaters with closed transfer systems only		>5000
<i>Cruiser Maxx Corn</i> (N)		83 mL <i>Cruiser 5FS</i> / 100 kg seed	A seed treatment containing <i>Cruiser 5 FS</i> and <i>Maxim Quattro</i> .		>5000

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Wireworms, continued</b>	<i>Poncho 600 FS</i> (N)	33.3 to 66.6 mL of <i>Poncho 600</i> / 80,000 units of seed	Seed treatment – for use in commercial seed treatment facilities with closed transfer equipment only		2000
	<i>NipsIt INSIDE</i> (N)	33.3 to 66.6 mL/ 80,000 units of seed	Seed treatment	Seed treatment	3044
<b>Seedcorn maggot</b>	<i>Lumivia</i> (D) <sup>3</sup> (suppression)	64 mL/unit (80,000 seed unit)	Seed treatment – by commercial treaters with closed transfer systems only		>5000
	<i>Fortenza</i> (D) <sup>4</sup> (suppression)	167 mL/100 kg seed	Seed treatment – by commercial treaters with closed transfer systems only		>5000
	<i>Cruiser Maxx Corn</i> (N)	83 to 166 mL <i>Cruiser 5FS</i> /100 kg seed	A seed treatment containing <i>Cruiser 5 FS</i> and <i>Maxim Quattro</i> .		>5000
	<i>Poncho 600 FS</i> (N)	33.3 to 66.6 mL of <i>Poncho 600</i> / 80,000 units of seed	Seed treatment – for use in commercial seed treatment facilities with closed transfer equipment only		2000
	<i>NipsIt INSIDE</i> (N)	33.3 to 66.6 mL/ 80,000 units of seed	Seed treatment	Seed treatment	3044
<b>Corn rootworm</b>	<b>Crop rotation</b> is an effective management strategy.				
	<b>Resistant Cultivars:</b> Some cultivars of Bt corn are resistant to feeding by corn rootworm. A table of registered Bt corn products in Canada (as of May 2025) is available at: <a href="https://cornpest.ca/wp-content/uploads/2025/05/Canadian-Bt-Traits-Table-May-2025-English-Final.pdf">https://cornpest.ca/wp-content/uploads/2025/05/Canadian-Bt-Traits-Table-May-2025-English-Final.pdf</a> .				
	<i>Cimegra</i>	250 mL/ha in furrow	In-furrow application		>2000
<b>Sap Feeders</b>					
<b>Aphids</b>	<i>Sivanto Prime</i> (B)	202 to 304 mL	7 (silage, forage, sweet corn) 21 (grain)	A or G	>2000
	<i>Closer</i> (S)	30 to 61 mL	7 (forage) 14 (grain)	A or G	>5000
	<i>Vayego</i> (D) (suppression)	61 mL	14	G	>2000
<b>Spider mites</b>	<i>Oberon</i> (TT)	162 to 243 mL	5 (green forage) 30 (grain or stover)	A or G	>2000
<b>Defoliators and Borers</b>					
<b>Grasshoppers</b>	<i>Coragen MaX</i>	17 to 34 mL	14 (field corn) 1 (seed corn or sweet corn)	A or G	>5000
<b>European corn borer</b>	<b>Stalk Management:</b> Stalk shredding during or after harvest can significantly reduce European corn borer overwintering. Mowing corn stalks after harvest can reduce overwintering populations up to 85 percent.				
	<b>Resistant Cultivars:</b> Some cultivars of Bt corn are resistant to feeding by European corn borer. A table of registered Bt corn products in Canada (as of May 2025) is available at: <a href="https://cornpest.ca/wp-content/uploads/2025/05/Canadian-Bt-Traits-Table-May-2025-English-Final.pdf">https://cornpest.ca/wp-content/uploads/2025/05/Canadian-Bt-Traits-Table-May-2025-English-Final.pdf</a> .				
	<i>Dipel 2X DF</i> (M)	0.23 to 0.45 kg	0	G	>5000
	<i>Bioprotec CAF/ Bioprotec PLUS</i> (M)	1.13 to 1.62 L 0.73 to 1.0 L	0	G	N/A
	<i>Coragen Max Shenzi Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole</i> (D)	33.5 to 50.5 mL 50.6 to 76.1 mL 101 to 152 mL	14 (field corn) 1 (seed corn or sweet corn)	A or G	>5000
	<i>Vayego</i> (D)	61 mL	14	G	>2000
<i>Intrepid</i> (E)	121 to 243 mL	21 (field corn) 3 (sweet corn)	G	>5000	

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
European corn borer, <i>continued</i>	<i>Delegate</i> (Sp)	49 to 85 g	28	A or G	>5000
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 to 76 mL	21 (field corn) DO NOT cut treated fields for silage/ forage, do not graze treated fields.	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	202 mL	21. Do not feed treated crop to livestock	A or G	98
	<i>Silencer Duo</i> (D+P) <i>Silencer Duo A</i> <i>Silencer Duo B</i>	116 mL 76 mL	21 days	A or G	N/A
	<i>Decis 100 EC/Advantage</i> <i>Deltamethrin 5 EC/Decimate/ Rauma/Poleci</i> (P)	51 to 61 mL ( <i>Decis 100 EC</i> ) 101 to 121 mL ( <i>Advantage Delta..5EC/ Decimate/Rauma</i> ) 202 to 243 mL ( <i>Poleci</i> )	1	G	>300 to 2000
	<i>UP-Cyde/Ship</i> (P)	113 mL	5	A or G	355
	<i>Malathion 85E</i> (OP)	0.445 to 0.544 L	5	A or G	>550
Corn earworm	Some cultivars of Bt corn are resistant to feeding by corn earworm.				
	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole</i> (D)	33.5 to 50.5 mL 50.6 to 76.1 mL 101 to 152 mL	14 (field corn) 1 (seed corn or sweet corn)	A or G	>5000
	<i>Vayego</i> (D)	61 mL	14	G	>2000
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 to 76 mL	21 (field corn) DO NOT cut treated fields for silage/ forage, do not graze treated fields.	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	202 mL	21. Do not feed treated crop to livestock	A or G	98
	<i>Silencer Duo</i> (D+P) <i>Silencer Duo A</i> <i>Silencer Duo B</i>	116 mL 76 mL	21 days	A or G	N/A
	<i>UP-Cyde/Ship</i> (P)	113 mL	5	A or G, see product label	355
	<i>Malathion 85E</i> (OP)	0.445 to 0.544 L	5	A or G	>550
Armyworm	Some cultivars of Bt corn are resistant to feeding by armyworms.				
	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole</i> (D)	33.5 to 50.5 mL 50.6 to 76.1 mL 101 to 152 mL	14 (field corn) 1 (seed corn or sweet corn)	A or G	>5000
	<i>Vayego</i> (D)	61 mL	14	G	>2000
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 to 84 mL ( <i>Matador/ Labamba</i> ) 34 mL ( <i>Silencer/Zivata</i> )	21 (field corn) DO NOT cut treated fields for silage/ forage, do not graze treated fields.	A or G	56 to 98

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Armyworm, continued</b>	<i>Voliam Xpress (D+P)</i>	202 mL	21. Do not feed treated crop to livestock	A or G	98
<b>Fall armyworm</b>	Some cultivars of Bt corn are resistant to feeding by fall armyworm.				
	<i>Coragen Max Shenzi Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole (D)</i>	33.5 to 50.5 mL 50.6 to 76.1 mL 101 to 152 mL	14 (field corn) 1 (seed corn or sweet corn)	A or G	>5000
	<i>Matador/Silencer/Labamba/ Zivata (P)</i>	34 mL	DO NOT cut treated fields for silage/ forage, do not graze treated fields.	A or G	56 to 98

**ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.**

<sup>1</sup> Insecticide Group: M=microbials, D=diamides, E=ecdysone receptor agonists, B=butenolides, N=neonicotinoids, P=pyrethroids, C=carbamates, OP=organophosphates, TT = tetronic and tetramic acid derivatives.

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

<sup>3</sup> DO NOT make a subsequent foliar application of any group 28 insecticide (such as Coragen) for a minimum of 60 days after planting seed treated with Lumivia.

<sup>4</sup> DO NOT make any subsequent applications of a group 28 insecticide (such as Coragen) following Fortenza seed treatment.

## Faba Bean Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Belowground Feeders</b>					
<b>Cutworms</b>	<i>Lumivia CPL (D)</i> <sup>3</sup>	32 to 64 mL/100 kg seed	Seed treatment		>5000
	<i>Scorpio Ant and Insect Bait (black cutworm) (Sp)</i>	10 to 20 kg	28	G	
	<i>Coragen Max Shenzi Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole (D)</i>	33.5 mL 50.6 mL 101 mL	1	A or G	>5000
	<i>Decis 100 EC (P)</i>	41 mL	7	A or G	633
<b>Wireworms</b>	<i>Cruiser 5FS (N)</i>	17 to 50 mL/100 kg seed	May be applied on-farm or by commercial seed treaters.		
	<i>Trilex EverGol Shield (N)</i>	A seed treatment containing <i>Stress Shield 600</i> and 3 fungicides.			
	<i>Scorpio Ant and Insect Bait (suppression) (Sp)</i>	10 to 20 kg	Incorporate into the soil at planting to a depth of 10 to 20 cm.		
<b>Pea leaf weevil</b>	<i>Lumivia CPL (D)</i> <sup>3</sup>	64 to 96 mL/100 kg seed	Seed treatment		
	<i>Trilex EverGol Shield (N)</i>	A seed treatment containing <i>Stress Shield 600</i> and 3 fungicides.			
	<i>Cruiser 5FS (N)</i>	50 mL/100 kg seed	May be applied on-farm or by commercial seed treaters.		
	<i>Voliam Xpress (D+P)</i>	91 mL	14. Do not feed treated crop to livestock	A or G	98
	<i>Decis 100 EC (P) (suppression)</i>	30 mL	7	A or G	633

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Sap and Fluid Feeders</b>					
<b>Lygus bugs</b>	<i>Carbine</i> (F)	81 g	7	G	>2000
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> ) DO NOT cut treated fields for hay/forage. Do not graze treated fields.	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 mL	14. Do not feed treated crop to livestock	A or G	98
	<i>Decis 100 EC</i> (P)	41 mL	7	A or G	633
<b>Potato leafhopper</b>	<i>Sivanto Prime</i> (B)	202 to 304 mL	7	A or G	>2000
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> ) DO NOT cut treated fields for hay/forage. Do not graze treated fields.	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 mL	14. Do not feed treated crop to livestock	A or G	98
<b>Pea aphid</b>	<i>Carbine</i> (F)	49 to 65 g	7	G	>2000
	<i>Sivanto Prime</i> (B)	202 to 304 mL	7	A or G	>2000
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 to 94 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> ) DO NOT cut treated fields for hay/forage. Do not graze treated fields.	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 to 223 mL	14. Do not feed treated crop to livestock.	A or G	98
<b>Defoliators</b>					
<b>Grasshoppers</b>	<i>Coragen Max Shenzi Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole</i> (D)	17 to 33.5 mL 25.5 to 50.6 mL 51 to 101 mL	1	A or G	>5000
	<i>Voliam Xpress</i> (D+P)	91 mL	14. Do not feed treated crop to livestock	A or G	98
	<i>Decis 100 EC</i> (P)	20 to 30 mL	7	A or G	633

**ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.**

<sup>1</sup> Insecticide Group: D=diamides, F=flonicamid, N=neonicotinoids, P=pyrethroids.

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

<sup>3</sup> Do not make a subsequent foliar application of any group 28 insecticide for a minimum of 60 days after planting seed treated with Lumivia CPL.

## Field Scouting in Flax

### • Cutworms

- **Typical Damage:** Notched, wilted, dead, or cut-off plants (weed or crop seedlings). Plants missing from rows, bare patches appearing in field.
- **When and How to Monitor:** Look for cutworm, and evidence of cutworm feeding, when monitoring in May and June. Often cutworm will be close to the cut or shriveled plants that they have just damaged. Cutworm will sometimes be most abundant in patches or a specific area of a field. In areas of the field where cutworm damage is noticeable, check around damaged plants in a 0.25 square metres (50 cm x 50 cm) area. Use trowel or shovel to carefully search through top 5 cm of soil for cutworm larvae. Multiply the number of cutworms found by 4 to get the number per square metre. Repeat in several locations to get an accurate assessment of what cutworm levels are.
- **Economic Threshold:** 4 to 5 larvae per square metre. Sometimes it is most economical to just treat infested patches, and not whole fields.

### • Aphids

- **Typical Damage:** Extract plant fluids from the stems, leaves and developing bolls. Can cause fewer seeds to be produced.
- **When and How to Monitor:** The easiest way to detect aphids in flax is to sample the upper portions of the plant with an insect sweep net when the crop is in full bloom, or tap plants over a white tray or bucket. If aphids

are found, fields need to be more closely inspected by randomly sampling plants. To inspect plants, lightly tap the plants on a white surface, such as a tray or the canvas of a sweep net, to dislodge the insects. Plants can be severed at the base prior to tapping if desired. Inspect a minimum of 25 plants at full bloom and 20 plants at early green boll randomly in the field to provide an accurate estimate of aphid density. Record total number of aphids and calculate average per plant.

- If control is not warranted at full bloom, aphid densities should be assessed again at the green boll stage.
  - **Economic Threshold:** Varies with crop value and control costs, but generally about 3 aphids per main stem at full bloom or 8 aphids per main stem at the green boll stage.
  - The yield loss of flax is 0.3346 bushels per acre per aphid per plant for crops sampled at full bloom and 0.1275 bushels per acre per aphid per plant for crops sampled at the green boll stage.
  - The potato aphid is highly susceptible to attack by fungi (especially in years of high rainfall and humidity in late June and July). Aphid populations sampled at full bloom that have many diseased insects should be sampled again at the early green boll stage to determine the effect of the disease on aphid densities.
- ### • Beet webworm
- **Nominal Threshold:** >10 larvae per square metre.

## Flax Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Belowground and Surface Feeders</b>					
Wireworms	No insecticides registered for the control of wireworm in flax.				
Cutworms	<i>Coragen Max</i>	33.5 mL	1	A or G	>5000
	<i>Shenzi</i>	50.6 mL			
	<i>Cosayr, Vermis, Rorvik, Maxunitech</i>	101 mL			
	<i>Chlorantraniliprole (D)</i>				
	<i>Decis 100 EC/Advantage Deltamethrin 5 EC/Poleci (P)</i>	40 mL ( <i>Decis 100 EC</i> ) 81 mL ( <i>Advantage Delta..5EC</i> ) 162 mL ( <i>Poleci</i> )	7 ( <i>Decis</i> ) 40 ( <i>Poleci, Advantage Delta..5EC</i> )	A or G	>300 to 2000
	<i>Matador/Labamba (P)</i>	34 mL	7	A or G	56
	<i>Pounce/Perm-UP/ IPCO Syncro (P)</i> <i>Ambush (P)</i>	73 to 158 mL 57 to 121 mL	Treat up to 5 leaf stage	A or G (see labels)	789 to 1030
<b>Sap Feeders</b>					
Potato aphid	<i>Lagon/Cygon 400EC/ Cygon 480-AG/Diamante 4 (OP)</i>	173 mL ( <i>Lagon, Cygon 480-AG, Diamante 4</i> ) 207 mL ( <i>Cygon 400EC</i> )	21	A or G	245 to 550

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
Lygus bugs	<i>Decis 100 EC</i> (P)	30 mL	7	A or G	633
	<i>Voliam Xpress</i> (D+P)	91 mL	7. Do not feed treated crop to livestock.	A or G	98
	<i>Silencer Duo</i> (D+P) <i>Silencer Duo A</i> <i>Silencer Duo B</i>	51 mL 34 mL	7 days	A or G	N/A
<b>Defoliators</b>					
Grasshoppers	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole</i> (D)	17 to 33.5 mL 25.5 to 50.6 mL 51 to 101 mL	1	A or G	>5000
	<i>Decis 100 EC/Advantage</i> <i>Deltamethrin</i> <i>5 EC/Poleci</i> (P)	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 61 mL ( <i>Advantage</i> <i>Delta..5EC</i> ) <i>Poleci</i> : 81 to 121 mL (ground), 121 mL (air)	7 ( <i>Decis 100 EC</i> ) 40 ( <i>Poleci,</i> <i>Advantage Delta..5EC</i> )	A or G	>300 to 2000
	<i>Matador/Silencer/Labamba/</i> <i>Zivata</i> (young grasshoppers only) (P)	25 to 34 mL (ground) 34 mL (air)	7	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 mL	7. Do not feed treated crop to livestock.	A or G	98
	<i>Silencer Duo</i> (D+P) <i>Silencer Duo A</i> <i>Silencer Duo B</i>	51 mL 34 mL	7 days	A or G	N/A
	<i>Malathion 85E</i> (OP)	0.217 to 0.346 L	7	A or G	>550
Bertha armyworm	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole</i> (D)	17 to 50.5 mL 25.5 to 76.1 mL 51 to 152 mL	1	A or G	>5000
	<i>Decis 100 EC</i> (P)	20 to 30 mL	7	A or G	633
	<i>Voliam Xpress</i> (D+P)	91 mL	7. Do not feed treated crop to livestock.	A or G	98
Clover cutworm	<i>Decis 100 EC/Advantage</i> <i>Deltamethrin</i> <i>5 EC/Poleci</i> (P)	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 61 mL ( <i>Advantage</i> <i>Delta..5EC</i> ) 81 to 121 mL ( <i>Poleci</i> )	7 ( <i>Decis 100 EC</i> ) 40 ( <i>Poleci,</i> <i>Advantage Delta..5EC</i> )	A or G	>300 to 2000
Beet webworm	<i>Decis 100 EC/Advantage</i> <i>Deltamethrin</i> <i>5 EC/Poleci</i> (P)	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 61 mL ( <i>Advantage</i> <i>Delta..5EC</i> ) 81 to 121 mL ( <i>Poleci</i> )	7 ( <i>Decis 100 EC</i> ) 40 ( <i>Poleci,</i> <i>Advantage Delta..5EC</i> )	G	>300 to 2000

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

<sup>1</sup> Insecticide Group: D=diamides, P=pyrethroids, C=carbamates, OC=organochlorines.

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

## Forage Grasses (Timothy, etc.) Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Belowground and Surface Feeders</b>					
Cutworms	<i>Coragen MaX</i>	34 mL	0	G	>5000
<b>Sap and Fluid Feeders</b>					
Plant bugs	<i>Lagon/Cygon 400EC/ Cygon 480-AG/Diamante 4 (OP)</i>	170 mL ( <i>Lagon, Cygon 480-AG, Diamante 4</i> ) 206 mL ( <i>Cygon 400EC</i> )	2	A or G	245 to 550
<b>Defoliators</b>					
Grasshoppers	<b>Spreadable Bran Baits</b>				
	<i>Nolo Bait</i>	Minimum of 0.45 kg		A or G	
	<i>Eco bran (C)</i>	0.8 to 1.6 kg	1 to 2	G	N/A
	<b>Sprays</b>				
	<i>Coragen Max Shenzi Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole (D)</i>	17 to 33.5 mL 25.5 to 50.6 mL 51 to 101 mL	0	G	>5000
	<i>Matador/Silencer/Labamba/ Zivata (P)</i> (on timothy - seed production only)	25 to 34 mL	14	G	56 to 98
	<i>Sevin XLR (C)</i>	0.49 to 1.42 L	1 to 2	G	699
	<i>Lagon/Cygon 400EC/ Cygon 480-AG/Diamante 4 (OP)</i>	Nymphs: 170 to 220 mL ( <i>Lagon, Cygon 480-AG, Diamante 4</i> ), 267 mL ( <i>Cygon 400EC</i> ). Adults: 340 to 400 mL ( <i>Lagon, Cygon 480-AG, Diamante 4</i> ), 413 to 486 mL ( <i>Cygon 400EC</i> ).	2 (nymphs) 28 (adults)	A or G	245 to 550
European skipper (on timothy)	<i>Dipel 2XDF (M)</i>	57 to 111 g	N/A	A or G	>5000
	<i>Bioprotec CAF (M)/ Bioprotec PLUS (M)</i>	0.22 to 0.28 L 0.14 to 0.18 L	0	G	N/A
Armyworm	<i>Coragen Max Shenzi Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole (D)</i>	33.5 to 50.5 mL 50.6 to 76.1 mL 101 to 152 mL	0	G	>5000

**ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.**

<sup>1</sup> Insecticide Group: M=microbials, D=diamides, P= pyrethroids, C=carbamates, OP=organophosphates.

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

## Hemp Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
European corn borer	<i>Bioprotec PLUS</i> (M)	0.73 to 1.0 L	0	G	N/A

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

<sup>1</sup> Insecticide Group: M=microbial.

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

## Field Scouting in Lentils

### • Grasshoppers

- **When and How to Monitor:** Look for when monitoring fields from the early bud stage through pod development.
- **Economic Threshold:** 2 grasshoppers per square metre during the flowering and podding stages, especially if two-striped grasshopper is the dominant species.

### • Lygus Bugs

- **When and How to Monitor:** Look for lygus bugs when monitoring lentils during blooming and podding by using a sweep net, making 25, 180° sweeps in at least

5 randomly selected places in a field. Afternoon sampling provides more accurate estimates than morning sampling.

- **Threshold:** As a nominal threshold, insecticide treatment is recommended when 7 to 10 Lygus bugs are collected per 25 sweeps.

### • Pea aphid

- **Economic Threshold:** 20 to 66 aphids per 180° sweep of a 38 cm (15 inch) diameter insect net. This provides a 7-day lead time before aphid populations reach the economic injury level of 78 aphids per sweep.

## Lentil Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Belowground and Surface Feeders</b>					
Wireworms	<i>Cruiser 5FS</i> (N)	17 to 50 mL/100 kg seed	May be applied on-farm or by commercial seed treaters.		
	<i>Trilex EverGol Shield</i> (N)	A seed treatment containing <i>Stress Shield 600</i> and 3 fungicides.			
	<i>Scorpio Ant and Insect Bait</i> (suppression) (Sp)	10 to 20 kg	Incorporate into the soil at planting to a depth of 10 to 20 cm.		
Cutworms	<i>Lumivia CPL</i> (D) <sup>3</sup>	32 to 64 mL/100 kg seed	Seed treatment		>5000
	<i>Scorpio Ant and Insect Bait</i> (black cutworm) (Sp)	10 to 20 kg	28	G	
	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole</i> (D)	33.5 mL 50.6 mL 101 mL	1	A or G	>5000
	<i>Decis 100 EC/Advantage</i> <i>Deltamethrin 5 EC/</i> <i>Poleci</i> (P)	41 mL ( <i>Decis 100 EC</i> ) 81 mL ( <i>Advantage</i> <i>Delta..5EC</i> ) 162 mL ( <i>Poleci</i> )	7 ( <i>Decis 100 EC</i> ) 30 ( <i>Poleci,</i> <i>Advantage Delta..5EC</i> )	A or G	>300 to 2000
	<i>Matador/Silencer/Labamba/Zivata</i> (P)	34 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> )	A or G	56 to 98
	<i>Pounce/Perm-UP/</i> <i>IPCO Syncro</i> (P) <i>Ambush</i> (P)	73 to 158 mL 57 to 121 mL	7	A or G (see labels)	789 to 1030
<b>Sap and Fluid Feeders</b>					
Lygus bugs	<i>Carbine</i> (F)	81 g	7	G	>2000
	<i>Matador/Silencer/Labamba/</i> <i>Zivata</i> (P)	34 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> )	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 mL	14. Do not feed treated crop to livestock	A or G	98

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
Lygus bugs, <i>continued</i>	<i>Decis 100 EC</i> (P)	41 mL	7	A or G	633
Potato leafhopper	<i>Sivanto Prime</i> (B)	202 to 304 mL	7	A or G	>2000
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> )	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 mL	14. Do not feed treated crop to livestock.	A or G	98
Pea aphid	<i>Carbine</i> (F)	49 to 65 g	7	G	>2000
	<i>Movento</i> (TT)	75 to 111 mL	7	G	>2000
	<i>Sivanto Prime</i> (B)	202 to 304 mL	7	A or G	>2000
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 to 94 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> )	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 to 223 mL	14. Do not feed treated crop to livestock	A or G	98
	<i>Silencer Duo</i> (D+P) <i>Silencer Duo A</i> <i>Silencer Duo B</i>	51 to 116 mL 34 to 76 mL	21 days	A or G	N/A
<b>Defoliators</b>					
Grasshoppers	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole</i> (D)	17 to 33.5 mL 25.5 to 50.6 mL 51 to 101 mL	1	A or G	>5000
	<i>Decis 100 EC/Advantage</i> <i>Deltamethrin 5 EC/ Poleci</i> (P)	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 60 mL ( <i>Advantage</i> <i>Delta..5EC</i> ) <i>Poleci</i> : 81 to 121 mL (ground), 121 mL (air)	7 ( <i>Decis 100 EC</i> ) 30 ( <i>Poleci,</i> <i>Advantage Delta..5EC</i> )	A or G	>300 to 2000
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> )	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 mL	14. Do not feed treated crop to livestock	A or G	98
	<i>Silencer Duo</i> (D+P) <i>Silencer Duo A</i> <i>Silencer Duo B</i>	51 mL 34 mL	21 days	A or G	N/A
	<i>Malathion 85E</i> (OP)	0.336 L	14	A or G	>550

**ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.**

<sup>1</sup> Insecticide Group: F=flonicamid, D=diamides, N=neonicotinoids, P= pyrethroids, OP=organophosphates, TT = tetronic and tetramic acid derivatives.

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

<sup>3</sup> Do not make a subsequent foliar application of any group 28 insecticide for a minimum of 60 days after planting seed treated with Lumivia CPL.

## Mustard Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Belowground and Surface Feeders</b>					
Root maggots	No insecticides registered.				
Cutworms	<b>Seed treatments</b>				
	<i>Lumiderm</i> (D) <sup>3</sup>	Applied combined with a neonicotinoid-based seed treatment.			
	<i>Fortenza Advanced</i> (D) <sup>4</sup>	A co-pack of <i>Fortenza</i> and <i>Rascendo</i> (sulfoxaflor) that can be combined with neonicotinoid-based seed treatments.			
	<b>Foliar Sprays</b>				
	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole</i> (D)	33.5 mL 50.6 mL 101 mL	1	A or G	>5000
	<i>Decis 100 EC</i> (P)	40 mL	7	A or G	633
<b>Sap Feeders</b>					
Lygus bugs	<i>Decis 100 EC/Advantage</i> <i>Deltamethrin 5 EC/Poleci</i> (P)	30 mL ( <i>Decis 100 EC</i> ) 60 mL ( <i>Advantage</i> <i>Delta..5EC</i> ) 121 mL ( <i>Poleci</i> )	7	A or G	>300 to 2000
	<i>Matador/Silencer/Labamba/</i> <i>Zivata</i> (oilseed only) (P)	34 mL	7	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P) (Oilseed only)	91 mL	7. Do not feed treated crop to livestock	A or G	98
<b>Defoliators</b>					
Flea beetles	<b>Seed treatments</b>				
	<i>Lumiderm</i> (D) <sup>3</sup>	Applied combined with a neonicotinoid-based seed treatment.			
	<i>Fortenza Advanced</i> (D) <sup>4</sup>	A co-pack of <i>Fortenza</i> and <i>Rascendo</i> (sulfoxaflor) that can be combined with neonicotinoid-based seed treatments.			
	<i>BUTEO start</i> (B)	625 to 1042 mL/ 100 kg seed	Seed treatment containing flupyradifurone - applied combined with a neonicotinoid-based seed treatment		1,030
	<i>Helix Vibrance</i> (N)	A seed treatment containing <i>Helix Xtra</i> and <i>Vibrance 500FS</i> .			
	<i>Prosper EverGol</i> (N)		Seed treatment	Seed treatment	>2000
	<b>Sprays</b>				
	<i>Sivanto Energy</i> (B+P)	304 mL	Do not apply after 6-leaf stage	A or G	N/A
	<i>Decis 100 EC/Advantage</i> <i>Deltamethrin 5 EC/Decimate/</i> <i>Rauma/Poleci</i> (P)	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 60 mL ( <i>Advantage</i> <i>Delta..5EC/Decimate/</i> <i>Rauma</i> ) 81 to 121 mL ( <i>Poleci</i> )	7	A or G	>300 to 2000
	<i>UP-Cyde/Ship</i> (P)	56.7 mL	30	A or G	355
	<i>Matador/Silencer/Labamba/</i> <i>Zivata</i> (oilseed only) (P)	34 mL	7	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P) (Oilseed only)	91 mL	7. Do not feed treated crop to livestock.	A or G	98
	<i>Malathion 85E</i> (OP)	0.217 to 0.346 L	7	A or G	>550

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Cabbage seedpod weevil</b>	Note: Yellow mustard ( <i>Sinapis alba</i> ) is resistant to cabbage seedpod weevil; oriental and brown mustards ( <i>Brassica juncea</i> ) are susceptible to feeding by cabbage seedpod weevil.				
	<i>Matador/Silencer/Labamba/ Zivata</i> (adults) (oilseed only) (P)	34 mL	7	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P) (Oilseed only)	91 mL	7. Do not feed treated crop to livestock	A or G	98
	<i>Decis 100 EC/Advantage Deltamethrin 5 EC/ Poleci</i> (for control of adults only) (P)	40 mL ( <i>Decis 100 EC</i> ) 80 mL ( <i>Advantage Delta..5EC</i> ) 162 mL ( <i>Poleci</i> )	7	A or G	>300 to 2000
<b>Diamondback moth</b>	<i>Coragen Max Shenzi Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole</i> (D)	17 mL 25.5 mL 51 mL	1	A or G	>5000
	<i>Decis 100 EC/Advantage Deltamethrin 5 EC/ Poleci</i> (P)	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 60 mL ( <i>Advantage Delta..5EC</i> ) 81 to 121 mL ( <i>Poleci</i> )	7	A or G	>300 to 2000
	<i>Matador/Silencer/Labamba/ Zivata</i> (oilseed only) (P)	34 mL	7	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P) (Oilseed only)	91 mL	7. Do not feed treated crop to livestock	A or G	98
	<i>Malathion 85E</i> (OP)	0.109 to 0.168 L	7	A or G	>550
<b>Bertha armyworm</b>	<i>Coragen Max Shenzi Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole</i> (D)	17 to 50.5 mL 25.5 to 76.1 mL 51 to 152 mL	1	A or G	>5000
	<i>Decis 100 EC/Advantage Deltamethrin 5 EC/ Poleci</i> (P)	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 60 mL ( <i>Advantage Delta..5EC</i> ) 81 to 121 mL ( <i>Poleci</i> )	7	A or G	>300 to 2000
	<i>Matador/Silencer/Labamba/ Zivata</i> (oilseed only) (P)	34 mL	7	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P) (Oilseed only)	91 mL	7. Do not feed treated crop to livestock	A or G	98
<b>Clover cutworm</b>	<i>Decis 100 EC/Advantage Deltamethrin 5 EC/ Poleci</i> (P)	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 60 mL ( <i>Advantage Delta..5EC</i> ) 81 to 121 mL ( <i>Poleci</i> )	7	A or G	>300 to 2000
<b>Imported cabbageworm</b>	<i>Coragen Max Shenzi Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole</i> (D)	33.5 mL 50.6 mL 101 mL	1	A or G	>5000
	<i>Matador/Silencer/Labamba/ Zivata</i> (oilseed only) (P)	34 mL	7	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P) (Oilseed only)	91 mL	7. Do not feed treated crop to livestock.	A or G	98

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
Beet webworm	<i>Decis 100 EC/Advantage Deltamethrin 5 EC/ Poleci</i> (P)	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 60 mL ( <i>Advantage Delta..5EC</i> ) 81 to 121 mL ( <i>Poleci</i> )	7	G	>300 to 2000
Cabbage looper	<i>Coragen Max Shenzi</i> <i>Cosayr, Vermis, Rorvik, Maxunitech</i> <i>Chlorantraniliprole</i> (D)	33.5 mL 50.6 mL 101 mL	1	A or G	>5000
	<i>Matador/Silencer/Labamba/Zivata</i> (oilseed only) (P)	34 mL	7	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P) (Oilseed only)	91 mL	7. Do not feed treated crop to livestock.	A or G	98
Grasshopper	<i>Coragen Max Shenzi</i> <i>Cosayr, Vermis, Rorvik, Maxunitech</i> <i>Chlorantraniliprole</i> (D)	17 to 33.5 mL 25.5 to 50.6 mL 51 to 101 mL	1	A or G	>5000
	<i>Decis 100 EC/Advantage Deltamethrin 5 EC/ Poleci</i> (P)	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 60 mL ( <i>Advantage Delta..5EC</i> ) <i>Poleci</i> : 81 to 121 mL (ground), 121 mL (air)	7	A or G	>300 to 2000
	<i>Matador/Silencer/Labamba/Zivata</i> (young grasshoppers only) (oilseed only) (P)	25 to 34 mL (ground) 34 mL (air)	7	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P) (Oilseed only)	91 mL	7. Do not feed treated crop to livestock	A or G	98
	<i>Malathion 85E</i> (OP)	0.217 to 0.346 L	7	A or G	>550

**ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.**

<sup>1</sup> Insecticide Group: D=diamides, N= neonicotinoids, P=pyrethroids, C=carbamates, OP=organophosphates.

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

<sup>3</sup>DO NOT apply any subsequent applications of a group 28 insecticide (such as Coragen) for a minimum of 60 days after planting seed treated with Lumiderm.

<sup>4</sup> DO NOT apply any subsequent applications of a group 28 insecticide (such as Coragen) after planting seed treated with Fortenza.

## Oats – See small grain cereals

### Pastures and Rangelands Insect Management Chart

**Note:** Insects for biological control of weeds such as leafy spurge may be introduced and established in some pastures in Manitoba and Saskatchewan. If insect feeding to pastures gets to economic levels, consider using control strategies and insecticides that will minimize harm to these biological control agents where possible.

Insects	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
Grasshoppers	<b>Reduced Agent and Area Treatments (RAATs):</b> Grasshoppers on rangelands may be managed by applying certain insecticides in treated swaths, which alternate with untreated swaths. This can reduce the cost of control and amount of insecticide used by more than 50 percent, while resulting in effective control.				

Insects	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
Grasshoppers, <i>continued</i>	<b>Spreadable Bran Baits</b>				
	<i>Eco bran (C)</i>	0.8 to 1.6 kg	1 – entry of beef cattle or other livestock. 2- entry of dairy cattle.	G	N/A
	<b>Sprays</b>				
	<i>Coragen Max Shenzi Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole (D)</i>	17 to 34 mL 25.5 to 50.6 mL 51 to 101 mL	0	G	>5000
	Decis 100 EC/Advantage Deltamethrin 5 EC/Poleci (P)	20 to 30 mL (Decis 100 EC) 40 to 60 mL (Advantage Deltamethrin 5EC) 81 to 121 mL (Poleci)	N/A	A or G	>300 to 2000
	Sevin XLR (C)	486 to 931 mL (for nymphs or sparse vegetation 931 mL to 1.4 L (for adults or dense vegetation)	1 to 2 (see label)	G	699
	Malathion 85E (OP)	0.336 L	DO NOT apply to fields occupied by dairy animals, but may be grazed or harvested on the day of application.	G	>550
Lagon/Cygon 400EC/ Cygon 480-AG/Diamante 4 (OP) (pastures)	Nymphs: 223 mL (Lagon, Cygon 480-AG, Diamante 4), 267 mL (Cygon 400EC). Adults: 344 to 405 mL (Lagon, Cygon 480-AG, Diamante 4), 413 to 486 mL (Cygon 400EC).	2 (nymphs) 7-28 (adults - see labels)	A or G (Lagon) G (Diamante 4, Cygon 480-AG, Cygon 400EC)	245 to 550	
<b>Armyworms</b>	<i>Coragen Max Shenzi Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole (D)</i>	34 to 51 mL 50.6 to 76.1 mL 101 to 152 mL	0	G	>5000

**ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.**

<sup>1</sup> Insecticide Group: D=diamides, P=pyrethroids, C=carbamates, OP=organophosphates.

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

## Field Scouting in Peas (Field Peas)

- Cutworm
  - **Nominal Threshold:** 2 to 3 cutworms per square metre.

### Sap Feeders

- Aphids
  - **When and How to Monitor:** Look for when monitoring field peas at the beginning of flowering. Take 180° sweeps or check 10, 8 inch (20 cm) plant tips at each stop. Record total number of aphids and calculate average per sweep or plant tip.

- **Economic Threshold:** If, at the beginning of flowering, there are 9 to 12 aphids per sweep or 2 to 3 aphids per 8 inch (20 cm) plant tip, an insecticide application when 50 percent of plants have produced some young pods will be cost-effective.

## Peas (Field Peas) Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Belowground and Surface Feeders</b>					
Wireworms	<i>Cruiser 5FS</i> (N)	17 to 50 mL/100 kg seed	May be applied on-farm or by commercial seed treaters.		
	<i>Trilex EverGol Shield</i>	A seed treatment containing <i>Stress Shield 600</i> and 3 fungicides.			
	<i>Scorpio Ant and Insect Bait</i> (suppression) (Sp)	10 to 20 kg	Incorporate into the soil at planting to a depth of 10 to 20 cm.		
Cutworms	<i>Lumivia CPL</i> (D) <sup>3</sup>	32 to 64 mL/100 kg seed	Seed treatment		>5000
	<i>Scorpio Ant and Insect Bait</i> (black cutworm) (Sp)	10 to 20 kg	28	G	
	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole</i> (D)	33.5 mL 50.6 mL 101 mL	1	A or G	>5000
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> ) Do not cut treated fields for hay/forage. Do not graze treated fields.	A or G	56 to 98
	<i>Decis 100 EC</i> (P)	41 mL	7	A or G	633
	<i>Pounce/Perm-UP/ IPCO Syncro</i> (P) <i>Ambush</i> (P)	73 to 158 mL 57 to 121 mL	7	A or G (see labels)	789 to 1030
<b>Sap and Fluid Feeders</b>					
Leafhoppers	<i>Sivanto Prime</i> (B)	202 to 304 mL	7	A or G	>2000
	<i>Malathion 85E</i> (OP)	0.445 L	3	A or G	>550
Pea aphid	<i>Carbine</i> (F)	49 to 65 g	7	G	>2000
	<i>Movento</i> (TT)	75 to 111 mL	7	G	>2000
	<i>Sivanto Prime</i> (B)	202 to 304 mL	7	A or G	>2000
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 to 94 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> ) Do not cut treated fields for hay/forage. Do not graze treated fields.	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 to 223 mL	14. Do not feed treated crop to livestock	A or G	98
	<i>Silencer Duo</i> (D+P) <i>Silencer Duo A</i> <i>Silencer Duo B</i>	51 to 116 mL 34 to 76 mL	21 days	A or G	N/A

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
Pea aphid, <i>continued</i>	<i>Malathion 85E</i> (OP)	0.445 L	3	A or G	>550
	<i>Lagon/Cygon 400EC/ Cygon 480-AG/Diamante 4</i> (OP)	110 to 150 mL ( <i>Lagon, Cygon 480-AG, Diamante 4</i> ) 134 to 185 mL ( <i>Cygon 400EC</i> )	3 to 21 (see labels)	A or G	245 to 550
<b>Defoliator</b>					
Grasshoppers	<i>Coragen Max Shenzi Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole</i> (D)	17 to 33.5 mL 25.5 to 50.6 mL 51 to 101 mL	1	A or G	>5000
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> ) Do not cut treated fields for hay/forage. Do not graze treated fields.	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 mL	14. Do not feed treated crop to livestock	A or G	98
	<i>Silencer Duo</i> (D+P) <i>Silencer Duo A Silencer Duo B</i>	51 mL 34 mL	21 days	A or G	N/A
	<i>Decis 100 EC</i> (P)	20 to 30 mL	7	A or G	633
Alfalfa looper	<i>Sevin XLR</i> (C)	1.90 L	3	G	699
Pea leaf weevil	<i>Lumivia CPL</i> (D) <sup>3</sup>	64 to 96 mL/100 kg seed		Seed treatment	
	<i>Cruiser 5FS</i> (N)	50 or 83 mL/100 kg seed	On-farm application at the lower rate only.		
	<i>Trilex EverGol Shield</i> (N)	A seed treatment containing <i>Stress Shield 600</i> and 3 fungicides.			
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 mL	14 ( <i>Matador/Labamba</i> ) 21 ( <i>Silencer/Zivata</i> ) Do not cut treated fields for hay/forage. Do not graze treated fields.	A or G	56 to 98
	<i>Voliam Xpress</i> (D+P)	91 mL	14. Do not feed treated crop to livestock.	A or G	98
	<i>Silencer Duo</i> (D+P) <i>Silencer Duo A Silencer Duo B</i>	51 mL 34 mL	21 days	A or G	N/A
	<i>Decis 100 EC</i> (P) (suppression)	30 mL	7	A or G	633
Armyworm	<i>Lumivia CPL</i> (D) <sup>3</sup>	32 to 64 mL/100 kg seed		Seed treatment	
	<i>Coragen Max Shenzi Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole</i> (D)	33.5 to 50.5 mL 50.6 to 76.1 mL 101 to 152 mL	1	A or G	>5000
	<i>Voliam Xpress</i> (D+P)	202 mL	14. Do not feed treated crop to livestock	A or G	98

**ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.**

<sup>1</sup> Insecticide Group: F=fonicamid, D=diamides, N=neonicotinoids, P=pyrethroids, C=carbamates, OP=organophosphates, TT = tetroneic and tetramic acid derivatives.

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

<sup>3</sup> Do not make a subsequent foliar application of any group 28 insecticide for a minimum of 60 days after planting seed treated with Lumivia CPL.

## Scouting and Thresholds for Insects in Potatoes

### • Matador/Aphids

- **Typical damage:** Several species of aphids are sap feeders on potato leaves. At very high numbers this sap feeding may cause plants to wilt in small localized areas of the field as “aphid holes”. The greatest injury is due to transmission of viruses. Identification and control of aphids is critical in potato seed production to prevent virus spread. In commercial production tuber quality may be reduced by net necrosis of tubers.
- **When and How to Monitor:** Aphid identification and scouting should start in early July when aphids begin to be observed in fields. Sample 25 lower canopy leaves from each of 4 areas in the field (100 leaves in total). Count potato aphids and green peach aphids on each compound leaf, using a magnifying device to identify the species.
- **Economic threshold:** For seed potatoes = 3 to 10 green peach aphids per 100 leaves. For processing potatoes = 30 to 100 green peach aphids per 100 leaves. There are no economic thresholds for buckthorn and potato aphids. These thresholds relate to transmission of potato leafroll virus and are not useful in determining infectivity relative to potato virus Y. No economic thresholds have been established for aphids that relate to potato virus Y transmission.

### • Leafhoppers

- **Typical damage:** the potato leafhopper injects a toxin into the plant which results in hopper burn, a yellowing and curling of the tips and margins of the leaflets, which ultimately turn brown and brittle. Damaged plants die prematurely and yield may be reduced.
- **When and How to Monitor:** Nymphs are scouted by visual inspection; sample 100 plants from 3 to 5 areas of the

field. Count the wingless nymphs on compound leaves taken from mid canopy. Adults are sampled with a sweep net (20 sweeps per location at 5 locations for a total of 100 sweeps).

- **Economic threshold:** Nymphs – 1 nymph per 10 leaves. Adults – 1 leafhopper per sweep.

### • Colorado potato beetle

- **Typical damage:** Larvae feeding may cause extensive defoliation of leaves and is capable of transmitting spindle tuber virus and bacterial ring rot.
- **When and How to Monitor:** Start scouting for larvae 2 weeks after crop emergence. On field edges, count number of beetles on 20 separate plants. Record per cent defoliation of leaves. Repeated scouting is required since beetles have developed resistance to many insecticides and 2 generations may occur during the year.
- **Economic threshold:** Economic threshold based on beetle numbers may vary by cost of treatment, expected returns and variety. Typical thresholds are 18 larvae per 20 plants for Russet Burbank vs 6 larvae per 20 plants for Norland. Treat when defoliation exceeds 10 percent.

### • Potato flea beetle

- **Typical damage:** Beetle feeding causes “shot holes” in the leaves. Two generations may attack the foliage. **When and How to Monitor:** Estimate feeding damage on the leaf or numbers of beetles on plants.
- **Economic threshold:** Early in the season treat if greater than 10 percent defoliation. Later in the season (August) treat if greater than 25 percent defoliation or with greater than 65 beetles per plant for Norland or 300 beetles per plant for Russet Burbank.

## Potatoes\* Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Belowground and Surface Feeders</b>					
Wireworms	<i>Cimegra</i>	250 mL/ha in furrow	In-furrow application		>2000
	<i>Titan</i> (N)	20.8 mL/100 kg potato seed pieces	Seed treatment	Seed treatment	2000
	<i>NipsIt INSIDE</i> (N)	20.8 mL/100 kg potato seed pieces	Seed treatment	Seed treatment	3044
	<i>Thimet 20-G</i> (OP)	105 g/100 m in sandy or light soil 161 g/100 m in silt or heavy soils	DO NOT harvest potatoes before 90 days after planting time.	G	5.1 to 13.5
	<i>Scorpio Ant and Insect Bait</i> (suppression) (Sp)	10 to 20 kg	Incorporate into the soil at planting to a depth of 10 to 20 cm.		
Cutworms	<i>Scorpio Ant and Insect Bait</i> (black cutworm) (Sp)	10 to 20 kg	7	G	
	<i>Pounce/Perm-UP/IPCO Syncro</i> (P) <i>Ambush</i> (P)	73 to 158 mL 57 to 121 mL	1	A or G (see labels)	789 to 1030
	<i>UP-Cyde /Ship</i> (P)	115 mL	21	G	355

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Sap or Fluid Feeders</b>					
<b>Aphids</b>	<b>Seed Piece Treatments</b>				
	<i>Actara 240SC</i> (N)	See chart on label	N/A	Seed treatment	>5000
	<i>Admire 240 F</i> (N)	11.79 to 17.69 mL/ 100 pounds (45.36 kg) of potato seed tubers	N/A	Seed treatment	>4870
	<i>Cruiser Maxx Potato Extreme</i> (N)	20 mL/100 kg seed	NA	Seed treatment	3129
	<i>Titan</i> (N)	10.4 to 20.8 mL/100 kg potato seed pieces	N/A	Seed treatment	2000
	<i>NipsIt INSIDE</i> (N)	10.4 to 20.8 mL/100 kg potato seed pieces	Seed treatment	Seed treatment	3044
	<i>Emesto Complete</i>	See product page	N/A	Seed treatment	N/A
	<b>In-Furrow Application</b>				
	<i>Minecto Duo</i> (N, D)	178 to 283 g		G	>5000
	<i>Actara 240SC</i> (N)	0.15 to 0.20 L (based on 90 cm row spacing)		G	>5000
	<b>Foliar Sprays</b>				
	<i>Beleaf 50SG</i> (F)	49 to 65 g	7	G	>2000
	<i>Sefina</i> (PP)	81 mL	7	A or G	>2000
	<i>Superior 70 Oil</i>	4 L	14	G	>5000
	<i>Movento</i>	89 to 148 mL	7	A or G	>2000
	<i>Exirel</i> (D)	202 to 607 mL	7	A or G	>5000
	<i>Vayego</i> (D) (suppression)	61 mL	14	A or G	>2000
	<i>Sivanto Prime</i> (B)	202 to 304 mL	7	A or G	>2000
	<i>Closer</i> (S)	20 to 61 mL	7	A or G	>5000
	<i>Cormoran</i> (SB + N)	263 to 304 mL	7	G	>2000
	<i>Actara 240SC</i> (N)	44.1 mL	7	A or G	>5000
	<i>Actara 25WG</i> (N)	42.5 g	7	A or G	>5000
	<i>Admire 240 F</i> (N)	81 mL	7	G	4143 to 4870
	<i>Assail/Aceta</i> (N)	22.7 to 34.8 g	7	G	1064
	<i>Clutch</i> (N)	28 to 43 g	14	A or G	3900 to 4700
	<i>Concept</i> (N + P)	263 mL	7	G	2500
	<i>Decis 100 EC</i> (P) (potato aphid and buckthorn aphid)	51 mL	1	G	633
	<i>Malathion 85E</i> (OP)	0.297 to 0.445 L	3	G	>550
	<i>Lagon/Cygon 400EC/ Cygon 480-AG/Diamante 4</i> (OP)	220 to 410 mL ( <i>Lagon, Cygon 480-AG, Diamante 4</i> ) 267 to 486 mL ( <i>Cygon 400EC</i> )	7	G	245 to 550
	<i>Imidan</i> (OP)	0.65 kg	7	G	258 to 275
<b>Potato psyllid</b>	<i>Beleaf 50SG</i> (F)	81 g	7	G	>2000
	<i>Agri-mek</i> (A)	49 to 91 mL	14	G	310
	<i>Minecto Pro</i> (A + D)	150 to 271 mL	14	G	451
	<i>Movento</i> (TT)	89 to 148 mL	7	A or G	>2000
	<i>Harvanta</i> (suppression) (D)	324 to 486 mL	7	A or G	>2000

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
Leafhoppers	<b>Seed Piece Treatments</b>				
	<i>Actara 240SC</i> (N)	See chart on label	N/A	Seed treatment	>5000
	<i>Cruiser Maxx Potato Extreme</i> (N)	20 mL/100 kg seed	NA	Seed treatment	3129
	<i>Titan</i> (N)	10.4 to 20.8 mL/100 kg potato seed pieces	N/A	Seed treatment	2000
	<i>NipsIt INSIDE</i> (N)	10.4 to 20.8 mL/100 kg potato seed pieces	Seed treatment	Seed treatment	3044
	<i>Emesto Complete</i>	See product page	N/A	Seed treatment	N/A
	<b>In-Furrow Application</b>				
	<i>Minecto Duo</i> (N, D)	178 to 283 g		G	>5000
	<i>Actara 240SC</i> (N)	0.15 to 0.20 L (based on 90 cm row spacing)		G	>5000
	<b>Foliar Sprays</b>				
	<i>Sivanto Prime</i> (B)	202 to 304 mL	7	A or G	>2000
	<i>Closer</i> (S)	121 mL	7	A or G	>5000
	<i>Cormoran</i> (SB + N)	198 to 304 mL	7	G	>2000
	<i>Actara 240SC</i> (N)	44.1 mL	7	A or G	>5000
	<i>Actara 25WG</i> (N)	42.5 g	7	A or G	
	<i>Pounce/Perm-UP/IPCO Syncro</i> (P)	73 to 105 mL	1	A or G	789 to 1030
	<i>Decis 100 EC/ Advantage Deltamethrin 5 EC/Poleci</i> (P)	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 60 mL ( <i>Advantage Delta..5EC</i> ) 81 to 121 mL ( <i>Poleci</i> )	1	A or G	>300 to 2000
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 mL	7	A or G	56 to 98
	<i>UP-Cyde/Ship</i> (P)	57 mL	7	A or G	355
	<i>Concept</i> (N + P)	263 mL	7	G	2500
	<i>Sevin XLR</i> (C)	1.01 L	7	G	699
	<i>Malathion 85E</i> (OP)	0.297 to 0.445 L	3	G	>550
	<i>Lagon/Cygon 400EC/ Cygon 480-AG/Diamante 4</i> (OP)	220 to 410 mL ( <i>Lagon, Cygon 480-AG, Diamante 4</i> ) 267 to 486 mL ( <i>Cygon 400EC</i> )	7	G	245 to 550
<i>Imidan</i> (OP)	0.65 kg	7	G	258 to 275	
Lygus bugs	<i>Closer</i> (S)	121 mL	7	A or G	>5000
	<i>Pounce/Perm-UP/IPCO Syncro</i> (P) <i>Ambush</i> (P)	73 to 105 mL 57 to 81 mL	1	A or G	789 to 1030
	<i>Decis 100 EC/Advantage Deltamethrin 5 EC/ Poleci</i> (P)	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 60 mL ( <i>Advantage Delta..5EC</i> ) 81 to 121 mL ( <i>Poleci</i> )	1	A or G	>300 to 2000
	<i>Matador/Silencer/Labamba/Zivata</i> (P)	34 mL	7	A or G	56 to 98
	<i>UP-Cyde/Ship</i> (P)	81 mL	7	A or G	355
	<i>Sevin XLR</i> (C)	2.12 to 2.59 L	7	G	699
	<i>Concept</i> (N + P)	263 mL	7	G	2500
	<i>Lagon</i> (OP)	0.22 to 0.41 L	7	G	425

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Defoliators</b>					
<b>Colorado potato beetle</b>	Note: Colorado potato beetles have been found to be resistant to several families of insecticides in localized areas of Manitoba. Rotation between different families of insecticides is essential.				
	<b>Seed Piece Treatments</b>				
	<i>Fortenza</i> (D)	10 to 22.5 mL/ 100 kg seed	N/A	Seed treatment	>5000
	<i>Actara 240SC</i> (N)	See chart on label	N/A	Seed treatment	>5000
	<i>Admire 240 F</i> (N)	11.79 to 17.69 mL/ 100 pounds (45.36 kg) of potato seed tubers	N/A	Seed treatment	4143 to 4870
	<i>Cruiser Maxx Potato Extreme</i> (N)	20 mL/100 kg seed	NA	Seed treatment	3129
	<i>Titan</i> (N)	10.4 to 20.8 mL/100 kg potato seed pieces	N/A	Seed treatment	2000
	<i>NipsIt INSIDE</i> (N)	10.4 to 20.8 mL/100 kg potato seed pieces	Seed treatment	Seed treatment	3044
	<i>Emesto Complete</i>	See product page	N/A	Seed treatment	N/A
	<b>In-Furrow Application</b>				
	<i>Verimark</i> (D)	304 to 405 mL (based on 90 cm row spacing)	N/A	G	>5000
	<i>Minecto Duo</i> (N, D)	178 to 283 g		G	>5000
	<i>Actara 240SC</i> (N)	0.15 to 0.20 L (based on 90 cm row spacing)		G	>5000
	<b>Foliar Sprays</b>				
	<i>BioTitan WP</i>	809 to 3,238 g	0	G	
	<i>Rimon</i> (SB)	0.17 to 0.33 L	14	G	3914 to >5000
	<i>Entrust</i> (Sp)	68 to 135 mL	7	G	>5000
	<i>Success</i> (Sp)	34 to 67 mL	7	G	>5000
	<i>Delegate</i> (Sp)	65 to 97 g	7	A or G	>5000
	<i>Coragen Max Shenzi Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole</i> (D)	33.5 to 67.5 mL 50.6 to 101.2 mL 101 to 202 mL	1	A or G	>5000
	<i>Exirel</i> (D)	304 to 405 mL	7	A or G	>5000
	<i>Harvanta</i> (D)	324 to 486 mL	7	A or G	>2000
	<i>Vayego</i> (D)	61 mL	14	A or G	>2000
	<i>Sivanto Prime</i> (B)	304 to 405 mL	7	A or G	>2000
	<i>Agri-mek</i> (A)	49 to 91 mL	14	G	310
	<i>Minecto Pro</i> (A + D)	225 to 271 mL	14	G	451
	<i>Cormoran</i> (SB + N)	178 to 283 mL	7	G	>2000
<i>Actara 240SC</i> (N)	44.1 mL	7	A or G	>5000	
<i>Actara 25WG</i> (N)	42.5 g	7	A or G	>5000	
<i>Admire</i> (N)	81 mL	7	G	4143 to 4870	
<i>Assail/Aceta</i> (N)	16.2 to 32.4 g	7	G	1064	
<i>Pounce/Perm-UP/IPCO Syncro</i> (P) <i>Ambush</i> (P)	73 to 105 mL 57 to 81 mL	1	A or G	789 to 1030	

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
Colorado potato beetle, <i>continued</i>	<i>Decis 100 EC/Advantage Deltamethrin 5 EC/Decimate/Rauma/Poleci</i> (P)	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 60 mL ( <i>Advantage Delta..5EC/ Decimate/Rauma</i> ) 81 to 121 mL ( <i>Poleci</i> )	1	A or G	>300 to 2000
	<i>Matador/Silencer/Labamba/Zivata</i> (P)	34 to 50 mL (ground) 34 mL (air)	7	A or G	56 to 98
	<i>Up-Cyde/Ship</i> (P)	57 mL	7	A or G	355
	<i>Concept</i> (N + P)	263 mL	7	G	2500
	<i>Cimegra</i>	51 to 76 mL	14	G	>2000
	<i>Sevin XLR</i> (C)	0.51 L	7	G	699
	<i>Imidan</i> (OP)	0.65 kg	7	G	258 to 275
Potato flea beetle	<b>Seed Piece Treatments</b>				
	<i>Admire 240 F</i> (N)	11.79 to 17.69 mL/ 100 pounds (45.36 kg) of potato seed tubers	N/A	Seed treatment	4143 to 4870
	<i>Titan</i> (N)	10.4 to 20.8 mL/100 kg potato seed pieces			2000
	<i>NipsIt INSIDE</i> (N)	10.4 to 20.8 mL/100 kg potato seed pieces	Seed treatment	Seed treatment	3044
	<i>Ernesto Complete</i>	See product page	N/A	Seed treatment	N/A
	<b>In-Furrow Application</b>				
	<i>Verimark</i> (D)	In-furrow application: 304 to 405 mL (based on 90 cm row spacing)	N/A	In-furrow application	>5000
	<b>Foliar Sprays</b>				
	<i>Exirel</i> (D)	202 to 405 mL	7	A or G	>5000
	<i>Vayego</i> (D)	61 mL	14	A or G	>2000
	<i>Minecto Pro</i> (A + D)	150 to 271 mL	14	G	451
	<i>Minecto Duo</i> (N + D)	178 to 283 g		G	>5000
	<i>Pounce/Perm-UP/IPCO Syncro</i> (P) <i>Ambush</i> (P)	73 to 105 mL 57 to 81 mL	1	A or G	789 to 1030
	<i>Decis 100 EC/Advantage Deltamethrin 5 EC/Decimate/Rauma/Poleci</i> (P)	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 60 mL ( <i>Advantage Delta..5EC/ Decimate/Rauma</i> ) 81 to 121 mL ( <i>Poleci</i> )	1	A or G	>300 to 2000
	<i>Matador/ Silencer/Labamba/Zivata</i> (P)	34 mL	7	A or G	56 to 98
	<i>UP-Cyde/Ship</i> (P)	57 mL	7	A or G	355
	<i>Concept</i> (N + P)	263 mL	7	G	2500
<i>Sevin XLR</i> (C)	1.01 L	7	G	699	
<i>Imidan</i> (OP)	0.65 kg	7	G	258 to 275	
Variegated cutworm	<i>Coragen Max Shenzi Cosayr, Vermis, Rorvik, Maxunitech Chlorantraniliprole</i> (D)	33.5 to 50.5 mL 50.6 to 76.1 mL 101 to 152 mL	1	A or G	>5000

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Variegated cutworm, continued</b>	<i>Exirel</i> (D)	202 to 304 mL	7	A or G	>5000
	<i>Minecto Pro</i> (A + D)	150 to 225 mL	14	G	451
	<i>Pounce/Perm-UP/IPCO Syncro</i> (P) <i>Ambush</i> (P)	73 mL 57 mL	1	G	789 to 1030
	<i>UP-Cyde/Ship</i> (P)	115 mL	7	G	355
	<i>Voliam Xpress</i> (D+P)	202 mL	7. Do not feed treated crop to livestock	A or G	98
	<i>Sevin XLR</i> (C)	45 mL/100 m of row	7	G	699
<b>Armyworm</b>	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech Chlorantraniliprole</i> (D)	33.5 to 50.5 mL 50.6 to 76.1 mL 101 to 152 mL	1	A or G	>5000
	<i>Exirel</i> (D)	202 mL	7	A or G	>5000
	<i>Minecto Pro</i> (A + D)	150 mL	14	G	451
	<i>Cormoran</i> (SB + N)	178 to 304 mL	7	G	>2000
	<i>Matador/Silencer/Labamba/Zivata</i> (P)	34 mL	7	A or G	56 to 98
<b>Grasshoppers</b>	<i>Coragen MaX</i>	17 to 34 mL	1	A or G	>5000
<b>Stem Borers</b>					
<b>European corn borer</b>	<i>Rimon</i> (SB)	0.17 to 0.33 L	14	G	3914 to >5000
	<i>Entrust</i> (Sp)	101 mL	7	G	>5000
	<i>Success</i> (Sp)	51 mL	7	G	>5000
	<i>Delegate</i> (Sp)	65 g	7	A or G	>5000
	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech Chlorantraniliprole</i> (D)	33.5 to 50.5 mL 50.6 to 76.1 mL 101 to 152 mL	1	A or G	>5000
	<i>Exirel</i> (D)	202 to 304 mL	7	A or G	>5000
	<i>Vayego</i> (D)	61 mL	14	A or G	>2000
	<i>Minecto Pro</i> (A + D)	150 to 225 mL	14	G	451
	<i>Cormoran</i> (SB + N)	263 to 304 mL	7	G	>2000
	<i>Matador/Silencer/Labamba/Zivata</i> (P)	34 mL	7	A or G	56 to 98
	<i>Decis 100 EC/Decimate/ Rauma</i> (P)	30 to 51 mL ( <i>Decis 100 EC</i> ) 61 to 101 mL ( <i>Decimate/Rauma</i> )	1	G	633
	<i>Pounce/Perm-UP/IPCO Syncro</i> (P) <i>Ambush</i> (P)	73 mL 57 mL	1	A or G	789 to 1030
	<i>Concept</i> (N + P)	263 mL	7	G	2500
	<i>Sevin XLR</i> (C)	1.01 to 2.12 L	7	G	699

\*Before using any pesticide on potatoes, consult the list of **Agricultural Pesticides Approved for Use**, available from Simplot Canada and McCain Foods (Canada).

**ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.**

<sup>1</sup> Insecticide Group: A = Avermectins, F=fonicamid, SB=substituted benzoylurea, Sp=spinosyns, D=diamides, S=sulfoxamines, B=butenolides, N=neonicotinoids, P=pyrethroids, PP=pyropenes, C=carbamates, OP=organophosphates, PAD= Pyridine azomethine derivatives

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

## Quinoa Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Sap or Fluid Feeders</b>					
Lygus bugs	<i>Closer</i> (S)	81 mL	14	G	>5000
<b>Defoliators and Borers</b>					
Beet webworm	<i>Bioprotec CAF</i> (M)	0.57 to 1.13 L	0	G	N/A
	Coragen MaX	34 to 51 ml	1	G	>5000
Goosefoot groundling moth	Coragen MaX	34 to 51 ml	1	G	>5000
European corn borer	<i>Dipel</i> (M)	227 to 453 g	N/A	A or G	>5000
	<i>Bioprotec CAF</i> (M)	1.13 to 1.62 L	0	G	N/A

**ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.**

<sup>1</sup> Insecticide Group: M=microbial, S=sulfoxamines

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

## Grasshopper Management on Roadsides, Headlands and Summerfallow.

**Note:** Insects for biological control of weeds such as leafy spurge may be introduced and established in some areas of Manitoba and Saskatchewan. If grasshopper numbers become high, consider using control strategies and insecticides that will minimize harm to these biological control agents.

Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Spreadable Bran Baits</b>				
<i>Eco bran</i> (roadsides, headlands, field borders, right-of-way, wastelands) (C)	0.8 to 1.6 kg	0	G	N/A
<b>Sprays</b>				
<i>Decis 100 EC/ Advantage Deltamethrin 5 EC/ Poleci</i> (P) (roadside)	20 to 30 mL (Decis 100 EC) 40 to 60 mL (Advantage Deltamethrin 5 EC) 81 to 121 mL (Poleci)	N/A	G	>300 to 2000
<i>UP-Cyde/ Ship</i> (P) (roadsides, headlands, and summerfallow) (young grasshoppers only)	33 to 46 mL		G	355
<i>Matador/Labamba</i> (P) (summerfallow) (young grasshoppers only)	25 to 34 mL (ground) 34 mL (air)	Treated areas must not be grazed or cut for hay or forage.	A or G	56 to 93
<i>Sevin XLR</i> (C) (headlands, ditchbanks, field borders, rights-of-way)	486 to 931 mL (for nymphs or sparse vegetation) 931 mL to 1.4 L (for adults or dense vegetation)	0	G	699
<i>Lagon/Cygon 400EC/Cygon 480-AG/ Diamante 4</i> (OP) (wastelands)	Nymphs: 223 mL ( <i>Lagon</i> , <i>Cygon 480-AG</i> , <i>Diamante 4</i> ), 267 mL ( <i>Cygon 400EC</i> ). Adults: 344 to 405 mL ( <i>Lagon</i> , <i>Cygon 480-AG</i> , <i>Diamante 4</i> ), 413 to 486 mL ( <i>Cygon 400EC</i> ).	2 (nymphs) 7-28 (adults - see labels)	A or G ( <i>Lagon</i> ) G ( <i>Diamante 4</i> , <i>Cygon 480-AG</i> , <i>Cygon 400EC</i> )	245 to 550

**ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.**

<sup>1</sup> Insecticide Group: P=pyrethroids, C=carbamates, OP=organophosphates.

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

## Field Scouting in Rye

Information on typical damage, when and how to monitor, and economic thresholds for cutworm, aphids and armyworm in rye can be found in the section on field scouting in small grain cereals (wheat, barley, oats).

### Rye Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Belowground and Surface Feeders</b>					
<b>Wireworms</b>	<i>Teraxxa F4</i>	300 mL/100 kg seed	Seed treatment		>2000
	<i>Lumivia CPL</i> (D) <sup>3</sup>	24 to 40 mL/100 kg seed	Seed treatment		>5000
	<i>Cruiser Vibrance Quattro</i> (N)	325 mL/100 kg seed		Seed treatment	>5000
	<i>Cruiser 5FS</i> (N)	17 to 50 mL/100 kg seed	May be applied on-farm or by commercial seed treaters.		
<b>Cutworms</b>	<i>Lumivia CPL</i> (D) <sup>3</sup>	8 to 24 mL/100 kg seed	Seed treatment		>5000
	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole</i> (D)	33.5 mL 50.6 mL 101 mL	1	A or G	>5000
	<i>Pounce/Perm-UP/</i> <i>IPCO syncro</i> (P)	73 to 158 mL	7	A or G (see labels)	789 to 1030
<b>Sap Feeders</b>					
<b>Aphids</b>	<i>Malathion 85E</i> (OP)	0.445 to 0.544 L	7	A or G	>550
<b>Defoliators</b>					
<b>Grasshoppers</b>	<b>Seed Treatments</b>				
	<i>Lumivia CPL</i> (D) <sup>3</sup> (Suppression only)	40 mL/100 kg seed	Seed treatment		>5000
	<b>Sprays</b>				
	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole</i> (D)	17 to 33.5 mL 25.5 to 50.6 mL 51 to 101 mL	1	A or G	>5000
	<i>Malathion 85E</i> (OP)	0.445 to 0.544 L	7	A or G	>550
	<i>Lagon 480 E</i> (OP)	0.22 L (nymphs) 0.34 to 0.41 L (adults)	35	A or G	60
<b>Armyworm</b>	<i>Lumivia CPL</i> (D) <sup>3</sup>	8 to 24 mL/100 kg seed	Seed treatment		>5000
	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole</i> (D)	33.5 to 50.5 mL 50.6 to 76.1 mL 101 to 152 mL	1	A or G	>5000
	<i>Delegate</i> (Sp)	40 to 81 g	21	G	>5000
	<i>Matador/Labamba</i> (P)	34 mL	28 days. Do not cut treated fields for hay/ forage. Do not graze treated fields.	A or G	56-93
	<i>Malathion 85E</i> (OP)	0.445 to 0.544 L	7	A or G	>550

**ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.**

<sup>1</sup> Insecticide Group: N=neonicotinoids, P=pyrethroids, C=carbamates, OP=organophosphates, Sp=spinosyns

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

<sup>3</sup> Do not make a subsequent foliar application of any group 28 insecticide for a minimum of 60 days after planting seed treated with Lumivia CPL.

## Safflower Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Belowground and Surface Feeders</b>					
Cutworms	<i>Coragen Max</i>	33.5 mL	1	A or G	>5000
	<i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole (D)</i>	50.6 mL 101 mL			
<b>Defoliators</b>					
Grasshoppers	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole (D)</i>	17 to 33.5 mL 25.5 to 50.6 mL 50.6 to 101 mL	1	A or G	>5000
	<i>Lagon 480 E/Cygon 480-AG/</i> <i>Cygon 400EC (OP)</i>	220 to 400 mL ( <i>Lagon</i> , <i>Cygon 480-AG</i> ) 267 to 486 mL ( <i>Cygon 400EC</i> )	21	A or G	425 to 550

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

<sup>1</sup> Insecticide Group: D=diamides, OP=organophosphates.

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

## Field Scouting in Small Grain Cereals (wheat, barley, oats)

Belowground and Surface Feeders

- **Cutworm**

- **Typical Damage:** Notched, wilted, dead, or cut-off plants. Plants missing from rows, bare patches appearing in field.
- **When and How to Monitor:** Look for cutworm, and evidence of cutworm feeding, when monitoring in May and June. Often cutworms will be close to the cut or shriveled plants they have just damaged. Cutworm will sometimes be most abundant in patches or a specific area of a field. In areas of the field where cutworm damage is noticeable, check around damaged plants in a 0.25 square metre (50 cm x 50 cm) area. Use trowel or shovel to carefully search through top half to 1 inch of soil for cutworm larvae. Multiply the number of cutworms found by 4 to get the number per square metre. Repeat in several locations to get an accurate assessment of what the cutworm levels are.
- **Economic Threshold:** Pale western cutworm – 3 to 4 per square metre; Redbacked and army cutworm – 5 to 6 per square metre. Well established fall-seeded crops or spring seeded crops with good moisture conditions can tolerate higher numbers. Sometimes it is most economical to just treat infested patches, and not whole fields.

Sap Feeders

- **Aphids**

- **Typical Damage:** Visible wilting of plants, yellow patches in fields, plants are sticky.
- **When and How to Monitor:** Look for aphids when monitoring prior to the soft dough stage. While monitoring the field, using a sweep net or tapping plants over a white tray or bucket can alert you to the presence and relative abundance of aphids. If aphid levels appear concerning, a more thorough examination is needed. Count aphids on 20 randomly selected stems in each of 5 areas. Counts should be at least 50 paces apart, and observations should be made well into the center of the field. Too frequently farmers become alarmed after checking a few plants along the margins, especially near shelterbelts, where populations are high. Record the total number of aphids and calculate the average per plant.
- **Economic Threshold:** 12 to 15 aphids per stem prior to the soft dough stage.
- **Cereal Aphid Manager** is a mobile app that helps growers determine aphid populations by predicting what the aphid population will be in 7 days along with beneficial insect pressure on the population and suggests if insecticide application is necessary. <https://open.canada.ca/en/app/cereal-aphid-manager-mobile-app>

- **Barley Thrips**

- **When and How to Monitor:** Sampling should begin when the flag leaf is first visible and continue until the head is completely emerged from the boot. Barley thrips exhibit an edge effect; there are usually more thrips near protected field margins than other areas of the field. Most thrips can be found under the top 2 leaf sheaths. Unroll the leaf sheaths away from the stem to find the thrips.
- **Economic Threshold:** Insecticide treatments are only effective when applied before heading is complete. Treat when thrips are equal to or greater than the number calculated by: Threshold (Thrips per stem) = (Cost of Control ÷ expected \$ value per bushel)/0.4

## Defoliators

- **Grasshoppers**

- **Typical Damage:** Black strips along margins of newly emerging crops, head clipping later in season.
- **When and How to Monitor:** Look for grasshoppers when monitoring fields from late – May through to harvest. Check along edges of crop, particularly areas adjacent to hayland, pastures and roadsides. Estimate number of hoppers per square yard (m<sup>2</sup>).
- **Economic Threshold:** 8 to 13 grasshoppers per square metre. Early in the season, when grasshoppers are small, 18 grasshoppers per square metre and visible crop damage may be a more appropriate threshold.
  - A rough estimate for an economic threshold for grasshoppers in crops to be used as greenfeed has been suggested at 20 grasshoppers per square metre or higher.

- **Armyworm**

- **Typical Damage:** Leaves stripped from plants, awns chewed from heads, heads clipped.
- **When and How to Monitor:** Check the soil surface for armyworm, and the plants for feeding, when monitoring in mid- June through early-August. At each stop shake plants and carefully check soil surface for dislodged larvae. During the day larvae may be under plant trash, soil clods or in soil cracks. Check the backs of armyworms for parasite eggs.
- **Economic Threshold:** Four unparasitized larvae, smaller than 2.5 cm (1 inch) per square foot. If heads are being clipped, treat when two or more armyworms per square foot are present. For migrating armyworms: treat a couple of swaths ahead of the infestation in the direction of movement to form a barrier strip.

## Seed Feeders Only

- **Wheat Midge (wheat only)**

- **When and How to Monitor:** Monitor wheat in July when crop emerges from boot stage until flowering. Check crop canopy at dusk for signs of wheat midge adult activity. At each stop, examine 10 heads. Record the number of midge adults observed on or near heads. Calculate average number of midge per head.
  - Sticky traps may be used to capture adult midge activity in wheat fields.
- **Economic Threshold:** *For yield only:* 1 adult midge per 4 to 5 heads. At this level of infestation, wheat yields will be reduced by approximately 15 percent if the midge is not controlled. *To maintain optimum grade:* 1 adult midge per 8 to 10 wheat heads during the susceptible stage.

## Small Grain Cereals (wheat, barley, oats) Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Belowground and Surface Feeders</b>					
Wireworms	<i>Teraxxa F4</i>	300 mL/100 kg seed	Seed treatment		>2000
	<i>Lumivia CPL</i> (D) <sup>3</sup>	24 to 40 mL/100 kg seed	Seed treatment		>5000
	Fortenza (D) <sup>4</sup>	17 to 50 mL/100 kg of seed	Seed treatment		
	<i>Cruiser Vibrance Quattro</i> (N)	325 mL/100 kg seed		Seed treatment	>5000
	<i>Cruiser 5FS</i> (N) (wheat and barley only)	17 to 50 mL/100 kg seed	May be applied on-farm or by commercial seed treaters.		
	<i>NipsIt SUITE Cereals</i> (N) (wheat only)	326 mL/100 kg seed	Seed treatment	Seed treatment	>5000
	<i>NipsIt INSIDE</i> (N)	17 to 100 mL/100 kg seed	Seed treatment	Seed treatment	3044
	<i>Intego Suite Cereals OF</i> (wheat only) (suppression) (N)	339 mL/100 kg seed	Seed treatment	Seed treatment	
<i>Raxil PRO Shield</i> (N)	A co-pack of <i>Raxil PRO</i> and <i>StressShield 600</i> .				
Cutworms	<i>Lumivia CPL</i> (D) <sup>3</sup>	8 to 24 mL/100 kg seed	Seed treatment		>5000
	Fortenza (D) <sup>4</sup>	33 to 50 mL/100 kg seed	Seed Treatment		>5,000

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
Cutworms, <i>continued</i>	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole (D)</i>	33.5 mL 50.6 mL 101 mL	1	A or G	>5000
	<i>Decis 100 EC/Advantage</i> <i>Deltamethrin 5 EC/ Poleci (P)</i>	40 mL ( <i>Decis 100 EC</i> ) 81 mL ( <i>Advantage</i> <i>Delta..5EC</i> ) 162 mL ( <i>Poleci</i> )	31 (oats) 40 (barley, wheat)	A or G	>300 to 2000
	<i>UP-Cyde/Ship (P)</i> (barley and wheat only)	115 mL	21	G	355
	<i>Pounce/Perm-UP/</i> <i>IPCO Syncro (P)</i>	73 to 158 mL	7	A or G (see labels)	789 to 1030
<b>Sap and Fluid Feeders</b>					
Aphids	<i>Malathion 85E (OP)</i>	0.445 to 0.544 L	7	A or G	>550
	<i>Cygon 400EC/Diamante 4 (OP)</i>	170 mL ( <i>Diamante 4</i> ) 206 mL ( <i>Cygon 400EC</i> )	35	A or G	245 to 550
Thrips	<i>Lagon 480 E/Cygon 400EC/</i> <i>Cygon 480-AG/Diamante 4 (OP)</i>	400 mL ( <i>Lagon,</i> <i>Cygon 480-AG,</i> <i>Diamante 4</i> ) 486 mL ( <i>Cygon 400EC</i> )	35	A or G	245 to 550
<b>Defoliators</b>					
Grasshoppers	<b>Seed Treatments</b>				
	<i>Lumivia CPL (D)</i> <sup>3</sup> (Suppression only)	40 mL/100 kg seed	Seed treatment		>5000
	<b>Sprays</b>				
	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole (D)</i>	17 to 33.5 mL 25.5 to 50.6 mL 51 to 101 mL	1	A or G	>5000
	<i>Decis 100 EC/Advantage</i> <i>Deltamethrin 5 EC/ Poleci (P)</i>	20 to 30 mL ( <i>Decis 100 EC</i> ) 40 to 60 mL ( <i>Advantage</i> <i>Delta..5EC</i> ) 81 to 121 mL ( <i>Poleci</i> )	31 (oats) 40 (wheat, barley)	A or G	>300 to 2000
	<i>UP-Cyde/Ship (P)</i> (young grasshoppers only) (wheat and barley only)	33 to 46 mL	30 (wheat) 45 (barley)	G	355
	<i>Matador/Silencer/Labamba/</i> <i>Zivata (P)</i> (young grasshoppers only)	25 to 34 mL (ground) 34 mL (air)	28 days. Do not cut treated fields for hay/ forage. Do not graze treated fields.	A or G	56 to 98
	<i>Silencer Duo (D+P)</i> <i>Silencer Duo A</i> <i>Silencer Duo B</i>	51 mL 34 mL	28 days	A or G	N/A
	<i>Malathion 85E (OP)</i>	0.445 to 0.544 L	7	A or G	>550
	<i>Lagon 480 E (OP)</i>	nymphs: 0.22 L adults: 0.34 to 0.40 L	35	A or G	425 to 450

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
Cereal leaf beetle	A parasitoid of cereal leaf beetle, <i>Tetrastichus julis</i> , has been released and established in many areas.				
	<i>Malathion 85E</i> (OP)	0.435 L	7	A or G	>550
Armyworm	<i>Lumivia CPL</i> (D) <sup>3</sup>	8 to 24 mL/100 kg seed	Seed treatment		>5000
	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole</i> (D)	33.5 to 50.5 mL 50.6 to 76.1 mL 101 to 152 mL	1	A or G	>5000
	<i>Delegate</i> (Sp)	40 to 81 g	21	G	>5000
	<i>Matador/Silencer/Labamba/ Zivata</i> (P)	34 mL	28 days. Do not cut treated fields for hay/ forage. Do not graze treated fields.	A or G	56 to 98
	<i>Silencer Duo (D+P)</i> <i>Silencer Duo A</i> <i>Silencer Duo B</i>	51 mL 34 mL	28 days	A or G	N/A
	<i>Malathion 85E</i> (OP)	0.445 to 0.544 L	7	A or G	>550
Slugs	<i>Sluggo Professional</i>	10 to 20 kg		G	>5000
<b>Pests of Seed Only</b>					
Wheat midge (a pest of wheat only)	<b>Rotate Crops</b> – Continuous wheat cropping encourages higher wheat midge populations.				
	<b>Resistant Varieties</b> – there are many varieties of wheat resistant to feeding by wheat midge. For an updated list of varieties and information on them see: <a href="https://www.midgetolerantwheat.ca/farmers/">https://www.midgetolerantwheat.ca/farmers/</a>				
	<b>Biological Control</b> - A parasitoid, <i>Macroglenes penetrans</i> , was found to control an average of 32 percent of the wheat midge in Saskatchewan.				
	<i>Lagon 480 E/Cygon 400EC/ Cygon 480-AG/Diamante 4</i> (OP)	400 mL ( <i>Lagon,</i> <i>Cygon 480-AG, Diamante 4</i> ) 486 mL ( <i>Cygon 400EC</i> )	35	A or G	245 to 550
<b>Stem-Borers</b>					
Hessian fly	<ul style="list-style-type: none"> <li>Never plant wheat in the same field 2 years in a row in areas where Hessian flies are a problem.</li> <li>The spring wheat cultivar <i>Superb</i> is partially resistant to the Hessian fly.</li> <li>Early seeded spring wheat (prior to June) is less susceptible to stem breakage caused by Hessian fly than later seeded wheat.</li> <li>Winter wheat planted in September will likely be free of Hessian flies.</li> </ul>				
Wheat stem maggot	Crop rotation and stubble cultivation may reduce populations.				
Wheat stem sawfly	<ul style="list-style-type: none"> <li>Solid-stem wheat varieties can reduce damage by wheat stem sawfly larvae compared to susceptible varieties, however the level of control can vary depending on environmental conditions.</li> <li>The parasitoid <i>Bracon cephi</i> can reduce population of wheat stem sawfly in localized areas. Parasitoids of wheat stem sawfly can be conserved by increasing stubble height at harvest.</li> <li>Early swathing can reduce losses.</li> </ul>				

**ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.**

<sup>1</sup> Insecticide Group: Sp=spinosyns, D=diamides, N= neonicotinoids, P=pyrethroids, C=carbamates, OP=organophosphates.

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

<sup>3</sup> DO NOT make a subsequent foliar application of any group 28 insecticide for a minimum of 60 days after planting seed treated with Lumivia CPL.

<sup>4</sup> DO NOT make any subsequent applications of a group 28 insecticide following Fortenza seed treatment.

## Scouting for insects in Soybeans

- **Cutworm**

- A nominal threshold that may be used for cutworm in soybeans is 1 or more larvae per 3 feet of row and larvae are small (less than 2 cm), or 20 percent of plants cut.

- **Soybean Aphid**

- **Typical Damage:** Soybean aphids suck sap from soybean plants. Infested leaves may wilt or curl when infestations are large. Other symptoms may include plant stunting, reduced pod and seed count, and yellowing of leaves.
- **When and How to Monitor:** Check 30 plants (6 plants in 5 areas) per field. Examine the entire plant and estimate populations of soybean aphids (counting exact numbers will not be possible or practical with higher populations). Once soybean aphid numbers reach 250 aphids per plant, scout the field frequently to determine if soybean aphid numbers are increasing. A population can stay at 250 to 300 aphids per plant and not cause economical yield loss. If the levels are not rising above 250 to 300 per plant, there is a good indication that field conditions are favouring natural enemies (such as

beneficial insects and fungi) that are helping control the aphids. An app called Aphid Advisor can be used to integrate common natural enemies of soybean aphids into the management decision (<http://www.aphidapp.com/>).

- **Economic Threshold:** When there are on average at least 250 aphids per plant and the population is increasing, and the plants are in the R1 (beginning bloom) to R5 (beginning seed) growth stages, treatment would be economical. This threshold gives an approximate 7 day lead time before aphid populations are expected to exceed the economic injury level (670 aphids per plant), where cost of control is equal to yield loss. When soybean aphid populations are not actively increasing above 250 aphids per plant, natural enemies are keeping up with the aphid population. DO NOT use an insecticide in this case, as it will kill the natural enemies which may enable the aphid population to increase above the economic injury level.

## Soybean Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Belowground and Surface Feeders</b>					
Wireworms	<i>Lumiderm</i> (D) <sup>3</sup>	0.0375 to 0.125 mg ai/seed			
	<i>Fortenza</i> (D) <sup>4</sup>	83 mL/100 kg seed			
	<i>Scorpio Ant and Insect Bait</i> (suppression) (Sp)	10 to 20 kg	Incorporate into the soil at planting to a depth of 10 to 20 cm.		
Seedcorn maggot	<i>Lumiderm</i> (D) <sup>3</sup>	0.0375 to 0.125 mg ai/seed			
	<i>Fortenza</i> (D) <sup>4</sup>	41.5 to 83 mL/100 kg seed			
	<i>Cruiser 5FS</i> (N)	50 to 83 mL/100 kg seed	May only be applied by commercial seed treaters.		
Cutworms	<i>Lumiderm</i> (D) <sup>3</sup>	0.0375 to 0.075 mg ai/seed			
	<i>Fortenza</i> (D) <sup>4</sup>	41.5 to 83 mL/100 kg seed			
	<i>Scorpio Ant and Insect Bait</i> (black cutworm) (Sp)	10 to 20 kg	28	G	
	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech Chlorantraniliprole</i> (D)	33.5 mL 50.6 mL 101 mL	1	A or G	>5000
	<i>Vayego</i> (D)	61 mL	14	G	>2000
	<i>Matador/Silencer/Labamba/Zivata</i> (P)	34 mL	21. Do not feed treated crops to livestock	A or G	56 to 98
<b>Sap or Fluid Feeders</b>					
Soybean aphid	<i>Sefina</i> (PP)	81 mL	7	A or G	>2000
	<i>Movento</i> (TT)	75 to 111 mL	21	A or G	>2000
	<i>Sivanto Prime</i> (B)	202 to 304 mL	21	A or G	>2000

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
Soybean aphid, <i>continued</i>	<i>Matador/Silencer/Labamba/Zivata</i> (P)	34 to 94 mL	21. Do not cut treated fields for hay/forage. Do not graze treated fields.	A or G	56 to 98
	<i>Voliam Xpress (D+P)</i>	91 to 223 mL	21. Do not feed treated crop to livestock.	A or G	98
	<i>Silencer Duo (D+P)</i> <i>Silencer Duo A</i> <i>Silencer Duo B</i>	51 to 116 mL 34 to 76 mL	21 days	A or G	N/A
	<i>Concept (N + P)</i>	132 to 263 mL	20	G	2500
	<i>Lagon 480 E (OP)</i>	280 to 400 mL	30	A or G	425
Leafhoppers	<i>Sivanto Prime (B)</i>	202 to 304 mL	21	A or G	>2000
	<i>Voliam Xpress (D+P)</i>	91 mL	21. Do not feed treated crop to livestock	A or G	98
	<i>Lagon 480 E (OP)</i>	280 to 400 mL	30	A or G	425
Lygus bugs	<i>Matador/Silencer/Labamba/ Zivata (P)</i>	34 mL	21. Do not cut treated fields for hay/forage. Do not graze treated fields.	A or G	56 to 98
	<i>Voliam Xpress (D+P)</i>	91 mL	21. Do not feed treated crop to livestock.	A or G	98
	<i>Lagon 480 E (OP)</i>	280 to 400 mL	30	A or G	425
Spider mites	<i>Lagon 480 E/Cygon 400EC/ Cygon 480-AG/Diamante 4 (OP)</i>	400 mL ( <i>Lagon</i> , <i>Cygon 480-AG</i> , <i>Diamante 4</i> ) 486 mL ( <i>Cygon 400EC</i> )	30	A or G ( <i>Lagon 480 E</i> ) G only ( <i>Cygon 400EC</i> , <i>Cygon 480-AG</i> , <i>Diamante 4</i> )	245 to 550
<b>Defoliators</b>					
Armyworm	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech Chlorantraniliprole (D)</i>	33.5 to 50.5 mL 50.6 to 76.1 mL 101 to 152 mL	1	A or G	>5000
	<i>Vayego (D)</i>	61 mL	14	G	>2000
	<i>Delegate (Sp)</i>	40 to 81 g	28	G	>5000
	<i>Voliam Xpress (D+P)</i>	202 mL	21. Do not feed treated crop to livestock.	A or G	98
Corn earworm	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech Chlorantraniliprole (D)</i>	33.5 to 50.5 mL 50.6 to 76.1 mL 101 to 152 mL	1	A or G	>5000
	<i>Voliam Xpress (D+P)</i>	202 mL	21. Do not feed treated crop to livestock.	A or G	98

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
Grasshoppers	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech Chlorantraniliprole (D)</i>	17 to 33.5 mL 25.5 to 50.6 mL 51 to 101 mL	1	A or G	>5000
	<i>Matador/Silencer/Labamba/ Zivata (P)</i>	34 mL	21. Do not cut treated fields for hay/forage. Do not graze treated fields.	A or G	56 to 98
	<i>Voliam Xpress (D+P)</i>	91mL	21. Do not feed treated crop to livestock.	A or G	98
	<i>Silencer Duo (D+P)</i> <i>Silencer Duo A</i> <i>Silencer Duo B</i>	51 mL 34 mL	21 days	A or G	N/A

**ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.**

<sup>1</sup> Insecticide Group: D=diamides, Sp=spinosyns, N= neonicotinoids, P=pyrethroids, PP=pyropenes, OP=organophosphates, TT = tetronic and tetramic acid derivatives.

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

<sup>3</sup> DO NOT make a subsequent foliar application of any group 28 insecticide (such as Coragen) for a minimum of 60 days after planting seed treated with Lumiderm.

<sup>4</sup>DO NOT make any subsequent applications of a group 28 insecticide (such as Coragen) following Fortenza seed treatment.

## Stored Grain Insect Control-

See Insect Control in Stored Grain; after Insect Management Charts.

## Summerfallow-

See grasshopper management on Pastures, etc.

## Scouting for insects in Sunflowers

Belowground and Surface Feeders

- **Cutworm**

- **Typical Damage:** Notched, wilted, dead, and cut-off plants (weed or crop seedlings). Plants missing from rows, bare patches appearing in field.
- **When and How to Monitor:** Look for cutworm, and evidence of cutworm feeding, when monitoring sunflowers in May and June. Often cutworms will be close to the cut or shriveled plants that they have just damaged. Cutworm will sometimes be most abundant in patches or a specific area of a field. In areas of a field where cutworm damage is noticeable, check around damaged plants in a square foot (30 cm x 30 cm) area. Use trowel or shovel to carefully search through top half to 1 inch of soil for cutworm larvae. Repeat in several locations to get an accurate assessment of what the cutworm levels are.
- **Nominal Threshold:** 1 cutworm or more per square foot (30 by 30 cm) or if there is a 25 to 30 percent stand reduction. Sometimes it is most economical to just treat infested patches, and not whole fields.

Defoliators

- **Sunflower Beetle**

- **Typical Damage:** Adults: Leaves of seedling plants chewed or completely destroyed late May through June, shot-holes or large areas of leaves chewed July through August. Larvae: Leaves of plants chewed or completely destroyed.
- **When and How to Monitor:** Adults: Look for when monitoring sunflower seedlings in May through June. Examine 10 plants at random at each stop. Larvae: Look for when monitoring sunflowers in July through mid-August. Examine 10 plants at random at each sampling site. Peel back leaves around growing tip and record total number of larvae found. Calculate average number per plant.
- **Economic Threshold:** Adults: 1 to 2 per seedling; Larvae: 10 to 15 per plant or 25 to 30 percent defoliation.

## Insects affecting the seeds

### Pests of Seed Only

- **Red Sunflower Seed Weevil**
  - **Typical Damage:** Seeds partly or completely destroyed, exit hole in hull. Shriveled kernels, kernels completely destroyed.
  - **When and How to Monitor:** Monitor fields when ray petals being to form and continue every 2 to 3 days until pollination is complete. When scouting, use the X pattern and begin counts at least 70 to 100 feet into the field to avoid margin effects. Examine 5 plants at each site for a total of 25 plants. For checking individual sunflower heads, brush the face of the head vigorously to bring the weevils to the surface, or use a commercial preparation of mosquito repellent containing diethyl toluamide (DEET) to spray the heads. This will cause the weevils to move out of hiding spots. Record total number of weevils and calculate average per head.
  - **Economic Threshold:**
    - Confection Sunflowers: 1 to 2 weevils per plant. Control is based on a need to keep seed damage below 3 or 4 percent because of industry standards.
    - Oilseed sunflowers: 12 to 14 weevils per head.
    - The ideal plant stage to treat is when most plants in the field are at 40 percent pollen shed (R5.4).
- **Banded Sunflower Moth**
  - **When and How to Monitor:** Look for banded sunflower moth adults when monitoring fields in the late bud (R-4) to early bloom (R5.1) plant growth stage. Count moths on 20 plants from 5 different sites for a total of 100 plants. Sampling in early evening or early morning when the moths are most active gives the most accurate counts.
  - Sampling strategies based on scouting for adult moths during daylight hours, and counting eggs, have also been developed.
  - **Economic Threshold:** 1 moth per 2 plants when monitoring in the early evening or early morning.
  - If monitoring for eggs or adult moths during daylight hours, tables for determining economic thresholds can be found at: <http://www.ag.ndsu.edu/extensionentomology/field-crops-insect-pests/Documents/sunflower/e-823-banded-sunflower-moth>. If treatment is warranted, it should be applied at the R5.1 sunflower plant growth stage.
- **Lygus bugs**
  - **Economic Threshold:** Confection – One adult lygus bug per 9 heads can result in economic losses through the reduction in seed quality. Lygus bug management should be initiated between when the inflorescence begins to open (R4) to early bloom (R5.1) stages if adult densities reach economic levels. No control is needed in oilseed sunflowers not used for human consumption.

## Sunflowers Insect Management Chart

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
<b>Belowground and Surface Feeders</b>					
Wireworms	Wireworm may sometimes damage sunflowers. Seeding sunflowers when the soil temperature is at least 8 to 10°C at 1 to 1.5 inches depth may minimize damage by wireworm.				
Cutworms	<i>Fortenza</i> (D)	16.56 to 32.56 mL/ 10,000 seed	Seed treatment – by commercial treaters with closed transfer systems only		>5000
	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole</i> (D)	33.5 mL 50.6 mL 101 mL	1	A or G	>5000
	<i>Pounce/Perm-UP/</i> <i>IPCO Syncro</i> (P) <i>Ambush</i> (P)	73 to 158 mL 57 to 121 mL	Treat up to 5-leaf stage	A or G (see labels)	789 to 1030
<b>Defoliators</b>					
Sunflower beetle	<i>Decis 100 EC/Advantage</i> <i>Deltamethrin 5 EC/ Poleci</i> (P)	20 mL ( <i>Decis 100 EC</i> ) 40 mL ( <i>Advantage</i> <i>Delta..5EC</i> ) 81 mL ( <i>Poleci</i> )	70	A or G	>300 to 2000
	<i>UP-Cyde/Ship</i> (P)	40 mL	70	A or G	355

Insect	Insecticide (and insecticide group <sup>1</sup> )	Rate per Acre	Pre-harvest interval (days)	Application (A=aerial; G=ground)	LD <sub>50</sub> (Mammalian Toxicity) <sup>2</sup>
Grasshoppers	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole (D)</i>	17 to 33.5 mL 25.5 to 50.6 mL 51 to 101 mL	1	A or G	>5000
<b>Pests of Head and Seeds</b>					
Lygus bugs	<b>Note:</b> Because the most appropriate timing of insecticides to control Lygus bugs in sunflowers includes flowering stages, steps to minimize harm to pollinators should be taken and insecticides should only be used when economic thresholds are exceeded.				
Sunflower seed weevil	Early planting helps to reduce seed damage by sunflower seed weevils.				
	<b>Note:</b> Because the most appropriate timing of insecticides to control sunflower seed weevils is during the flowering stage, steps to minimize harm to pollinators should be taken and insecticides should only be used when economic thresholds are exceeded.				
	<i>UP-Cyde/Ship (P)</i>	40 mL	70	A or G	355
Banded sunflower moth	Late planting may provide some control.				
	<b>Note:</b> Because the most appropriate timing of insecticides to control banded sunflower moth includes flowering stages, steps to minimize harm to pollinators should be taken and insecticides should only be used when economic thresholds are exceeded.				
	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole (D)</i>	33.5 to 50.5 mL 50.6 to 76.1 mL 101 to 152 mL	1	A or G	>5000
Sunflower moth	<i>Dipel 2X DF</i> (young larvae) (M)	127 to 253 g	N/A	A or G	>5000
	<i>Bioprotec CAF/</i> <i>Bioprotec PLUS (M)</i>	0.32 to 0.65 L 0.20 to 0.40 L	0	A or G	N/A
	<i>Coragen Max</i> <i>Shenzi</i> <i>Cosayr, Vermis, Rorvik,</i> <i>Maxunitech</i> <i>Chlorantraniliprole (D)</i>	33.5 to 50.5 mL 50.6 to 76.1 mL 101 to 152 mL	1	A or G	>5000
Sunflower midge	<b>Crop rotation:</b> If a sunflower midge infestation is anticipated, new fields should be established away from fields damaged the previous season.				

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

<sup>1</sup> Insecticide Group: M=microbial, D=diamides, N=Neonicotinoids, P=pyrethroids, C=carbamates, OP=organophosphates.

<sup>2</sup> LD<sub>50</sub> values represent the relative toxicity of a pesticide. They represent the dose (in milligram per kilogram body weight) that will kill 50 percent of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD<sub>50</sub>.

### Sweet Clover- See clovers (sweet, red, alsike)

### Timothy-

See forage grasses

### Wheat-

See small grain cereals

## Insect Control in Stored Grain

### Prevention

**Clean in and around storage facilities.** Grain storage facilities, and the area around storage facilities, should be cleaned thoroughly prior to storing grain.

**Clean equipment used to move grain.** Grain left in equipment throughout the summer months can result in new grain that is being placed into storage becoming infested. Combines, truck beds, grain wagons, augers and other equipment used to move grain should be cleaned of grain residue. Other potential sources of grain infesting insects include livestock feeds, old seed bags, spilled grain, etc.

**Inspect grain storage facilities** for signs of deterioration, especially for leaks or holes through which insects or rodents can gain access to the stored grain. Moving and storing the grain in clean facilities will eliminate one source of infestation. However, grain stored for long periods of time still has the potential for renewed infestations.

**Treating storage facilities.** Depending on the commodity to be stored, storage facilities may additionally be sprayed or dusted, if needed, with a recommended insecticide before storing grain in the bin (e.g. malathion or diatomaceous earth – refer to product labels for details). **Note:** some commodities, such as canola, flax and sunflowers, should not be stored in facilities recently treated with malathion.

**Dry and Cool Grain.** Ideally, the grain should be dry before being put into storage, and cooled as quickly as possible. For long-term storage, producers are urged to lower the grain temperature below 15°C as soon as possible after the grain is placed in storage. At 15°C the stored product insects stop laying eggs and development stops. Aeration systems used during the night immediately after harvest should have the grain below 15°C in about 2 weeks. Grain that is not moved or aerated after harvest can remain warm enough to allow insects to survive the winter. Convection currents arising from this warm air can also promote condensation, sprouting (heating) and mould growth in unmanaged grain. These conditions are very attractive to stored product pests and support their development.

Once the grain mass is cooled to the desired temperature, fans should be sealed to prevent unwanted air migration through the mass that could result in early grain mass warm-up. Cold grain has a longer storage life than warm grain.

Note, however, that under cool grain temperatures, insect movement is reduced to the point that some insecticides may not be effective.

### Monitoring for Insects

**Bin probe and Sieves:** Stored grain insects can be monitored by taking grain samples with a bin probe, sieving the grain, and looking in the dockage for insects.

**Probe Traps:** Another means of detecting insects in stored grain is through placing probe traps (such as the WB PROBE II Trap from Trece) in the grain and monitoring them. Often the first indication of an infestation will be found near the top centre of a storage bin, and therefore, this is where traps should be placed. Monitoring

should take place once every 7 to 10 days during the onset of storage (first 60 days) and then the frequency of monitoring may be adjusted.

### Identifying insects in stored grain

Correct identification of insects found in stored grain is important in determining the most appropriate control methods. Some of the insects found in stored grain feed directly on the grain, referred to as primary pests, while others feed on grain that is damaged or going out of condition, referred to as secondary pests.

#### Primary insect pests

Insects that feed directly on the grain include rusty grain beetles, red flour beetles, and sawtoothed grain beetles.

**Rusty grain beetles** are reddish brown beetles about 2 mm long. Heavy infestations of this insect cause grain to heat and spoil.

The **red flour beetle** is another common insect pest of stored grain in the prairies. Red flour beetles cannot feed on undamaged, dry seed with less than 12 percent moisture content. They prefer grain dust, broken grain and milled stocks.

**Sawtoothed grain beetles** are more common in stored oats than in stored wheat and barley.

#### Secondary insect pests:

Insects that feed on fungus in the grain bin or stored grain that is damaged include the foreign grain beetle, hairy fungus beetle, psocids, and grain mites.

**Foreign grain beetles** resemble the rusty grain beetle, but can be distinguished from it by club-shaped antennae. Also, when placed in a glass jar, foreign grain beetles will climb up the sides, while rusty grain beetles cannot. While foreign grain beetle is considered a fungus feeder, they will feed on grain if the moisture content is in the high end of the acceptable range (e.g. 14.5 percent mc wheat).

**Grain mites** are whitish, about 0.2 to 0.5 mm long, and can be hard to see with the naked eye. About eight kinds of mites are common in farm granaries and elevators.

**Psocids** are soft-bodied insects, about 1 mm long, with long antennae relative to the body size.

Fungus feeding insects and mites cannot survive in dry grain. Chemical control is not necessary for fungus feeding pests in stored grain. Practices that result in the grain drying may be all that is needed to control such pests.

Information to help identify insect pests of stored grain, as well as information on control, can be found on the Canadian Grain Commission website at: <https://www.grainscanada.gc.ca/en/grain-quality/manage/>.

#### Control Techniques:

*The Canada Grain Act* states that an elevator operator may reject any grain if the operator has reason to believe it is infested or contaminated. Outlined below are some control techniques and when and how these techniques can be best used.

## Cold Temperatures

Rusty grain beetles are cold hardy and can survive subzero temperatures. Rusty grain beetles and other stored grain insects can be killed by reducing core grain temperatures as follows:

### Time Required to Kill Insects at Various Grain Temperatures

Grain Temperature	Time required to kill insects
-5°C	12 weeks
-10°C	8 weeks
-15°C	4 weeks
-20°C	1 week

## Phostoxin, Fumitoxin

**Company:** Degesch America Inc. (*Phostoxin* round tablets – PCP#15736; *Phostoxin* pellets – PCP#15735; *Fumitoxin* tablets – PCP#19227; *Fumitoxin* Pellets – PCP#19226).

**Formulation:** 55% aluminum phosphide.

Formulation	Primary Use	Container Size
<i>Phostoxin</i> tablets (3 g each) <i>Fumitoxin</i> tablets (3g each)	On the farm or country elevator	333 tablets (1kg) ( <i>Phostoxin</i> ) 500 tablets (1.5 kg) ( <i>Fumitoxin</i> )
<i>Phostoxin</i> pellets (0.6 g each) <i>Fumitoxin</i> pellets (0.6g each)	On the farm or country elevator	1666 pellets (1kg) ( <i>Phostoxin</i> ) 2490 pellets (1.5kg) ( <i>Fumitoxin</i> )
<i>Phostoxin</i> tablets prepac	Containers	1 to 4 strips of 33 tablets to a pouch

**Insects and other pests controlled:** Rusty grain beetle, red flour beetle, saw toothed grain beetle, granary weevil, yellow mealworm, lesser grain borer, spider beetles, hairy fungus beetles, Indian meal moth, Hessian fly, nematodes, mice and rodents.

**Approved for use on the following stored grains:** Barley, corn, dried peas, lentils, millet, oats, rye, soybeans, sunflower seeds, triticale, wheat, straw and hay.

**Restricted Product:** The use and sale of Aluminum Phosphide (*Phostoxin* or *Fumitoxin*) is restricted to licensed pesticide applicators possessing a valid fumigation license (Saskatchewan) or stored agricultural products license (Manitoba).

*Phostoxin* or *Fumitoxin* can only be used in conjunction with a detailed fumigation management plan.

**Rate and Minimum Exposure Period:** Refer to labels to determine rate. For grain bins a dosage of 250 to 500 tablets (or 880 to 2560 pellets) per 100 cubic metres of bin space being treated (not volume of grain) is recommended. It is important to ensure that bins are relatively secure. It is not advisable to use phosphine products in bins that are leaky or not well sealed. The following table may be used as a guide to determine the minimum length of exposure period to *Phostoxin* or *Fumitoxin* at the indicated temperatures:

Temperature	Exposure Period
Below 5°C (40°F)	DO NOT fumigate
5°C to 12°C (40° to 53°F)	10 days
13° to 15°C (54° to 59°F)	5 days
16° to 20°C (60° to 68°F)	4 days
above 20°C (68°F)	3 days

Cooling the grain, through aeration or moving the grain several times during mid-winter, should provide effective control of rusty grain beetles.

## Moving Grain

Moving grain using cyclone-based pneumatic conveyors (grain vacs) at about 200 bushels per hour has been shown to be an effective means of controlling insects in stored grain. However, moving too large a volume of grain at a time using a pneumatic conveyor results in the grain protecting the insects and reduces kill of stored grain insects. Loading the grain using a pneumatic grain conveyor removes insects from grain being delivered to elevators.

Aluminum phosphide cannot be used when the grain temperature is below 5°C as the tablets release the gas too slowly. Very dry grain will also slow the release of the gas from the pellets. A shortened exposure period cannot be compensated for by increased dosage. Also ensure that storage is well ventilated for at least 24 hours after the required time for fumigation.

**Environmental Hazards:** Toxic to birds and mammals. Carefully inspect the outside and inside of the structure prior to application to ensure the absence of nesting or roosting birds. Avoid application if birds are present.

## Diatomaceous earth (*Protect-It*)

**Company:** Hedley Technologies Ltd. (*Protect-It* – PCP#24259)

**Formulation:** *Protect-It*: 74 percent Silicon dioxide, 10 percent Silica aerogel.

**Insects controlled:** *Beetles* – Rusty grain beetle, red flour beetle, rice weevil, granary weevil. *Moths* – Angoumois grain moth, Mediterranean flour moth, Indian meal moth.

**Approved for use on the following stored products:** Feed grains, seed, stored grains, wheat, barley, buckwheat, corn, oats, rye, flax, peas, soybeans and sorghum. Also registered for structural treatment of empty grain storage and transportation containers.

**How it works:** Diatomaceous earth damages the cuticle of the insect, reducing the insect's ability to retain moisture. The insect eventually dies from dehydration. A 6 week period of treatment above 20°C is needed for maximum efficacy.

**Rate, for empty storage structures:** Use a dust blower or aeration fan to get diatomaceous earth into the cracks, crevices and void spaces of the structure being treated. Dust areas at a rate of 1 kg per 200 square metres (5 g per square metre).

**Rate, while grain is being placed into storage:**

- **Protect-It:** The application rate for *Protect-It* varies by crop and insect species, ranging from 100 g per tonne for control of rusty grain beetle in wheat to 1000 g per tonne for red flour beetle in corn. Refer to the label for details.

**Precautions:** The application of DE will lower the test weight measurement of the grain, but usually not to the point of downgrading. If test weight loss is excessive, the grain can be diluted with untreated grain. DE is non-toxic to humans and animals.

**Malathion Grain Protector Dust**

**Company:** Loveland Products Canada (PCP#15896)

**Formulation:** 2% malathion

**Insects controlled:** confused flour beetles, flat grain beetles, granary weevil, Indian meal moth, lesser grain borer, rusty grain beetle and sawtoothed grain beetle.

**Approved for use on the following stored grains:** Wheat, rye, barley and oats as stored grains.

Malathion Grain Dust can be applied to grain when it is in the truck or wagon prior to binning. It can also be used to control surface infestations by applying to the grain surface and raking in to

**Malathion 85E (Loveland Products Canada)**

Insect	Rate	Note
Rusty grain beetle, red flour beetle, sawtoothed grain beetle, confused flour beetle, grain mite, granary weevil, Indian meal moth, lesser grain borer, flat grain beetles, rice weevils (empty grain storage facilities)	Mix 490 mL in 15 L of water. Apply 5 L of mixture on 100 m <sup>2</sup>	Wait until spray has thoroughly dried before storing grain in treated areas.

15 cm depth of the grain. Malathion controls insects by ingestion and contact and insects must be active for it to be effective.

**Rate:**

Crop	Rate-g/1000 kg (tonne) grain
Wheat	415
Rye	450
Barley	520
Oats	735

DO NOT apply to grain within 7 days of sale.

Be aware that the Canadian Grain Commission allows only 8 ppm of malathion residues in stored grains.

**Malathion 85E**

Refer to the label for this product for insect and mite control in *empty* grain bins, grain elevators, grain box cars and flour mills.

**Note:** Some commodities, such as canola, should not be stored in facilities recently treated with malathion. Malathion residue can linger in bins for up to six months after treatment and can be transferred from the bin to canola seed. Canola found with malathion residues is unacceptable for export customers.

## Insecticide Product Pages

For rates and pre-harvest intervals for insecticides, see the insect management charts on pp. 638-677.

# Acetamiprid

Insecticide Group  
4A

### Company:

Sharda CropChem Limited (*Aceta 70 WP* – PCP#33298)  
Nippon Soda Company Ltd. (*Assail 70 WP* – PCP#27128)  
Distributed by Belchim Crop Protection.

### Formulations:

70% acetamiprid formulated as a wettable powder.

### Formulations, Crops, Insects, Rates:

Product		Aceta 70 WP	Assail 70 WP
Formulation and Container Size		70% acetamiprid formulated as a wettable powder.	
Crop	Insect	Application rate (per acre)	
Potato	Colorado potato beetle	16.2 to 32.4 g	16.2 to 32.4 g
	Aphids	22.7 to 34.8 g	22.7 to 34.8 g
Seed alfalfa	Alfalfa plant bug	35 to 69 g	35 to 69 g
	Lygus bug	35 to 69 g	35 to 69 g

### Application:

- **Ground application:** Apply in a minimum finished spray volume of 200 per hectare. Use the higher rates when the majority of the Colorado Potato Beetle population is in the adult stage and for heavy pest pressure.
  - **Seed alfalfa** – Apply in a minimum finished spray volume of 100 L per hectare by ground. Apply prior to bloom up to the time when 50 percent of seed pods are ripe. Begin when adults and/or 4-5<sup>th</sup> instar nymphs have reached economic threshold levels for your area.
- **Aerial application:** Aerial use on potatoes is permitted in the provinces of Alberta, Saskatchewan and Manitoba only.

### How it Works:

*Aceta 70 WP* and *Assail 70WP* are neonicotinoid insecticides that works by contact or ingestion. They have an anti-feedant effect that can prevent pest damage to host plants prior to the death of the insect. Products rapidly degrades in the soil with no carryover effects.

### Restrictions:

- **Potato:** DO NOT make more than 2 applications per crop year. DO NOT apply more than once every 7 days. DO NOT exceed a total of 120 g active ingredient (172 g product) per hectare per season.
- **Seed alfalfa:** DO NOT make more than 3 applications per season. DO NOT apply more than once every 7 days. DO NOT exceed a total of 357 g active ingredient (510 g product) per hectare per season. DO NOT cut treated seed alfalfa fields for hay/forage.
- **Grazing:** DO NOT graze treated seed alfalfa fields.
- **Pre-harvest Interval:**
  - **Potato** – DO NOT harvest within 7 days of application.
  - **Seed Alfalfa** – DO NOT apply less than 1 day before harvest.
- **Re-Entry:** DO NOT re-enter treated areas for 12 hours after foliar application.

### Precautions

If this product is to be applied to a product destined for export to the United States, information on acceptable residue levels are available at [www.croplife.ca](http://www.croplife.ca).

**Storage:** DO NOT store in or around the home. Store unused product in a cool, ventilated, dry, locked area. DO NOT allow prolonged storage in areas where temperatures frequently exceed 46°C.

## Environmental Hazards:

**Bees:** Toxic to bees exposed to direct treatment, drift, or residues in flowering crops or weeds. DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area. Minimize spray drift to reduce harmful effects on bees in habitats close to application site.

**Aquatic Organisms:** Toxic to aquatic organisms. To reduce runoff from treated areas into aquatic habitats, avoid application to areas with a moderate to steep slope, compacted soil, or clay. Avoid application when heavy rain is forecasted.

**Others:** The lower rates allow for maximum beneficial survival and faster rebound of beneficial populations.

## Hazard Rating:



Warning – Poison

Refer to the Introduction for an explanation of the symbols.

# Actara

Insecticide Group  
4A

## Company:

Syngenta Canada

## Formulations, Crops, Insects, Rates:

Product		Actara 240SC	Actara 25WG	
Formulation and Container Size		240 g/L thiamethoxam formulated as a soluble concentrate. 2 x 2.04 L	25% thiamethoxam formulated as a water dispersible granule. 4 x 850 g	
Crop	Insect	Application	Application rate (per acre)	
Potato	Aphids	Seed Piece Treatments	See chart on label	
		In-Furrow Application	0.15 to 0.20 L (based on 90 cm row spacing)	
		Foliar Sprays	44.1 mL	42.5 g
	Potato leafhopper	Seed Piece Treatments	Seed Piece Treatments; See chart on label	
		In-Furrow Application	In-Furrow Application, 0.15 to 0.20 L (based on 90 cm row spacing)	
		Foliar Sprays	Foliar Sprays, 44.1 mL	42.5 g
	Colorado potato beetle	Seed Piece Treatments	Seed Piece Treatments; See chart on label	
		In-Furrow Application	In-Furrow Application, 0.15 to 0.20 L (based on 90 cm row spacing)	
		Foliar Sprays	Foliar Sprays, 44.1 mL	42.5 g

## Application:

### Actara 240SC

- **Soil application:** Apply as an in-furrow spray during planting to allow the insecticide to be absorbed by plant roots. For 90 cm row spacing, apply 151 to 196 mL per acre. Use the higher rate for extended control. DO NOT follow a soil application with a foliar application.
- **Potato seed piece treatment:** Choose the appropriate rate from the chart on label, based on seeding rate. Apply only in areas with adequate ventilation or in areas that are equipped to remove mist or dust. Best results are obtained if potatoes are planted immediately after *Actara 240SC* is applied to seed. When transporting cut and treated seed ensure the seed is covered. DO NOT apply a subsequent treatment of in-furrow or foliar application of thiamethoxam or other Group 4 insecticide following seed piece treatment with *Actara 240SC*.
- **Foliar application:** *Actara* may be applied by ground or air. For ground application use a minimum of 40 L per acre unless otherwise indicated on label. A maximum of 2 foliar applications of *Actara* may be made per season. DO NOT exceed a total of 88 grams per acre. Allow at least 7 days between applications. DO NOT use a foliar application of *Actara* following in-furrow or soil application of *Actara*.

## How it Works:

*Actara* is a systemic (taken up into the plant foliage after application), neonicotinoid insecticide.

## Restrictions:

- **Rainfastness:** *Actara* is rainfast once spray has dried on treated plants.
- **Pre-harvest Interval:** DO NOT harvest within 7 days of application.
- **Re-Entry:** DO NOT re-enter treated areas for 12 hours after foliar application.
- **Re-cropping:** No restrictions following the harvest of sorghum, wheat, barley, canola, potatoes or cover crops. For all other crops 120 day plant-back interval is required.
- **Tank mix:** According to the Pest Management Regulatory Agency of Health Canada's Guidance Document on Tank Mix Labelling (March 2023), unlabelled tank mixes of this product are permitted only if the label of this product and the label of the product it might be mixed with include at least general wording on their respective labels indicating they may be mixed with other pesticides. When tank mixes are permitted, apply mixes according to the most restrictive use limitations for either product.
- **Buffer Zones:** Buffer zones are required for the protection of terrestrial and freshwater habitats. Refer to specific label for buffer zones required.

## Environmental Hazards:

**Bees:** *Actara* is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. To minimize exposure to bees from foliar application, DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area.

**Aquatic Organisms:** Toxic to aquatic organisms. To reduce runoff from treated areas into aquatic habitats, avoid application to areas with a moderate to steep slope, compacted soil, or clay. Avoid application when heavy rain is forecasted.

**Others:** Toxic to certain beneficial insects.

## Hazard Rating:



*Actara 240SC:* Caution – Poison

*Actara 25WG:* Caution – Eye and Skin Irritant

Refer to the Introduction for an explanation of the symbols.

# Admire 240

Insecticide Group  
4A

## Company:

Bayer (*Admire 240* – PCP#24094)

## Formulations, Crops, Insects, Rates:

Product		Admire 240
Formulation and Container Size		240 g/L imidacloprid formulated as a suspension concentrate.
Crop	Insect	Application rate (per acre)
Potato	Colorado potato beetle, aphids, potato leafhopper, potato flea beetle	11.79 to 17.69 mL/100 pounds (45.36 kg) of potato seed tubers

## Application:

### *Imidacloprid*

- **Seed piece treatment:** (*Admire 240*) Refer to Imidacloprid in the seed treatments product pages.
- **Foliar application:** (*Admire 240*) Apply only if insect populations exceed recommended economic thresholds. For optimum control, good coverage of the foliage is needed. A maximum of 2 foliar applications may be made per crop per season. Scout fields and retreat if needed. For aphids, two applications at least 7 days apart may be required to achieve control. DO NOT make a foliar application following a seed treatment of the product in the same crop. Allow at least 7 days after the last application and before harvesting the crop.

## How it Works:

*Imidacloprid* is a neonicotinoid, systemic (within the plant) insecticide that works by contact or ingestion. Control period may vary due to climate and soil conditions

## Restrictions:

- DO NOT apply by air.
- DO NOT apply following a soil, in-furrow or seed treatment application of a Group 4 Insecticide.
- **Re-cropping:** Acceptable plant-back intervals for:
  - *Cereal grains (wheat, barley, oats)* – minimum 30 days
  - *Peas and beans* – 9 months
  - *All other food and feed crops* – 12 months
  - *Green manure and other cover crops* – can be grown without plant-back intervals but cannot be grazed or harvested for food or feed.
- DO NOT apply in fields where *imidacloprid* has been used during the previous season. DO NOT apply through any irrigation system.
- DO NOT apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

## Precautions:

DO NOT re-enter treated areas for 24 hours after foliar application. Avoid application when heavy rain is forecast.

DO NOT apply product or plant treated seed pieces within 15 metres of well-heads or aquatic systems, including marshes, ponds, ditches, reservoirs, streams, lakes, etc.

DO NOT mix, load or clean spray equipment within 30 metres of well-heads or freshwater habitats.

For application with air-blast equipment, DO NOT apply within 40 metres of well-heads or aquatic systems.

The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or where the water table is shallow.

**Storage:** DO NOT store in or around the home. Store unused product in a cool, ventilated, dry, locked area and avoid cross-contamination with other pesticides, fertilizers, food and feed.

DO NOT use treated seed pieces for food, feed or fodder.

If this product is to be applied to a product destined for export to the United States, contact 1-866-375-4648 or [www.croplife.ca](http://www.croplife.ca).

## Environmental Hazards:

**Bees:** This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds.

**Aquatic Invertebrates:** This product is highly toxic to aquatic invertebrates.

**Birds:** This product is toxic to birds. Any spilled or exposed seeds must be incorporated into the soil or otherwise cleaned-up from the soil surface.

**Aquatic organisms:** Highly toxic to aquatic invertebrates.

## Hazard Rating:



Caution – Poison

Refer to the introduction for an explanation of the symbols.

# Agri-Mek SC

Insecticide Group  
6

## Company:

Syngenta Canada (PCP#31607)

## Formulations, Crops, Insects, Rates:

Product		Agri-Mek SC
Formulation and Container Size		84 g/L abamectin formulated as a suspension concentrate.
Crop	Insect	Application rate (per acre)
Potato	Potato psyllid, Colorado potato beetle, Spider mites	49 to 91 mL

## Application:

### Agri-Mek

- Can be applied by ground only. Colorado Potato Beetle: Make the first application after approximately 50% of the egg masses have hatched and larvae are present. Apply when potato psyllids and spider mites first appear. Make first application after approximately 50 per cent of the egg masses of Colorado potato beetle have hatched and larvae are present. If two applications are required, limit them to a single Colorado potato beetle generation per crop. Apply in sufficient in solution to ensure thorough coverage of plant foliage. Avoid application when heavy rain is forecast.

## How it Works:

*Agri-Mek* interferes with neuro-transmission in insects and mites resulting in paralysis, cessation of feeding and eventually death of the pest.

## Restrictions:

- DO NOT apply by air.
- **Buffer zone:** DO NOT apply within 30 metres of freshwater habitats.
- Allow 7 days between application.
- DO NOT make more than 2 applications per growing season. DO NOT apply more than 800 mL per acre of *Agri-Mek* per season. DO NOT graze treated crop.
- DO NOT enter or allow entry into treated areas for 12 hours following application.
- **Pre-harvest interval:** 14 days
- **Storage:** Store product in original container only, away from food or feed. Keep container closed.

## Precautions:

DO NOT contaminate water, food or feed by storage or disposal.

If *Agri-Mek* is to be used on a commodity that may be exported to the United States and you require information on acceptable residue levels in the United States, visit CropLife Canada's website at [www.croplife.ca](http://www.croplife.ca) or contact Syngenta Canada Inc. at 1-877-964-3682.

## Environmental Hazards:

**Bees:** *Agri-Mek* is highly toxic to bees exposed to direct treatment or residues on flowering crops and weeds. DO NOT apply this product or allow drift to flowering crops and weeds if bees are visiting the treatment area.

**Aquatic organisms:** Toxic to aquatic organisms and wildlife. A buffer zone of 30 metres is required between the last point of direct application and the closest downwind end of sensitive freshwater habitats. Avoid application when heavy rain is forecast.

## Hazard Rating:



Warning – Poison

Refer to the introduction for an explanation of the symbols.

# Bioprotec CAF/Bioprotec PLUS

Insecticide Group  
11

## Company:

AEF Global Inc. (*Bioprotec CAF* – PCP#26854 / *Bioprotec PLUS* – PCP#32425)

## Formulation:

*Bacillus thuringiensis subspecies kurstaki*, strain EVB113-19, in a water based formulation. Potency - Bioprotec CAF: 11,400 cabbage looper units (CLU)/mg of product (equivalent to 12.7 billion CLU/L) - Bioprotec PLUS: 17,500 Cabbage Looper Units (CLU) per mg of product (equivalent to 20 billion CLU per liter).

- Container size - 10 L

## Formulations, Crops, Insects, Rates:

Product		Bioprotec CAF	Bioprotec PLUS
Formulation and Container Size		Bacillus thuringiensis subspecies kurstaki, strain EVB113-19, in a water based formulation. 10 L	
Crop	Insect	Application rate (per acre)	Application rate (per acre)
Quinoa	European corn borer	1.13-1.62 L	0.61-1.0 L
	Fall armyworm, beet webworm	0.57-1.13 L	0.36-0.73 L
Timothy	Essex skipper	0.22-0.28 L	0.14-0.18 L
Sunflower	Sunflower moth	0.32-0.65 L	0.20-0.40 L
Hemp	European corn borer		0.73-1.0 L

## Application:

### *Bioprotec CAF/Biotprotec PLUS*

- Use the higher rate for heavy infestations. If egg hatch is extended or re-infestation occurs, repeat applications. Apply every 7 to 10 days.
- Apply at first signs of infestations when larvae are small. Repeat applications, according to economic threshold, as necessary to maintain control. Consult provincial recommendations and regional advisors for monitoring procedures, treatment thresholds, and timing of applications. Monitor for the pest and apply at hatching, before larvae bore into plant tissues. Apply Bioprotec CAF with a high volume sprayer in a minimum of 300 L of water per hectare.
- Apply in sufficient water volume to ensure thorough coverage. A minimum of 121.4 L per acre is recommended. Begin application at hatching before larvae bore into plant tissues. Use diluted spray mixtures within a 12-hour period.
- Bioprotec CAF/Biotprotec PLUS should be applied by aerial equipment undiluted. Dilute with minimal quantities of water only when required to improve deposit. Best results can be expected when Bioprotec CAF is applied to dry foliage with calibrated aircraft capable of obtaining droplet sizes below 300 microns and preferably in the range of 50 to 150 microns.

## How it Works:

*Bioprotec CAF/Biotprotec PLUS* is selectively toxic to some species of lepidopteran larvae. It is a stomach intoxicant only; to be effective, deposits must be ingested by susceptible larvae. Thorough coverage of target foliage where larvae are feeding is essential. In general, larvae should be treated when they are newly hatched and actively feeding. After ingestion of a sufficient dose, larvae cease feeding within a few hours and death occurs in 2 to 5 days.

## Restrictions:

- Maximum of 6 applications per year with a 5 to 10 day interval between applications.
- **Pre-harvest Interval:** 0 days
- **Storage:** *Bioprotec CAF/Biotprotec PLUS* should be stored in the original container between 4°C and 20°C. Product should be used within 18 months of the date of manufacture. Re-Entry Interval: When the product is dry.

## Precautions:

DO NOT allow the pilot to mix product to be loaded onto the aircraft. However, loading of premixed product with a closed system is permitted. Keep out of reach of children. Avoid contact with skin, eyes or clothing. Avoid breathing dust/spray mist. Wear a long-sleeved shirt, long pants, waterproof gloves, shoes plus socks, eye goggles and a NIOSH-approved respirator with any N-95, R-95, or P-95 filter for biological products when handling, mixing/loading or applying the product and during all cleanup/repair activities

## Hazard Rating:

Caution – Eye Irritant  
Potential Sensitizer

# BioTitan WP

Insecticide Group  
UNF

## Company:

Anatis Bioprotection (PCP#33923)

## Formulations, Crops, Insects, Rates:

Product	BioTitan WP	
Formulation and Container Size	Beauveria bassiana strain ANT-03 as a wettable powder. 500 g to 25 kg	
Crop	Insect	Application rate (per acre)
Potato	Colorado potato beetle	0.81-1.62 kg

## Application:

Minimum water volume: Use spray volume sufficient to cover foliage infested with insect pests. Crop size and spray equipment will determine spray volume needed. Depending on crop treated, 500 to 1000 L of spray volume will typically be required for 1 ha.

## How it Works:

Thorough coverage of infested plant parts is necessary for effective control. BioTitan WP acts via contact and does not have systemic activity. Infection begins with the attachment of conidia to the insect cuticle, followed by germination and penetration of the fungi inside the insect body. Once inside, *B. bassiana* kills the host and if conditions are adequate, it will sporulate outside the insect's body after a few days and produce newly infective conidia.

## Effects of Weather on Performance or Safe Use

Apply only when the potential for drift to areas of human habitation or areas of human activity such as houses, cottages, schools and recreational areas is minimal. Take into consideration wind speed, wind direction, temperature inversions, application equipment and sprayer settings. Do not apply in extremely hot weather. On sunny days, apply later in the afternoon; do not apply at mid-day when temperatures are highest and the sun is most intense. For foliar applications, do not apply when heavy rain is forecast.

## Tank Mixes

Do not mix with fungicide. If a fungicide must be used, make the application of the fungicide at least 4 days before the BioTitan WP application or at least 2 days after the BioTitan WP application. According to the Pest Management Regulatory Agency of Health Canada's Guidance Document on Tank Mix Labelling (March 2023), unlabelled tank mixes of this product are permitted only if the label of this product and the label of the product it might be mixed with include at least general wording on their respective labels indicating they may be mixed with other pesticides. When tank mixes are permitted, apply mixes according to the most restrictive use limitations for either product.

## Restrictions

- **Rainfast period:** Avoid application when heavy rain is forecast.
- **Re-entry interval:** DO NOT re-enter or allow re-entry into treated areas for 4 hours or until sprays have dried, unless wearing appropriate personal protective equipment including long-sleeved shirt, long pants, waterproof gloves, socks and shoes.
- **Pre-harvest interval:** 0 days
- **Other restrictions:** To reduce runoff from treated areas into aquatic habitats avoid application to areas with a moderate to steep slope, compacted soil, or clay. Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative filter strip between the treated area and the edge of the water body. Do not apply in extremely hot weather. On sunny days, apply later in the afternoon; do not apply at mid-day when temperatures are highest and the sun is most intense.
- **Buffer zones:** Apply only when the potential for drift to areas of human habitation or areas of human activity such as houses, cottages, schools, and recreational areas is minimal. Take into consideration wind speed, wind direction, temperature inversions, application equipment and sprayer settings.
- **Storage:** Store in a cool, dry place. Can be stored up to 18 months if in the refrigerator at 4°C. Can be stored up to 6 months at 21°C in an unopened package. If the package is open, this product can be stored up to 3 months at 21°C. Tightly reclose the container of unused product to prevent decrease of the efficacy. The BioTitan WP contains live spores of the naturally occurring fungus, *B. bassiana*. Spores may be damaged by storage at high temperatures (higher than 25°C) or contact with water for more than 24 hours. To prevent contamination, store this product away from food or feed.

## Environmental Hazards

*Beauveria bassiana* strain ANT-03 is considered safe for beneficial insects, although it is recommended to avoid spraying directly in areas where bees are actively foraging. If bees are contacted directly, they can bring fungal spores back to the hive and infect the susceptible brood. *Beauveria bassiana* strain ANT-03 is toxic and/or pathogenic to daphnia (aquatic invertebrate).

## Hazard Rating (Mammalian Toxicity)

Potential sensitizer.

Warning - eye irritant.

Warning - poison

# Carbine/Beleaf 50SG

Insecticide Group  
29

## Company:

FMC of Canada - Carbine - (PCP#34659), Beleaf 50SG - (PCP#29796)

## Formulations, Crops, Insects, Rates:

Product	Carbine	Beleaf 50 SG	
Formulation and Container Size	50% flonicamid formulated as a water dispersible granule. 4 x 1.587 kg	50% flonicamid formulated as a water soluble granule. 6 x 0.68 kg jug per case	
Crop	Insect	Application rate (per acre)	Application rate (per acre)
Dry beans, faba beans, chickpea, lentil, field	Aphids	0.05-0.06 Kg	0.05-0.06 Kg
	Reduces numbers of Lygus, including tarnished plant bug	0.08 Kg	0.08 Kg
Alfalfa (seed production)	Aphids	0.05-0.06 Kg	0.05-0.06 Kg
	Tarnished plant bug	0.08 (2 applications) - 0.12 (3 applications) Kg	0.08 (2 applications) - 0.12 (3 applications) Kg
Alfalfa (forage), clover ( <i>Trifolium</i> spp., <i>Melilotus</i> spp.), lupin, sainfoin, trefoil, vetch (crown, milk)	Aphids	0.05-0.06 Kg	0.05-0.06 Kg
	Tarnished plant bug	0.08 (2 applications) - 0.12 (3 applications) Kg	0.08 (2 applications) - 0.12 (3 applications) Kg
Potato	Potato aphid		0.05-0.06 Kg
	Psyllid (suppression)		0.08 Kg

## Application:

- Thorough spray coverage of plant foliage is essential for optimum control. Apply in sufficient water volumes to ensure good coverage. Use a minimum of 38 litres per acre of water. Rates and finished spray volumes should be increased under extreme pest populations or dense plant foliage.
- For applications to control aphids, use higher rate under extreme pest populations and/or dense plant foliage.
- Scout fields and reapply if necessary.

## How it Works:

Flonicamid insecticide is a member of Insecticide Group 29 and controls target pests by contact and ingestion provoking rapid and irreversible feeding cessation. There is translaminar movement in the plant.

## Tank Mixes:

Coragen® MaX Insecticide. According to the Pest Management Regulatory Agency of Health Canada's Guidance Document on Tank Mix Labelling (March 2023), unlabelled tank mixes of this product are permitted only if the label of this product and the label of the product it might be mixed with include at least general wording on their respective labels indicating they may be mixed with other pesticides. When tank mixes are permitted, apply mixes according to the most restrictive use limitations for either product.

## Restrictions:

- DO NOT apply by air.
- DO NOT use seed or forage from alfalfa grown for seed for human or animal consumption
- Allow a minimum of 7 days from alfalfa grown for seed between applications. DO NOT make more than 3 applications per year.
- **Preharvest interval:**
  - DO NOT apply within 7 days of harvest.
- DO NOT apply more than 121 grams per acre per application. DO NOT apply more than 243 grams per acre per season.
- DO NOT use in home gardens.
- **Re-cropping:** There are no plant-back restrictions for any crop listed on the label. All other crops may be planted 30 days after the last application of *Beleaf*.

**Precautions:**

Avoid overnight storage of spray mixture. Prepare only enough spray mixture required for immediate application. DO NOT use liquid fertilizer as a carrier.

*Beleaf* insecticide should not be used with spray adjuvants. Avoid application of *Beleaf* or *Carbine* Insecticide when heavy rain is forecast. DO NOT enter or allow entry into treated areas for 12 hours after application.

**Storage:** Store product in original container, in a secured, dry place separate from other pesticides, fertilizer, food or feed. Avoid the overnight storage of spray mixtures.

If this product is to be applied to a commodity destined for export, visit Crop Life Canada's website [www.croplife.ca](http://www.croplife.ca) for information on acceptable residue limits.

**Environmental Hazards:**

Toxic to certain beneficial insects. Minimize spray drift to reduce harmful effects on beneficial insects in habitats next to the application site such as hedgerows and woodland. Toxic to non-target terrestrial plants. Observe spray buffer zones specified on the label. To reduce runoff from treated areas into aquatic habitats avoid application to areas with a moderate to steep slope, compacted soil, or clay.

**Hazard Rating:**

Caution – Eye Irritant

Refer to the introduction for an explanation of the symbols.

# Chlorantraniliprole

Insecticide Group  
28

**Company:**

FMC of Canada (Coragen MaX - PCP#34385)

UPL AgroSolutions Canada (*Shenzi* - PCP#34974)

Maxunitech North America (*Maxunitech Chlorantraniliprole 200SC* - PCP# 35432)

ADAMA Agricultural Solutions Canada (*Cosayr* - PCP#35005)

AgraCity Crop & Nutrition Ltd (*Vermis Insecticide* - PCP#35368)

**Formulations, Crops, Insects, Rates:**

Product		Coragen MaX	Shenzi	Chlorantraniliprole 200SC	Cosayr	Vermis
Formulation and Container Size		600 g/L chlorantraniliprole formulated as a suspension 4 x 2L	400 g/L chlorantraniliprole formulated as a suspension 4 x 4L	200g/L chlorantraniliprole formulated as a suspension	200g/L chlorantraniliprole formulated as a suspension	200g/L chlorantraniliprole formulated as a suspension
Crop	Insect	Application rate (per acre)				
Alfalfa, clover (Trifolium, Melilotus), lupin, sainfoin, trefoil	Alfalfa weevil (suppression only)	51-68 mL	76-101 mL	152-202 mL	152-202 mL	152-202 mL
	Grasshoppers	17-34 ml	25-51 mL	51-101 mL	51-101 mL	51-101 mL
	Cutworms	34 mL				
Bean, chickpea, fava, lentil, pea, soybean	Grasshoppers	17-34 ml	25-51 mL	51-101 mL	51-101 mL	51-101 mL
	Cutworms	34 mL	51 mL	101 mL	101 mL	101 mL
	Armyworm, European corn borer, Corn earworm, Fall armyworm	34-51 mL	51-76 mL	101-152 mL	101-152 mL	101-152 mL
	Cabbage looper	34 mL	51 mL	101 mL	101 mL	101 mL
Borage	Grasshoppers	17-34 ml	25-51 mL	51-101 mL	51-101 mL	51-101 mL

Product		Coragen MaX	Shenzi	Chlorantraniliprole 200SC	Cosayr	Vermis
Canola, mustard, rapeseed	Bertha armyworm	17 to 50.5 mL	25.5 to 76.1 mL	51 to 152 mL	51 to 152 mL	51 to 152 mL
	Grasshoppers	17-34 ml	25-51 mL	51-101 mL	51-101 mL	51-101 mL
	Cutworms	34 mL	51 mL	101 mL	101 mL	101 mL
	Diamondback moth	17 mL	25 mL	51 mL	51 mL	51 mL
	Cabbage looper, Imported cabbageworm	34 mL	51 mL	101 mL	101 mL	101 mL
Crop	Insect	Application rate (per acre)				
Corn	Armyworm, Fall armyworm, Corn earworm, European corn borer	34-51 mL	51-76 mL	101-152 mL	101-152 mL	101-152 mL
	Black cutworm	34 mL	51 mL	101 mL	101 mL	101 mL
	Grasshoppers	17-34 ml	25-51 mL			
Flax	Bertha armyworm	17-51 mL	51-76 mL	51-101 mL	51-151 mL	51-151 mL
	Cutworms	34 mL	51 mL	101 mL	101 mL	101 mL
	Grasshoppers	17-34 ml	25-51 mL	51-101 mL	51-101 mL	51-101 mL
Forage grasses (for feed)	Armyworm	34-51 mL	51-76 mL	101-152 mL	101-152 mL	101-152 mL
	Grasshoppers	17-34 ml	25-51 mL	51-101 mL	51-101 mL	51-101 mL
	Cutworms	34 mL				
Pastures	Grasshoppers	17-34 ml	25-51 mL	51-101 mL	51-101 mL	51-101 mL
	Cutworms	34 mL				
Potato	Armyworm, Corn earworm, Variegated cutworm, European corn borer, Cabbage looper, Black cutworm	34-51 mL	51-76 mL	101-152 mL	101-152 mL	101-152 mL
	Colorado potato beetle	34-68 mL	51-101 mL	101-202 mL	101-202 mL	101-202 mL
	Grasshoppers	17-34 ml				
Safflower	Grasshoppers	17-34 ml	25-51 mL	51-101 mL	51-101 mL	51-101 mL
	Cutworms	34 mL	51 mL	101 mL	101 mL	101 mL
Sunflower (seed)	Cutworms	34 mL	51 mL	101 mL	101 mL	101 mL
	Banded sunflower moth	34 mL	51-76 mL	101-152 mL	101-152 mL	101-152 mL
	Grasshoppers	34-51 mL	25-51 mL	51-101 mL	51-101 mL	51-101 mL
Wheat, barley, buckwheat, millet, oats, rye, triticale	Armyworm	34-51 mL	51-76 mL	101-152 mL	101-152 mL	101-152 mL
	Cutworms	34 mL	51 mL	101 mL	101 mL	101 mL
	101-152 mL	51-76 mL	101-152 mL	101-152 mL	101-152 mL	
	Grasshoppers	17-34 ml	25-51 mL	51-101 mL	51-101 mL	51-101 mL

Product		Coragen MaX	Shenzi	Chlorantraniliprole 200SC	Cosayr	Vermis
Quinoa	Beet webworm, goosefoot, groundling moth	34-51 mL				

## Application:

### *Coragen Max/Shenzi/Chlorantraniliprole 200SC/Vermis/Cosayr*

- May be applied by air or ground equipment. Aerial applications for Shenzi, Chlorantraniliprole 200SC Vermis, and Cosayr are limited to potatoes, corn, oilseeds, legume vegetables, and cereals.
- Begin application when treatment thresholds have been reached. Thorough coverage is essential for optimal control. Use the high rate under heavy pest pressure and/or when larger larvae are present.
- **Spray Volume for Potatoes:** Apply in a minimum finished spray volume of 40 L per acre by ground. Apply in a minimum finished spray volume of 20 L per acre by air (20 L/ac by air for Chlorantraniliprole 200SC, Silencer Duo A, Cosayr, Vermis).
- **Quinoa:** Coragen MaX - Do not make more than 3 applications per year. DO NOT APPLY BY AIR. Do not apply less than 1 day before harvest. Observe a 1-day PHI.

## How it Works:

Chlorantraniliprole disrupts muscle activity in the insects, resulting in paralysis. Treated pests stop feeding quickly after ingestion, become lethargic and lose mobility. Insect death may take several days.

## Tank Mixes:

Apply mixes according to the most restrictive use limitations for either product.

- **Insecticides:** *Pounce(R) 384EC insecticide*. According to the Pest Management Regulatory Agency of Health Canada's Guidance Document on Tank Mix Labelling (March 2023), unlabelled tank mixes of this product are permitted only if the label of this product and the label of the product it might be mixed with include at least general wording on their respective labels indicating they may be mixed with other pesticides. When tank mixes are permitted, apply mixes according to the most restrictive use limitations for either product.

## Restrictions:

- DO NOT make more than 4 applications per season on bean, chickpea, lentil, pea, soybean, potatoes, corn, and forage grasses. DO NOT exceed a total of 455 mL of *Coragen* or 152 mL of *Coragen MaX* per acre per season.
- DO NOT make more than 1 application per cutting on alfalfa and sweet clover.
- **Potatoes, bean, chickpea, lentil, pea, soybean:** DO NOT apply more than once every 3 days.
- **Canola, rapeseed, mustard, flax, sunflower:** DO NOT make more than 3 applications per season. DO NOT apply more than once every 5 days.
- **Corn:** DO NOT apply more than once every 7 days. Do not apply more than once every 3 days on seed corn or sweet corn.
- **Wheat, barley, oats, buckwheat, millet:** DO NOT make more than 3 applications per season. DO NOT exceed a total of 455 mL of *Coragen* or 152 mL of *Coragen MaX* per acre per season.
- Forage (grass), fodder or hay may be fed to livestock.
- DO NOT make a foliar application of for a minimum of 60 days following an in-furrow or soil application or planting of seed or seed pieces treated with any Group 28 insecticide.
- **Restricted Entry Interval:** 12 hours
- **Storage:** Store product in original container only, away from other pesticides, fertilizer, food or feed. Not for use or storage in or around the home. Keep container closed.

## Precautions:

DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

## Environmental Hazards:

**Aquatic organisms:** Toxic to aquatic organisms. To reduce runoff from treated areas into aquatic habitats avoid application to areas with a moderate to steep slope, compacted soil, or clay. Avoid application when heavy rain is forecast.

**Beneficial insects:** May cause harm to some generalist predators, but not harmful to some beneficial insects such as parasitic Hymenoptera.

## Hazard Rating:

Very low toxicity to mammals. Keep out of reach of children.

# Cimegra

Insecticide Group  
30

## Company:

BASF Canada Inc. (PCP#33666)

## Formulations, Crops, Insects, Rates:

Product		Cimegra
Formulation and Container Size		Broflanilide formulated as a suspension concentrate (100 g/L). 2 x 3 L
Crop	Insect	Application rate (per acre)
Potato	Colorado potato beetle, Wireworms	51-76 mL (foliar)
Corn	Corn rootworm, Wireworms	101 mL; 1.9 mL/ 100 m of row (in-furrow)

MRLs will be established for potatoes across North America (pending registration in the United States), and BASF has submitted for other key markets but is awaiting approvals. Discuss with your potato processor for more information.

## Application:

- For *Cimegra* insecticide to be most effective, apply in-furrow or as a T-band at planting. Apply as a dilute concentrate in sufficient water to get good coverage of the seed furrow. DO NOT apply *Cimegra* to the soil surface.
- Instructions for In-furrow Use to Control Wireworm in Potatoes:**
  - Use 250 mL per hectare of *Cimegra* insecticide in-furrow to control wireworm in potato. Apply at planting as a dilute spray in water. Apply the in-furrow spray to uniformly cover the seed pieces and surrounding soil. The spray pattern should be a 10 to 20 cm (4 to 8 inch) band that is applied to the open seed piece furrow prior to being covered with soil.
  - Dilute *Cimegra* insecticide product in a minimum of 50 L of water per hectare and apply the dilute mixture into the furrow. Use sufficient water to ensure thorough coverage of the seed piece and surrounding seed furrow.
- Instructions for In-furrow:** Use to control wireworm and corn rootworm in corn.
  - Use 250 mL per hectare of *Cimegra* insecticide in furrow to control wireworm and corn rootworm (*Diabrotica virgifera virgifera* and *Diabrotica barberi*) in corn. Apply at planting as an in-furrow or T-band spray by directing spray pattern to uniformly cover seed and surrounding soil.
    - In-furrow:** Apply through spray nozzles or microtubes into the open seed furrow, between the planter furrow openers and press wheels.
    - T-band:** Apply in a 10 to 20 cm (4 to 8 inch) band over the top of the open seed furrow, between planter furrow openers and press wheels. DO NOT T-band over the top of a closed furrow.
- Instructions for foliar application to control Colorado potato beetle in potato:**
  - Cimegra* is not systemic so recommend higher water volume to ensure thorough coverage of the plant.

## How it Works:

Broflanilide is a Group 30 insecticide that is a GABA-gated chloride channel moderator that controls listed pest species through contact and ingestion. Broflanilide binds to a specific site of action upon contact that impacts the central nervous system. Causes rapid, irreversible hyperactivity of nerves and muscles leading to convulsions, paralysis and death.

## Effects of Weather:

Avoid application when heavy rain is forecast.

## Restrictions:

- Re-entry interval:** 12 hours.
- Pre-harvest interval:** 14 days.
- Re-cropping:** Immediate plant-back is permitted for all labelled crops. A plant-back interval of 30 days is required for all crops not on the label.
- Storage:** Prevent from freezing; however, in the instance that the product freezes, allow to thaw at room temperature for 24 hours and agitate well prior to use. To prevent contamination, store this product away from food and feed. Store in original tightly closed container in a cool, dry, locked, well-ventilated area without floor drain.
- Other restrictions:** Do not apply more than 2 foliar applications per year. Do not apply more than 50g active ingredient per hectare per year (20g per acre) total. This includes all application types (in-furrow, foliar, etc.)

**Precautions:**

Wear a long-sleeved shirt, long pants, chemical-resistant gloves, shoes and socks during mixing, loading, application, clean-up and repair. Gloves are not required during application within a closed cab. Wash hands before eating, drinking, smoking or using the toilet. Change out of work clothes and take a bath or shower after handling or spraying the product. Launder protective clothing before re-use.

**Environmental Hazards:**

**Bees:** Toxic to bees. Avoid application during crop blooming period. If applications must be made during the crop blooming period, restrict applications to evening when most bees are not foraging. However, this product is not systemic and when used according to label directions, minimal exposure or risk is expected.

**Aquatic organisms:** Toxic to aquatic organisms. To reduce runoff from treated areas into aquatic habitats avoid application to areas with a moderate to steep slope, compacted soil, or clay. Avoid application when heavy rain is forecast. Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative filter strip between the treated area and the edge of the water body.

**Hazard Rating:**

Warning – Contains the Allergen Soy

Refer to the introduction for an explanation of the symbols.

# Closer

Insecticide Group  
4C

**Company:**

Corteva Agriscience (PCP#30826)

**Formulations, Crops, Insects, Rates:**

Product		Closer
Formulation and Container Size		240 g/L sulfoxaflor formulated as a suspension concentrate. 12 x 1 L
Crop	Insect	Application rate (per acre)
Corn	Aphids	30-61 mL
Potato	Aphids	20-61 mL
	Aphids	20-61 mL
Quinoa	Lygus	81 mL

**Application:***Closer*

- May be applied by ground or air in corn and potatoes. Use low rates for light infestations of target pests and higher rates for moderate to heavy infestations. Apply in sufficient in sufficient solution to ensure thorough coverage of plant foliage. For ground application use a minimum spray volume of 40 L per acre. For aerial application use a minimum spray volume of 12 L per acre.

**How it Works:**

*Closer* is a systemic (within the plant) insecticide that causes blockage in the insect's nervous system resulting in paralysis and eventually death, through contact or stomach action.

**Restrictions:**

- DO NOT make more than 2 applications per growing season. DO NOT apply more than 121 mL per acre per growing season. The 121 mL per acre max is for potatoes and corn. Quinoa is listed at 2 applications per growing season with max of 161 mL per acre per growing season.
- DO NOT apply through an irrigation system.
- **Plant back interval:** A period of 30 days must elapse between treatment of primary crops and the planting of secondary crops not on the *Closer* label.
- **Restricted Entry Interval:** 12 hours.
- **Storage:** Store product in original container only, away from food or feed. Keep container closed.

**Precautions:**

DO NOT store or ship with food, feeds, drugs or clothing.

DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

If *Closer* is to be used on a commodity that may be exported to the United States and you require information on acceptable residue levels in the United States, visit CropLife Canada's website at [www.croplife.ca](http://www.croplife.ca).

## Environmental Hazards:

**Bees:** Toxic to bees exposed to direct treatment, drift, or residues on flowering crops or weeds. Apply early in the morning or late in the evening when bees are not active.

**Aquatic organisms:** The use of this chemical may result in contamination of groundwater, particularly in areas where soil is permeable (e.g. sandy soil) and/or the depth to the water table is shallow. Avoid application of *Closer* if heavy rain is forecast.

**Others:** Toxic to certain beneficial insects.

## Hazard Rating:

None specified

# Concept

Insecticide Group  
3A, 4A

## Company:

Bayer (PCP#29611)

## Formulations, Crops, Insects, Rates:

Product		Concept
Formulation and Container Size		75 g/L imidacloprid and 10 g/L deltamethrin formulated as a suspension concentrate. 5.26 L
Crop	Insect	Application rate (per acre)
Potato	Colorado potato beetle, aphids, leafhoppers, potato flea beetle, tarnished plant bug, European corn borer (suppression only)	142 mL
Soybean	Soybean aphid	132 mL

## Application:

### Concept

- Ground application only.
- Apply when target pest has reached economic threshold levels. Repeat application if pest populations reach economic thresholds.
- Use sufficient water volumes for thorough coverage (e.g. minimum of 40 to 80 L of water per acre).
- For control of tarnished plant bug it is recommended to use *Concept* insecticide only when timing of application coincides with the timing for another pest on the label for potatoes.

## How it Works:

*Concept* insecticide works through contact and systemic activity. Insecticide components: Imidacloprid is a neonicotinoid, systemic (within the plant) insecticide that works by contact or ingestion. Deltamethrin is a non-systemic pyrethroid insecticide that works through contact and ingestion.

## Restrictions:

- Allow a minimum of 5 days between applications.
- DO NOT make more than 3 applications of *Concept* in a year.
- DO NOT apply *Concept* through any type of irrigation equipment.
- DO NOT apply *Concept* following a seed treatment or soil application of any Group 4 (neonicotinoid class) insecticide.
- A buffer zone of 8 metres is required between the downwind point of application and the closest edge of aquatic habitats.
- **Re-cropping:** Treated areas may be replanted with any crop specified on an imidacloprid label, or any crop for which a tolerance exists for the active ingredient, as soon as practical following the last application.
- **Acceptable plant-back intervals for:**
  - *Cereal grains (wheat, barley, oats)* – 30 days
  - *Pea and bean (including faba bean, soybean and dry common bean)* – 9 months
  - *All other food and feed crops* – 12 months
  - *Green manure and other cover crops not intended for human or animal consumption* – no plant-back interval required following treatment.
- DO NOT graze or harvest cover crops for food or feed.

**Precautions:**

DO NOT enter or allow entry into treated areas for a period of 24 hours after application of *Concept*.

DO NOT apply *Concept* within 15 metres of well-heads or aquatic systems. DO NOT mix, load or clean equipment within 30 metres of well-heads or aquatic systems.

If this product is to be applied to a commodity destined for export to the United States, visit Crop Life Canada's website [www.croplife.ca](http://www.croplife.ca) for information on acceptable residue limits.

**Storage:** DO NOT use or store in or around the home. Store unused product away from feeds, seeds, fertilizer, plants and foodstuffs. *Concept* cannot be stored below freezing.

If stored for one year or longer, shake well before using.

**Environmental Hazards:**

**Bees:** This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area.

**Aquatic organisms:** Highly toxic to fish and other aquatic organisms. DO NOT apply where runoff is likely to occur. Runoff from treated areas may be hazardous to aquatic organisms in neighbouring areas. Avoid application when heavy rain is forecast.

**Hazard Rating:**

Warning – Eye Irritant

 **Deltamethrin:** Danger – Poison

 **Imidacloprid:** Caution – Poison

Refer to the Introduction for an explanation of the symbols.

# Cormoran

**Insecticide Group  
4A, 15**

**Company:**

ADAMA Agricultural Solutions Canada (PCP#33353)

**Formulations, Crops, Insects, Rates:**

Product		Cormoran
Formulation and Container Size		Acetamiprid and Novaluron formulated as an emulsifiable concentrate. (Acetamiprid – 80 g/L; Novaluron – 100 g/L). 10.08 L
Crop	Insect	Application rate (per acre)
Potato	Colorado potato beetle, armyworm, cabbage looper	178-283 mL
	Aphids, European corn borer	146-303 mL
Seed alfalfa	Alfalfa plant bug, Lygus	303-364 mL

**Application:**

- Apply in a minimum finished spray volume of 200 L per hectare by ground.
- For Colorado potato beetle, DO NOT apply more than twice to a single generation and DO NOT apply to successive generations.
- For seed alfalfa, apply prior to bloom up to the time when 50 percent of seed pods are ripe. Begin when adults and/or 4<sup>th</sup> to 5<sup>th</sup> instar nymphs have reached economic threshold levels for your area.
- Minimum re-application interval of 7 days.
- Apply when insect numbers exceed economic threshold levels and use sufficient water for good coverage. Use higher rates for mature insect stages or severe infestations.

**How it Works:**

Acetamiprid is a neonicotinoid insecticide that works by contact or ingestion. It has an anti-feedant effect that can prevent pest damage to host plants prior to the death of the insect. Novaluron is an insect growth regulator that must be absorbed by eggs or ingested by insect larvae to be fully effective. The primary mode of action is by disrupting cuticle formation and deposition occurring when insects change from one developmental stage to another, resulting in death at molting.

## Effects of Weather:

Drift potential is lowest between wind speeds of 3 to 16 kilometres per hour. However, many factors, including droplet size and equipment type, determine drift potential at any given speed. Application should be avoided below 2 miles per hour due to variable wind direction and high inversion potential. When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry. Applications should not occur during a temperature inversion because drift potential is high. Avoid application when heavy rain is forecast.

## Restrictions:

- **Storage:** Keep in original container during storage. DO NOT contaminate or store near foodstuffs. Store in cool, dry, locked, well-ventilated area without floor drain. Keep away from fire or open flame, or other sources of heat.
- **Restricted Entry Interval:** 12 hours
- **Buffer zones:** DO NOT apply directly to water or where runoff could occur to adjacent aquatic sites.
- **Pre-harvest Interval:** 7 days

## Precautions:

Wear a long-sleeved shirt, long pants, chemical-resistant gloves, socks and shoes during mixing, loading, application, clean-up and repair. Wash the outside of gloves before removing.

## Environmental Hazards:

**Bees:** Toxic to bees exposed to direct treatment, drift, or residues in flowering crops or weeds. DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area. Minimize spray drift to reduce harmful effects on bees in habitats close to application site.

**Aquatic organisms:** Toxic to aquatic organisms and Non-target terrestrial plants.

## Hazard Rating:

No specific hazard rating specified.

# Cypermethrin

Insecticide Group  
3A

## Company:

UPL AgroSolutions Canada Inc. (UP-Cyde 2.5 EC – PCP#28795)

Sharda CropChem Limited (Ship 250 EC – PCP#32563)

## Formulations, Crops, Insects, Rates:

Product		UP-Cyde 2.5 EC	Ship 250 EC
Formulation and Container Size		250 g/L, emulsifiable concentrate. 1, 3.79, 5, 10 L	250 g/L, emulsifiable concentrate. 1, 3.79, 5, 10 L
Crop	Insect	Application rate (per acre)	
Wheat, barley	Grasshoppers	33-46 mL	33-46 mL
	Cutworm	115 mL	115 mL
Canola, rapeseed, mustard	Grasshoppers	33-46 mL	33-46 mL
	Flea beetles	57 mL	57 mL
	Bertha armyworm	81-113 mL	81-113 mL
Roadsides, headlands, summerfallow	Grasshoppers	33-46 mL	33-46 mL
Sunflower	Sunflower beetle, sunflower seed weevils	40 mL	40 mL
Corn	European corn borer, corn earworm	113 mL	113 mL
	Cutworm	115 mL	115 mL
Potato	Colorado potato beetle, flea beetle leafhoppers	57 mL	57 mL
	Tarnished plant bug	81 mL	81 mL
	Variiegated cutworm, cutworms	115 mL	115 mL

## Application:

### Cypermethrin

- May be applied by ground application only for control of immature (up to 4<sup>th</sup> instar) grasshoppers on wheat, barley, roadsides, headlands and canola; for flea beetle control on canola and mustard; and for control of cutworm. After application for cutworm leave soil surface undisturbed for 5 days.
- May be applied by ground or air for flea beetles (aerial application for *Up-cyde* and *Ship 250 EC* only – one aerial application per year) and bertha armyworm in canola, sunflower beetle, sunflower seed weevil in sunflower, corn earworm, European corn borer in corn and Colorado potato beetle, flea beetle, leafhoppers and tarnished plant bug on potatoes.
- Apply when insect numbers exceed economic threshold levels and use sufficient water for good coverage. Use higher rates for mature insect stages (grasshoppers) or severe infestations.

## How it Works:

*UP-Cyde* and *Ship* are pyrethroid insecticides that work as a contact and stomach poison.

## Effects of Weather:

Activity of cypermethrin on grasshoppers is reduced as soil temperature increases. Application for grasshopper control should be made at temperatures below 25°C. Spraying for grasshoppers should be delayed until evening if daytime temperatures are above 25°C.

## Restrictions:

- **Grazing:** Treated crops must not be grazed or cut for hay except field corn silage derived from corn treated with *Up-Cyde* at the recommended rate and pre-harvest interval may be fed to lactating dairy cattle and beef cattle.
- **Storage:** Keep in original container during storage. DO NOT contaminate or store near foodstuffs.
- **Restricted Entry Interval:** 12 hours
- **Buffer zones:**
  - **Canola, Rapeseed, Mustard** – Cypermethrin must be applied by ground for grasshoppers.
  - DO NOT apply Cypermethrin more than once per season by air. DO NOT apply *Up-Cyde* to mustard by air.
  - **Corn** – DO NOT apply more than a maximum of 3 applications by ground. DO NOT make more than 2 aerial applications per season. Repeat as necessary with 4 to 7 day intervals between applications.
  - **Potatoes** – Ground – Apply as required with 10 to 12 day intervals up to a maximum of 3 applications per season. Air – up to 2 applications per season.
  - **Sunflower** – Ground – Apply when required with a 5 day interval between applications. A maximum of 2 applications per season. Air – 1 aerial application is permitted per season.
  - **Pre-harvest intervals:**
    - **Barley** – 45 days
    - **Canola, Rapeseed, Mustard** – 30 days
    - **Corn** – 5 days
    - **Potatoes** – 7 days
    - **Sunflower** – 70 days
    - **Wheat** – 30 days

## Precautions:

Harmful or fatal if swallowed. May be harmful if absorbed through skin. Severely irritating to eyes. Causes skin irritation and sensitization. Wear longsleeved protective clothing and gloves when handling or applying. Wear face shield or goggles when mixing.

## Environmental Hazards:

**Bees:** Very toxic to bees. Avoid spraying when bees are foraging. Spray deposit should be dry before bees commence foraging in treated crop.

**Aquatic organisms:** Very toxic to aquatic organisms and fish, and overspray or drift into sensitive areas such as sloughs, streams, rivers, dugouts and wetlands must be avoided.

## Hazard Rating:



Caution – Poison

Refer to the introduction for an explanation of the symbols.

# Delegate

Insecticide Group  
5

## Company:

Corteva Agriscience (PCP#28778)

## Formulations, Crops, Insects, Rates:

Product		Delegate
Formulation and Container Size		25% spinetoram formulated as wettable granules. 840 g
Crop	Insect	Application rate (per acre)
Corn**	European corn borer	49-85 g
Potato*	Colorado potato beetle (time for egg hatch or small larvae)	65-97 g
	European corn borer (time to coincide with peak egg hatch)	65 g
Wheat, barley, oats, rye**	Armyworm	40-81 g
Soybean	Armyworm	40 to 81 g

\* Maximum 3 applications per year with a minimum retreatment interval of 7 days.

\*\* Maximum 3 applications per year with a minimum retreatment interval of 5 days.

\*\*\* Maximum of 3 applications per year, with a minimum of 5 days between applications.

## Application:

- Aerial application in potatoes and corn only. Apply in sufficient water volume to cover the entire plant using a combination of nozzles and pressure designed to deliver thorough, even coverage with **ASABE fine classification** droplets. DO NOT apply through irrigation systems.
- Spinosyns require a spray solution pH between 6 to 8. This is important for the efficacy of the product. It is recommended that growers test the pH of the spray solution prior to adding a spinosyn to the spray tank.

## How it Works:

*Delegate* is derived from the fermentation of the bacterium *Saccharopolyspora spinosa*, which is then chemically modified to create the active ingredient. Spinetoram affects the insect nervous system. It does not interact with the known binding sites of other classes of insecticides. It works through ingestion or contact with the target insects. Target insects cease feeding within a few minutes, although death may take a few days.

## Tank Mixes:

Acapela (Fungicide) is a registered tank mix on corn. According to the Pest Management Regulatory Agency of Health Canada's Guidance Document on Tank Mix Labelling (March 2023), unlabelled tank mixes of this product are permitted only if the label of this product and the label of the product it might be mixed with include at least general wording on their respective labels indicating they may be mixed with other pesticides. When tank mixes are permitted, apply mixes according to the most restrictive use limitations for either product.

## Restrictions:

- **Re-entry:** DO NOT enter treated field for 12 hours.
- **Pre-harvest:** DO NOT harvest within 21 days of application for wheat (spring and durum), barley, oats and rye, within 7 days for potato or within 28 days for corn or soybean.
- **Forage/Grazing:** DO NOT apply within 28 days of stover harvest or with 7 days of forage harvest.
- **Aerial Application:**
  - **Potatoes and Corn (field, sweet, seed and popcorn):** Use a minimum spray volume of 12.1 L per acre. Recommended spray volume is 12.1 to 20.2 L per acre.
- **Storage:** Store in a cool, dry place. Keep from freezing.
- **Buffer Zones:** 1 m required between the point of direct application and the closest downwind edge of sensitive terrestrial habitats (such as grasslands, forested areas, shelter belts, woodlots, hedgerows, riparian areas and shrublands).

## Tank Cleaning:

Refer to Introduction.

**Environmental Hazards:**

**Bees:** Toxic to bees exposed to direct treatment, drift, or residues on flowering crops or weeds. DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area.

**Aquatic organisms:** Avoid application when heavy rain is forecast to reduce runoff into aquatic habitats.

**Others:** Toxic to small wild mammals. May be toxic to certain beneficial insects.

**Hazard Rating:**

No specific hazard rating specified.

# Deltamethrin

**Insecticide Group  
3A**

**Company:**

Bayer (*Decis 100 EC* – PCP#33700)

Sharda Cropchem Limited (*Poleci 2.5 EC Western* – PCP#32446)

Advantage Crop Protection Inc. (*Advantage Deltamethrin 5 EC* – PCP#34043)

AgraCity Crop & Nutrition Ltd. (*Decimate* – PCP#35068)

Viking Crop Protection Partners Inc. (*Rauma* – PCP 35144)

**Formulations, Crops, Insects, Rates:**

Product		Decis 100 EC	Poleci 2.5 EC Western	Advantage Deltamethrin 5 EC	Decimate	Rauma
Formulation and Container Size		100 g/L deltamethrin formulated as emulsifiable concentrate. 1.2 L, 4.8 L	25 g/L deltamethrin formulated as emulsifiable concentrate. 1.2 L, 4.8 L	50 g/L deltamethrin formulated as emulsifiable concentrate. 4 x 4.8 L	50 g/L deltamethrin formulated as emulsifiable concentrate. 2 x 10L	50 g/L deltamethrin formulated as emulsifiable concentrate. 2 x 10L
Crop	Insect	Application rate (per acre)				
Alfalfa (seed crops only)	Alfalfa weevil, Lygus	40-51 mL	162-202 mL	81-101 mL		
	Grasshoppers	20-30 mL				
Field and sweet corn	European corn borer	51-61 mL	202-242 mL	101-121 mL (field corn)	101- 121 mL (field, sweet and seed corn)	101- 121 mL (field, sweet and seed corn)
Potato	Colorado potato beetle, potato flea beetle, Lygus	20-30 mL	81-121 mL	40-61 mL	40-61 mL	40-61 mL
	Leafhoppers	20-30 mL	81-121 mL	40-61 mL		
	European corn borer	30-51 mL	202-242 mL		40-61 mL	40-61 mL
	Potato aphid, buckthorn aphid	51 mL	202 mL			
Crop	Insect	Application rate (per acre)				
Canola, rapeseed, oilseed mustard	Beet Webworm, Bertha armyworm	20-30 mL	81-121 mL	40-61 mL		
	Cabbage seedpod weevil (adults)	40 mL	162 mL	81 mL		
	Clover cutworm, diamondback moth	20-30 mL	81-121 mL	40-61 mL		
	Flea beetles	20-30 mL	81-121 mL	40-61 mL	40-61 mL	40-61 mL
	Grasshoppers	20-30 mL	81-121 mL	40-61 mL		
	Lygus bugs	30 mL	121 mL	61 mL		

Product		Decis 100 EC	Poleci 2.5 EC Western	Advantage Deltamethrin 5 EC	Decimate	Rauma
Sunflower	Sunflower beetle	20 mL	81 mL	40 mL		
Wheat, barley, oats	Cutworms	40 mL	162 mL	81 mL		
	Grasshoppers	20-30 mL	81-121 mL	40-61 mL		
Rangeland, pastures, roadside, fence row	Grasshoppers	20-30 mL	81-121 mL	40-61 mL		
Flax	Cutworms	40 mL	162 mL	81 mL		
	Beet Webworm	20-30 mL	81-121 mL	40-61 mL		
	Lygus bugs	30 mL				
	Bertha armyworm	20-30 mL				
	Clover cutworm	20-30 mL	81-121 mL	40-61 mL		
Red clover (seed production only)	Lesser clover leaf weevil (suppression only)	51 mL	202 mL	101 mL		
Dry beans, faba beans, chickpeas, lentils	Grasshoppers	20-30 mL	81-121 mL (lentils only)	81 mL (lentils only)		
	Pea leaf weevil (suppression)	30 mL				
	Cutworms	40 mL	162 mL (lentils only)	40-61 mL (lentils only)		
	Lygus bugs	40 mL				
Field peas	Grasshoppers	20-30 mL				
	Pea leaf weevil (suppression), cutworms, Lygus	30 mL				

## Application:

### Deltamethrin

- May be applied by air or ground equipment to all crops with the exception of alfalfa, red clover and corn, which require ground application only. Apply when insects exceed economic threshold numbers with sufficient water for good coverage. Use higher rates for severe infestations, on dense foliage or when a number of insect growth stages are present.
- Alfalfa (seed production) - Use higher rates if alfalfa weevil present.

## Tank Mixes:

When in a tank-mix the spray mixture must be constantly agitated throughout application. DO NOT allow the spray mixture to stand in the spray tank for more than 4 hours after mixing.

*Deltamethrin* may be tank mixed with the following herbicides: *Pardner*, *Buctril M*, *Banvel*, MCPA, 2,4-D, *Puma Advance*. **Tank mixes with *Puma Advance* and *Buctril M* are for use in spring and durum wheat only.**

When a tank mix is used the labels of the tank mix partners are to be consulted. According to the Pest Management Regulatory Agency of Health Canada's Guidance Document on Tank Mix Labelling (March 2023), unlabelled tank mixes of this product are permitted only if the label of this product and the label of the product it might be mixed with include at least general wording on their respective labels indicating they may be mixed with other pesticides. When tank mixes are permitted, apply mixes according to the most restrictive use limitations for either product.

## How it Works:

*Deltamethrin* is a non-systemic, synthetic pyrethroid which works by contact and ingestion.

## Effects of Weather:

DO NOT spray under a strong temperature inversion, or when temperature exceeds 25°C as this will result in a reduction in control. Best control will be achieved when deltamethrin is applied during cooler periods of the day. DO NOT apply within 1 hour of rain.

## Restrictions:

- **Alfalfa seed production** – DO NOT apply more than once per year.
- **Canola – Decis**: Maximum application of 3 applications per season with maximum seasonal load of 500 mL per hectare (202 mL per acre) or 25 g ai/ha. If 3 applications are used, only the first or second application can be at 200 mL per hectare. Allow a 7 day interval between treatments by ground application. Maximum of ONE (1) APPLICATION/YEAR via aerial application.
- **Corn (field and seed)** – DO NOT apply more than 3 times per year; ground application only.
- **Potato** – (Ground) DO NOT apply more than 3 times per year. (Aerial) DO NOT apply more than 2 times per year. May be used only once per season on high organic (muck) soils.
- **Red clover** – DO NOT apply by air. DO NOT make more than 2 applications per year. DO NOT use treated crop for feed or forage. Restricted entry interval – 12 hours
- **Wheat, barley, oats, flax, lentil** – (Ground) DO NOT apply more than 3 times per year. (Aerial) DO NOT apply more than 2 times per year.
- **Dry beans, faba beans, chickpeas, lentils, and field peas (Decis only)** – DO NOT apply more than 3 times per year (field and seed).
- **Rangeland, pastures**: Maximum 3 applications per year; only 2 of these may be by air.
- **Pre-harvest Intervals (Days)**: alfalfa (20), barley (40), canola (7), flax (40), lentils (30), mustard (7), shelled pea and beans (*Decis* only) (7), oats (31), potatoes (3), sunflower (70), wheat (40), sugar beets (100).
- **Storage**: DO NOT store below freezing. DO NOT store near feed, food, seeds or fertilizer. Keep away from heat, sparks and open flames. If stored for 1 year or longer, shake well before using. Insecticides and fungicides should be segregated from herbicides to prevent the possibility of cross-contamination.
- **Others**: DO NOT apply *deltamethrin* by air when the wind speed exceeds 8 kilometres per hour.  
In soils with high organic content (muck soils), *deltamethrin* should be applied only once during each crop year, prior to August 1.

## Precautions:


*Deltamethrin* is of high mammalian toxicity and is a severe eye and skin irritant. Avoid contacting or breathing spray mist. Wear protective clothing, including goggles and respirator, when handling or spraying. DO NOT contaminate or store near feed or foodstuffs. Wash thoroughly after using *deltamethrin*.

## Environmental Hazards:

**Bees**: Toxic to bees. Avoid spraying when bees are foraging.

**Aquatic organisms**: Toxic to fish and aquatic organisms. Avoid contamination of aquatic systems during application.

## Hazard Rating:

 Danger – Poison

Refer to the introduction for an explanation of the symbols.

# Dimethoate

Insecticide Group  
1B

## Company:

FMC of Canada (*Cygon 480-Ag* – PCP#25651, *Cygon 400EC* – PCP#35268)

Loveland Products Canada (*Lagon 480E* – PCP#9382)

Sharda Cropchem Limited (*Diamante 4* – PCP#34413)

Different trade names refer to different companies. Note that products may have different label recommendations.

Check your label for more information.

## Formulations, Crops, Insects, Rates:

Product	Cygon 400EC	Lagon 480E	Diamante 4	Cygon 480-AG
Formulation and Container Size	(400 g/L dimethoate) formulated as an emulsifiable concentrate. 2 x 9.7L	480 g/L dimethoate formulated as an emulsifiable concentrate. 10L	480 g/L dimethoate formulated as an emulsifiable concentrate. 10L	480 g/L dimethoate formulated as an emulsifiable concentrate. 10L
Crop	Insect	Application rate (per acre)		
Peas	Aphids	134-185 mL	110-150 mL	110-150 mL

Product		Cygon 400EC	Lagon 480E	Diamante 4	Cygon 480-AG
Potatoes (ground application only)	Aphids	267-486 mL	220-410 mL	220-410 mL	220-410 mL
	Leahoppers	267-486 mL	220-410 mL	220-410 mL	220-410 mL
	Aphids	206 mL	170 mL	170 mL	170 mL
	Leahoppers	206 mL	170 mL	170 mL	170 mL
	Lygus, plant bugs	534 mL	440 mL	440 mL	440 mL
	Alfalfa blotch leafminer, grasshopper nymphs	267 mL	220 mL	220 mL	220 mL
	Grasshopper adults	413-437 mL	340-360 mL	340-360 mL	340-360 mL
	Alfalfa weevil larvae (reduction)	206 mL	170 mL	170 mL	170 mL
Canaryseed, canarygrass for human consumption	Aphids	202 mL	202 mL		202 mL
Canaryseed, canarygrass	Aphids	202 mL	202 mL	202 mL	202 mL
Canola/ rapeseed	Aphids, leafhoppers, grasshoppers	413-437 mL	340-360 mL	340-360 mL	340-360 mL
	Lygus	182-364 mL	219-437 mL	219-437 mL	219-437 mL
Dry beans	Aphids, leafhoppers, Lygus	340-486 mL	280-400 mL	280-400 mL	280-400 mL
	Spider mites	340-486 mL	280-400 mL	280-400 mL	280-400 mL
Forage crops	Lygus, plant bugs	206 mL	170 mL	170 mL	170 mL
	Grasshopper nymphs	267 mL	170-220 mL	170-220 mL	170-220 mL
	Grashopper adults	413-486 mL	340-400 mL	340-400 mL	340-400 mL
Crop	Insect	Application rate (per acre)			
Sweet clover, red clover, alsike clover	Sweet clover weevil	413-534 mL	340-450 mL	340-450 mL	340-450 mL
	Aphids		172-223 mL		
	Grasshopper nymphs		172-223 mL		
	Grashopper adults		344-405 mL		
	Lygus, plant bugs		172 mL		
Pastures, waste areas	Grasshopper nymphs	267 mL	223 mL	223 mL	223 mL
	Grashopper adults	413-486 mL	344-405 mL	344-405 mL	344-405 mL
Wheat	Russian wheat aphid		404 mL		
	Aphids, Russian wheat aphid (suppression)	206 mL		172 mL	
	Wheat midge, thrips	486 mL	404 mL	404 mL	404 mL
	Grasshopper nymphs		223 mL		
	Grashopper adults		344-405 mL		
Barley, oats	Thrips	486 mL	404 mL	404 mL	404 mL
	Aphids			172 mL	172 mL
	Grasshopper nymphs		223 mL		
	Grashopper adults		344-405 mL		
Flax	Aphids	207 mL	177 mL	177 mL	177 mL
Rye	Grasshopper nymphs		223 mL		
	Grashopper adults		344-405 mL		

Product		Cygon 400EC	Lagon 480E	Diamante 4	Cygon 480-AG
Soybeans	Aphids, leafhoppers, Lygus		283-404 mL		
	Spider mites	486 mL	404 mL	404 mL	404 mL

## Application:

### Dimethoate

- May be applied by air or ground equipment (unless otherwise specified). If adult midges are present (1 midge / 4-5 wheat heads), sprays should be applied when 25 percent of the wheat head has fully emerged from the boot but before flowering has begun. At this stage, wheat first becomes susceptible to attack by the egg-laying females. Applications should be made in the late afternoon or evening when temperatures exceed 15°C and the wind speed is less than 10 km/h. High volume sprays will improve penetration of the crop. Proper timing of application is essential for control. Will not control midge larvae.

## How it Works:

*Dimethoate* is a broad spectrum, systemic (within the plant) and contact, organophosphate insecticide and acaricide.

## Restrictions:

- **Grazing:** Remove cattle prior to spraying. Read label carefully to determine livestock re-entry period.
- **Storage:** Store at temperatures between 4°C and 30°C and in areas away from feed and food.
- **Others:** DO NOT treat when bees are foraging. For alfalfa, canola, safflower and clovers, DO NOT apply during the crop blooming period or during the 5 day period before the crop blooms. Wait at least 10 days before placing leafcutter bees in treated fields. DO NOT make more than 2 applications per season. *Canary seed* - Minimum application interval is 30 days. *Beans, Peas*, - Minimum application interval is 14 days (7 for *Beans* with *Lagon*). Other listed crops - Minimum application interval is 7 days.

## Precautions:

Wear a respirator, goggles, rubber gloves, rubber boots and coveralls when handling concentrate. Avoid contact with skin and eyes. DO NOT inhale spray mist.

## Environmental Hazards:

**Bees:** Toxic to bees. Avoid applications when bees are foraging in the treatment area or in groundcover containing blooming weeds. For applications on crops that are highly attractive to pollinators (alfalfa, clovers, canola, safflower, etc.) DO NOT apply during the crop blooming period or during the 5 day period before the crop blooms.

**Aquatic organisms:** Toxic to aquatic organisms. Avoid application of this product when heavy rain is forecast.

**Others:** Toxic to birds, mammals, and certain beneficial insects.

## Hazard Rating:



*Lagon, Cygon 480 AG, Diamante 4:* Warning – Poison

Refer to the introduction for an explanation of the symbols.

# Dipel 2X DF

Insecticide Group

11

## Company:

Valent Canada (PCP#26508)

## Formulations, Crops, Insects, Rates:

Product		Dipel 2X DF
Formulation and Container Size		Bacillus thuringiensis var. kurstaki strain ABTS-351 fermentation solids, spores and insecticidal toxins- 57.0% Potency: 32,000 cabbage looper units (CLU) per mg (32 billion CLU per Kg)
Crop	Insect	Application rate (per acre)
Sunflower	Sunflower moth	127-253 g
Timothy	Essex (European) skipper	57-111 g
Corn (sweet and field)	European corn borer larvae	226-453 g
Potato	Cabbage looper	226-453 g
Quinoa	European corn borer	226-453 g

**Application:***Dipel*

- Treat when larvae are young (early instars) before the crop is damaged. A spreader sticker such as *Triton B1956* should be used to give thorough foliage coverage.

**How it Works:**

*Dipel* is a biological stomach insecticide resulting in the larvae ceasing to eat in a few hours, with death usually occurring within 1 to 3 days.

**Restrictions:**

- **Storage:** Store at temperatures between 0° and 25°C (cooler temperatures preferable).
- **Others:** DO NOT allow diluted spray to stand in tank for more than 12 hours. Use product within 24 months of date of manufacture if stored at cool temperatures. Final spray solution for *Dipel* should have a pH of 5-7.

**Precautions:**

Harmful if swallowed, inhaled, or absorbed through the skin. Avoid breathing dust or spray mist. Avoid contact with skin, eyes, or clothing. In case of contact with eyes or skin, immediately flush eyes or skin with plenty of water.

**Environmental Hazards:**

**Aquatic organisms:** DO NOT contaminate irrigation or drinking water supplies.

**Hazard Rating:**

Warning – Contains the Allergen Soy

Caution – Eye Irritant, Skin Irritant, Potential Sensitizer

**Eco Bran**

**Insecticide Group  
1A**

**Company:**

Peacock Industries (PCP#25815)

**Formulations, Crops, Insects, Rates:**

Product		Eco Bran
Formulation and Container Size		Wheat bran infused with carbaryl insecticide. 20 kg bag, 1 kg bottle
Crop	Insect	Application rate (per acre)
Beans, canola, pastures, rangelands, forage grasses, field borders, headlands, rights of-way, roadsides, wastelands	Grasshoppers	809-1618 g

**Application:***Eco Bran*

- For ground application only. DO NOT apply by air.
- Broadcast evenly over treatment area. Use gloves and wash thoroughly following application. More information on application and applicators can be found at: <http://www.grasshoppercontrol.com>.

**Restrictions:**

- DO NOT apply within 50 metres of sloughs, ponds, streams, dugouts or open water. Apply when winds are between 3 to 8 kilometres per hour and do not favour drift.
- May be used in pastures while beef cattle are grazing.

**Precautions:**

Harmful if inhaled or swallowed. Avoid breathing dust or vapour from bait. Use only in well-ventilated areas. May cause eye irritation. Avoid contact with eyes and skin. Wash thoroughly after handling and before eating or smoking. Avoid contamination of feed and foodstuffs. Keep away from heat, sparks and open flame.

**Environmental Hazards:**

**Bees:** Presence of product on flowering crops such as alfalfa and clover will not harm foraging honey or leafcutter bees.

**Aquatic Organisms:** Toxic to aquatic organisms. Avoid application when heavy rain is forecast.

# Entrust

## Company:

Corteva Agriscience (PCP#30382)

## Formulations, Crops, Insects, Rates:

Product		Entrust
Formulation and Container Size		Spinosad 240 g/L suspension concentrate. 1 L
Crop	Insect	Application rate (per acre)
Potato	Colorado potato beetle	68 to 135 mL
	European corn borer larvae	101 mL

## Application:

### Entrust

- Apply as a foliar spray by ground only. Apply when scouting indicates the target pest species have reached economic threshold levels. For Colorado potato beetle larvae, target eggs at hatch or small larvae. For control of European corn borer, time the application to coincide with peak egg hatch. Use higher application rate for higher pest pressure or when extended egg hatch is anticipated. If pest populations persist, a repeat application 7 to 10 days after the initial application may be necessary.
- Spinosyns require a spray solution pH between 6 to 8. This is important for the efficacy of the product. It is recommended that growers test the pH of the spray solution prior to adding a spinosyn to the spray tank.

## How it Works:

*Entrust* is in the spinosine class of insecticides. It is a contact and stomach insecticide. It is derived from the fermentation of *Saccharopolyspora spinosa*.

## Effects of weather:

This product has the potential for run-off. DO NOT spray immediately after a rainfall or if rain is forecast within 48 hours after application.

## Restrictions:

- **Storage:** Avoid freezing. DO NOT store or ship with food, feeds, drugs or clothing.
- **Others:** DO NOT make more than 2 applications per season (maximum of 202 mL per acre).
- **Pre-harvest Interval:** DO NOT apply *Entrust Insecticide* within 7 days of potato harvest.

## Precautions:

**Buffer Zones:** A buffer zone of 2 metres (early season) or 1 metre (late season) is required between downwind edge of spray boom and sensitive aquatic habitats.

Avoid contact with eyes, skin, and clothing.

DO NOT enter or allow worker entry into treated areas for a period of 12 hours after application.

## Environmental Hazards:

**Bees:** Highly toxic to bees exposed to direct treatment, drift or residues on blooming plants. DO NOT apply this product or allow it to drift to blooming plants if bees are visiting the treatment area.

**Aquatic organisms:** This product is highly toxic to aquatic invertebrates. Avoid application of this product when heavy rain is in the forecast, or immediately after a rainfall.

**Others:** Harmful to parasitoids and predatory mites and slightly harmful to foliage-dwelling predators.

## Hazard Rating:

No specific hazard rating specified.

# Exirel

Insecticide Group  
28

## Company:

FMC of Canada (PCP#30895)

## Formulations, Crops, Insects, Rates:

Product		Exirel
Formulation and Container Size		Cyantraniliprole 100 g/L, formulated as a suspension. 0.5, 3.79, 100 L
Crop	Insect	Application rate (per acre)
Potato	Colorado potato beetle	304 to 405 mL
	Aphids	202 to 607 mL
	European corn borer, variegated cutworm	202 to 304 mL
	Armyworm	202 mL
	Potato flea beetle	202 to 405 mL

## Application:

- Applied as a foliar spray, using ground or aerial application. *Exirel* insecticide is mixed with water for application. Time applications to the most susceptible insect pest stage, typically at egg hatch and/or newly hatched larvae or nymphs, before populations reach damaging levels. When pest populations are high, use the highest listed application rate for that pest. Use the higher rate and high spray volumes for large plants or dense foliage.

## How it Works:

*Exirel* insecticide is a member of the anthranilic diamide class of insecticides which act on insect ryanodine receptors. Although *Exirel* insecticide has contact activity, it is most effective through ingestion of treated plant material. After exposure to *Exirel* insecticide, affected insects will rapidly stop feeding, become paralyzed, and typically die within 1 to 3 days.

## Effects of Weather:

Avoid application when heavy rain is forecast.

## Restrictions:

- Storage:** Store product in original container only, away from other pesticides, fertilizer, food or feed.
- Application interval:** DO NOT apply more than once every 5 days.
  - Ground:** Apply in a minimum finished spray volume of 40 L per acre by ground. Minimum finished spray volume of 40 L per acre. DO NOT apply during periods of dead calm. Avoid application of this product when winds are gusty.
  - Air:** Apply in a minimum finished spray volume of 20 L per acre by air. Minimum finished spray volume of 20 L per acre. DO NOT apply during periods of dead calm. Avoid application of this product when winds are gusty.
- Pre-harvest interval:** 7 days.
- Others:** DO NOT make more than 4 applications per season. DO NOT exceed a total of 1.8 litres *Exirel* insecticide per ac per season. DO NOT make a foliar application of *Exirel* insecticide for a minimum of 60 days following an in-furrow or soil application or planting of seed or seed pieces treated with any Group 28 insecticide.

## Precautions:

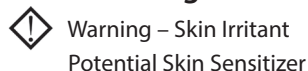
Causes skin irritation. DO NOT get on skin.

## Environmental Hazards:

**Bees:** Toxic to bees. DO NOT apply this product to blooming crops or weeds while bees are actively visiting the treatment area. Apply early in the morning or late in the evening when bees are not active. Minimize spray drift to reduce harmful effects on bees in habitats close to the application site.

**Aquatic organisms:** This product is highly toxic to aquatic organisms. To reduce runoff from treated areas into aquatic habitats avoid application to areas with a moderate to steep slope, compacted soil, or clay. Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip between the treated area and the edge of the water body.

**Others:** Toxic to non-target terrestrial plants. Toxic to certain beneficial insects. Minimize spray drift to reduce harmful effects on beneficial insects in habitats next to the application site such as hedgerows and woodland.

**Hazard Rating:**

Refer to the introduction for an explanation of the symbols.

# Harvanta 50 SL

Insecticide Group  
28

**Company:**

ISK Biosciences Corporation (PCP#32889)  
 Distributed in Canada by Belchim Crop Protection Canada

**Formulations, Crops, Insects, Rates:**

Product		Harvanta 50 SL
Formulation and Container Size		Cyclanilprole 50 g/L formulated as a suspension.
Crop	Insect	Application rate (per acre)
Potato	Colorado potato beetle, potato psyllid (suppression)	324 to 486 mL

**Application:**

- Minimum water volume:
  - **Ground:** 200 L per hectare.
- Avoid application during the crop blooming period.

**How it Works:**

*Harvanta 50 SL* is effective through contact with the insect and ingestion and has translaminar properties.

**Effects of Weather:**

Avoid application when heavy rain is forecast.

**Restrictions:**

- **Storage:** Store product in cool, dry, well ventilated place. To prevent contamination, store this product away from food or feed.
- **Restricted Entry Interval:** 12 hours
- **Pre-harvest interval:** 7 days
- **Others:** Max 3 applications per crop per year. Minimal interval between treatments is 5 days.

**Precautions:**

Avoid contact with eyes. Avoid prolonged contact with skin. Wash exposed areas of skin thoroughly with soap and warm water after handling or using. Remove contaminated clothing and wash before re-use. Wear a long-sleeved shirt, long pants, chemical-resistant gloves, socks and shoes during mixing, loading, application, clean-up and repair. In addition, wear protective eyewear (goggles or face shield) during mixing and loading. DO NOT enter or allow worker entry into treated areas during the restricted entry interval of 12 hours.

**Environmental Hazards:**

**Bees:** Toxic to bees.

**Aquatic organisms:** Very toxic to aquatic organisms. To reduce runoff from treated areas into aquatic habitats, avoid application to areas with a moderate to steep slope, compacted soil, or clay.

**Others:** Toxic to certain beneficial insects.

**Hazard Rating:**

Refer to the introduction for an explanation of the symbols.

# Imidan WP Insecticide

Insecticide Group  
1B

## Company:

Gowan Canada (PCP#29064)

## Formulations, Crops, Insects, Rates:

Product		Imidan WP
Formulation and Container Size		70% phosmet formulated as a wettable powder in water soluble sachets.
Crop	Insect	Application rate (per acre)
Potato	"Aphids, leafhoppers, Colorado potato beetle, potato flea beetle"	0.65 kg

## Application:

### *Imidan*

- Apply by ground only.
- *Imidan WP* Insecticide is packaged in water soluble sachets that are to be dropped into the spray tank unopened. DO NOT use in low-volume, gear-type spray equipment.

## How it Works:

*Imidan* is an organophosphate insecticide.

## Restrictions:

- **Storage:** Keep sachets dry and DO NOT allow sachets to contact any moist surface prior to adding to spray tank. Keep water soluble sachets in the protective container and store in a cool, dry place. DO NOT store at temperatures below 0°C or above 40°C.
- Buffer zones required for the protection of freshwater habitat: 35 metres for depth of less than 1 metre and 10 metres for depths greater than 1 metre.
- DO NOT apply within 7 days of harvest.
- DO NOT make more than 5 applications per season.
- **Re-entry Interval (REI):** Hand set/handline irrigation related activities involving foliar contact – 33 days; roguing – 26 days; scouting – 2 days; all other activities 0.5 days.

## Precautions:

Harmful if swallowed, inhaled or absorbed through the skin. Wear protective clothing, including rubber gloves and goggles, during mixing, loading and spraying.

## Tank Mixes:

According to the Pest Management Regulatory Agency of Health Canada's Guidance Document on Tank Mix Labelling (March 2023), unlabelled tank mixes of this product are permitted only if the label of this product and the label of the product it might be mixed with include at least general wording on their respective labels indicating they may be mixed with other pesticides. When tank mixes are permitted, apply mixes according to the most restrictive use limitations for either product.


## Environmental Hazards:

**Bees:** Toxic to bees. Bees may be exposed through direct spray, spray drift, and residues on leaves, pollen and nectar in flowering crops and weeds. Minimize spray drift to reduce harmful effects on bees in habitats close to the application site. Avoid applications when bees are foraging in the treatment area in ground cover containing blooming weeds.

**Aquatic organisms:** Toxic to aquatic organisms. Avoid application when heavy rain is forecast.

**Others:** Toxic to birds and small wild mammals. Toxic to certain beneficial insects.

## Hazard Rating:

 Danger – Poison

Refer to the introduction for an explanation of the symbols.

# Intrepid

## Company:

Corteva Agriscience (PCP#27786)

## Formulations, Crops, Insects, Rates:

Product	Intrepid	
Formulation and Container Size	240 grams per litre methoxyfenozide	
Crop	Insect	Application rate (per acre)
Corn (field and sweet), Beans (dry)	European corn borer	121 to 243 mL

## Application:

- **Ground application:** Thorough uniform coverage of all foliage and fruit is essential for good insect control. Apply in sufficient spray volume to ensure uniform coverage of the treated crop. A minimum of 300 L of water per hectare is generally recommended for ground application.
  - **Corn** – Apply at the first signs of feeding damage before the insect enters the fruit. Monitoring of insect populations is key to controlling this pest. Direct application at the whorl for early season (first generation) infestations. Repeat applications after 5 to 10 days if required based on population monitoring. Use the higher rate for heavy infestations, or larger crop canopies
  - **Beans** – Apply at the first signs of feeding damage before the insect enters the pods. Repeat applications after 7 to 14 days if required based on population monitoring. Use the higher rate for heavy infestations or advanced growth stages of the target pest.

## How it Works:

*Intrepid* belongs to the diacylhydrazine class of insecticides and mimics the action of the molting hormone of larval Lepidoptera. Upon ingestion, larvae undergo an incomplete and developmentally premature molt which is ultimately lethal. This process interrupts and rapidly halts their feeding. Feeding typically ceases within hours of ingestion although complete mortality of the larvae may take several days. Affected larvae often become lethargic and develop discoloured areas or bands between segments.

## Restrictions:

- DO NOT apply during periods of dead calm. Avoid application of this product when winds are gusty. DO NOT apply with spray droplets smaller than the *ASAE fine* classification. Boom height must be 60 cm or less above the crop or ground.
- **Corn:** Apply a maximum of 3 applications per year.
- **Beans:** Apply a maximum of 3 applications per year.
- **Restricted Entry Interval:** 12 hours
- **Pre-harvest interval:**
  - **Corn** – DO NOT apply within 3 days of harvest for sweet corn. DO NOT apply within 21 days of harvest for field corn and popcorn.
  - **Beans** – DO NOT apply within 7 days of harvest.
- **Storage:** Keep product in original container during storage. To prevent contamination, store this product away from food or feed.

## Precautions:

DO NOT apply using aerial application equipment. Avoid contact with eyes, skin or clothing. Avoid breathing spray mist. Apply only when the potential for drift to areas of human habitation or areas of human activity such as houses, cottages, schools and recreational areas is minimal. Take into consideration wind speeds, wind direction, temperature inversions, application equipment and sprayer settings.

## Environmental Hazards:

Avoid application when heavy rain is forecast. Methoxyfenozide is persistent and will carryover; it is recommended that *Intrepid* not be used in areas treated with this product during the previous season. The use of this chemical may result in contamination of groundwater, particularly in areas where soils are permeable (e.g., sandy soil) and/or the depth to the water table is shallow.

**Aquatic organisms:** Toxic to aquatic organisms. Observe buffer zones specified under directions for use.

**Others:** Insecticide use should be based on an IPM program that includes scouting, record keeping, and considers cultural, biological and other chemical control practices. This product is harmful to certain beneficial arthropods.

## Hazard Rating:

None listed.

# Lambda-cyhalothrin

Insecticide Group  
3A

## Company:

ADAMA Agricultural Solutions Canada (*Silencer 120 EC* – PCP#29052, *Zivata* – PCP#32427)

Sharda Cropchem Limited (*Labamba* – PCP#33576)

Syngenta Canada (*Matador* – PCP#24984)

## Formulations, Crops, Insects, Rates:

Product	Silencer 120 EC	Zivata	Labamba	Matador	
Formulation and Container Size	120g/L lambda-cyhalothrin formulated as an emulsifiable concentrate. 4 x 3.79 L	120g/L lambda-cyhalothrin formulated as an emulsifiable concentrate. 4.08 L	120g/L lambda-cyhalothrin formulated as an emulsifiable concentrate. 4 x 3.79 L	120g/L lambda-cyhalothrin formulated as an emulsifiable concentrate. 4 x 3.79 L	
Crop	Insect	Application rate (per acre)			
Potatoes	Armyworm	34 mL	34 mL	34 mL	34 mL
	Colorado potato beetle	34 to 50 mL (ground)	34 to 50 mL (ground)	34 to 50 mL (ground)	34 to 50 mL (ground)
	Leafhoppers, Lygus, potato flea beetle, European corn borer	34 mL (air)	34 mL (air)	34 mL (air)	34 mL (air)
Canola, oilseed mustard	Lygus, crucifer flea beetle, cabbage seedpod weevil, diamondback moth, Bertha armyworm, imported cabbageworm, cabbage looper	34 mL	34 mL	34 mL	34 mL
	Grasshoppers	25 to 34 mL (ground), 34 mL (air)	25 to 34 mL (ground), 34 mL (air)	25 to 34 mL (ground), 34 mL (air)	25 to 34 mL (ground), 34 mL (air)
	Cutworms			34 mL	34 mL
Wheat, barley, oats	Grasshoppers	25 to 34 mL (ground), 34 mL (air)	25 to 34 mL (ground), 34 mL (air)	25 to 34 mL (ground), 34 mL (air)	25 to 34 mL (ground), 34 mL (air)
	Armyworm	34 mL	34 mL	34 mL	34 mL
Summerfallow	Grasshoppers			25 to 34 mL (ground), 34 mL (air)	25 to 34 mL (ground), 34 mL (air)
Flax	Grasshoppers	25 to 34 mL (ground), 34 mL (air)	25 to 34 mL (ground), 34 mL (air)	25 to 34 mL (ground), 34 mL (air)	25 to 34 mL (ground), 34 mL (air)
	Curworms			34 mL	34 mL
Crop	Insect	Application rate (per acre)			
Alfalfa	Alfalfa weevil, Lygus bugs, pea aphid, potato leafhopper	34 mL	34 mL	34 mL	34 mL
	Grasshoppers	25 to 34 mL (ground), 34 mL (air)	25 to 34 mL (ground), 34 mL (air)	25 to 34 mL (ground), 34 mL (air)	25 to 34 mL (ground), 34 mL (air)

Product		Silencer 120 EC	Zivata	Labamba	Matador
Corn (field and sweet)	Armyworm				
Corn (Field, Sweet, Pop and Seed)	European Corn Borer, Corn Earworm	34 mL	34-84 mL	34 mL	34-84 mL
	Fall armyworm, cutworms	34 mL	34 mL	34 mL	34 mL
	Armyworm	34 mL	34-84 mL	34 mL	34-84 mL
Beans	Cutworm, corn borer, potato leafhopper, Lygus bugs	34 mL	34 mL	34 mL	34 mL
	Aphids	34-94 mL (ground), 34 mL (aerial)	34-94 mL (ground), 34 mL (aerial)	34-94 mL (ground), 34 mL (aerial)	34-94 mL (ground), 34 mL (aerial)
Chickpeas	Grasshoppers, potato leafhopper, cutworms	34 mL	34 mL	34 mL	34 mL
	Aphids	34-94 mL (ground), 34 mL (aerial)	34-94 mL (ground), 34 mL (aerial)	34-94 mL (ground), 34 mL (aerial)	34-94 mL (ground), 34 mL (aerial)
Faba beans (broad beans)	Lygus bugs, potato leafhopper,	34 mL	34 mL	34 mL	34 mL
	Aphids	34-94 mL (ground), 34 mL (aerial)	34-94 mL (ground), 34 mL (aerial)	34-94 mL (ground), 34 mL (aerial)	34-94 mL (ground), 34 mL (aerial)
Lentils, soybeans	Cutworm, grasshoppers, Lygus bugs, potato leafhopper	34 mL	34 mL	34 mL	34 mL
	Aphids	34-94 mL (ground), 34 mL (aerial)	34-94 mL (ground), 34 mL (aerial)	34-94 mL (ground), 34 mL (aerial)	34-94 mL (ground), 34 mL (aerial)
Peas	Cutworm, grasshoppers, pea leaf weevil	34 mL	34 mL	34 mL	34 mL
	Aphids	34-94 mL (ground), 34 mL (aerial)	34-94 mL (ground), 34 mL (aerial)	34-94 mL (ground), 34 mL (aerial)	34-94 mL (ground), 34 mL (aerial)
Timothy (Seed production only)	Grasshoppers	25-34 mL	25-34 mL	25-34 mL	25-34 mL

## Application:

### *Lambda-cyhalothrin*

- **Aerial:**

- Apply in spray volume of 10 to 40 L per hectare
- **Canola, mustard, sunflower, flax, alfalfa** – DO NOT make more than 1 application at the 33.2 mL per acre rate per year.
- **Corn, wheat, barley, oats, potatoes, soybean, dry edible bean, pea, chickpea, lentil, favabean** – DO NOT make more than 2 applications at the 33.2 mL per acre rate per year.
- **Matador and Labamba: Summerfallow** - DO NOT make more than 1 application at the 33.2 ml/acre rate per year.

- **Ground:**

- Apply in 100 to 200 L per hectare
- **Canola, mustard, sunflower, flax, alfalfa, summerfallow (Labamba and Matador), corn, wheat, barley, oats** – DO NOT make more than 3 applications per year at the 33.2 mL per acre rate. DO NOT cut treated fields for hay or forage; do not graze treated fields.
- **Potatoes** – DO NOT make more than 3 applications per year at the 33.2 mL per acre rate. DO NOT make more than 2 applications per year if using the 50 mL per acre rate. DO NOT exceed 100 mL per acre of lambda-cyhalothrin per year.
- **Beans, chickpeas, favabeans, lentils, peas, soybeans** – DO NOT make more than 3 applications per year. DO NOT graze or harvest treated forage straw or hay for livestock feed.
- **Timothy** – For seed production only.
- **Alfalfa** – Seed from treated crops is not to be used for production of 'alfalfa sprouts' for human consumption.

## Timing:

For potato insects, timing of application should be based on the presence of vulnerable pest developmental stages and significant populations as determined by local monitoring.

For sunflower beetles, use the high rate to control adults.

For flea beetles, to prevent migration of over-wintering adults throughout the field, spray a 15 metre strip around the field at the first sign of flea beetle feeding.

For grasshoppers, apply the low rate when grasshoppers are up to the 3<sup>rd</sup> nymphal stage (up to 1 cm in length) or when insect numbers are low. Apply the high rate when insects are larger, up to but not including, winged adults or when insect numbers are high.

For corn borer control apply before the larva bores into the plant stalk or pods.

## How it Works:

*Lambda-cyhalothrin* is a synthetic pyrethroid insecticide. It is a fast acting stomach and contact insecticide effective against a broad spectrum of foliar pests. It has no fumigant or systemic activity.

## Effects of Weather:

For best results, apply *Lambda-cyhalothrin* during the early morning before temperatures rise, and during the evening, past the heat of the day.

## Tank Mixes:

**Herbicides:** (Ground only)

- *Horizon (Matador)*
- Tralkoxydim<sup>Δ</sup> (*Matador* and *Silencer*)

**Fungicides:** (Tank mixes on legumes (bean, chickpea, lentil, pea, soybean), corn, barley, oats and wheat may be applied by ground or air).

Refer to label for other crops.

- Propiconazole<sup>Δ</sup> (*Matador* and *Silencer*)
- *Allegro* in dry bean (*Matador*)
- *Quadris* (*Matador* only)
- *Quilt* (*Labamba* and *Matador*). Refer to the, *Labamba*, *Matador* and *Quilt* labels for diseases and insects controlled as well as specific application instructions and precautions.
- *Headline* (*Silencer* and *Zivata*) on dry field pea to control insects and diseases listed on the label of each product. Read carefully and follow all use directions and use precautions on both the *Silencer 120 EC* and *Headline EC* Fungicide labels. Failure to follow the rates of use and timing of application as recommended for each product will result in unsatisfactory control of target pest.
- *Traxion* (*Matador*)

<sup>Δ</sup> **Manufacturers may only support specific mixes. Contact the manufacturer for more information.** According to the Pest Management Regulatory Agency of Health Canada's Guidance Document on Tank Mix Labelling (March 2023), unlabelled tank mixes of this product are permitted only if the label of this product and the label of the product it might be mixed with include at least general wording on their respective labels indicating they may be mixed with other pesticides. When tank mixes are permitted, apply mixes according to the most restrictive use limitations for either product.

## Restrictions:

- DO NOT apply to flowering crops or weeds if bees are visiting treatment area.
- **Grazing:** DO NOT cut treated fields for hay/forage. DO NOT graze treated fields. DO NOT feed treated crops to livestock. DO NOT feed seed screenings and aftermath to livestock. Corn - DO NOT cut treated fields for silage/forage, do not graze treated fields.
- Alfalfa seed from treated crops is not to be used for production of "alfalfa sprouts" for human consumption.
- **Storage:** Store above 0°C. Storage below 0°C will not impair the effectiveness of *Lambda-cyhalothrin*. However, following such storage, agitate well before use.
- **Others:** Allow a 7day interval between applications. DO NOT apply within 15 metres of productive fisheries, water or waterfowl habitat.
- **Restricted Entry Interval:** 24 hours

## Precautions:

As a result of the completed re-evaluation of lambda-cyhalothrin by the Pest Management Regulatory Agency (PMRA), effective April 29, 2023, changes will affect how all lambda-cyhalothrin-based products may be used in Canada.

*Lambda-cyhalothrin* has potential for skin and eye irritation. Avoid splashing in eyes or on skin, particularly the face. If hands are contaminated, wash with soap and water before touching other areas of skin.

## Environmental Hazards:

**Bees:** Toxic to bees when exposed to direct treatment, drift, or residues on flowering crops or weeds. DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area. Spray deposits should be dry before bees commence foraging in treated crop.

**Aquatic organisms:** Toxic to aquatic organisms. Avoid application when heavy rain is forecast.

**Hazard Rating:**
 Danger – Poison

Refer to the introduction for an explanation of the symbols.

# Malathion

Insecticide Group  
1B

**Company:**

Loveland Products Canada (*Malathion 85E* – PCP#8372)

**Formulations, Crops, Insects, Rates:**

Product		Malathion 85E
Formulation and Container Size		85% malathion formulated as an emusifiable concentrate.
Crop	Insect	Application rate (per acre)
Alfalfa	Grasshoppers, aphids, lygus bugs, alfalfa weevil larvae, leafhoppers, spider mites, spittlebugs	445-544 mL
	Alfalfa blotch leafminer	544 mL
Clover	Aphids, grasshoppers, leafhoppers, spider mites	445-544 mL
Canola, mustard, rape	Diamondback moth	109-168 mL
	Flea beetles, grasshoppers	217-346 mL
Wheat, barley, oats, rye	Grasshoppers, aphids, armyworm	445-544 mL
	Cereal leaf beetle	435 mL
Potatoes	Colorado potato beetle, leafhoppers, aphids, spider mites	297-445 mL
Canaryseed (for seed) (85E only)	Aphids	277 mL
Sweet clover	Sweet clover weevil	297-494 mL
Flax	Grasshoppers	217-346 mL
Crop	Insect	Application rate
Lentils	Grasshoppers	336 mL
Pasture	Grasshoppers	336 mL
Alfalfa hay	Grasshoppers	445-544 mL
Corn (grain, forage)	Earworms, European corn borers	445-544 mL
Peas	Aphids, leafhoppers, spider mites	445 mL
Beans	Aphids, leafhoppers, spider mites	297-544 mL
Empty bin spray (grain bins, grain elevators, grain box cars, flour mills)	Confused flour beetles, flat grain beetles, granary weevils, grain mites, Indian meal moths, lesser grain borers, red flour beetle, rice weevils, rusty grain beetles, saw-toothed grain beetle	490 mL in either 15 litres of water or 15 litres of deodorized kerosene. Spray to the point of run-off or at the rate of approximately 5 litres of spray mixture per 100 m <sup>2</sup>

**Application:***Malathion*

- May be applied by air or ground equipment. Apply when insect numbers exceed economic threshold levels using sufficient water for good coverage. Use higher rates for heavy infestations, dense canopy or mature stages of insects.

**How it Works:**

*Malathion* is a non-systemic, contact, organophosphate insecticide and acaricide of brief to moderate persistence. Generally non-phytotoxic.

## Effects of Weather:

For best results apply when daytime temperatures are above 20°C.

## Restrictions:

- **Grazing:** When spraying forages and pastures, cattle should be removed and returned after spraying.
- **Storage:** DO NOT store near food or feed. Store in a cool dry place but not below -10°C. Protect from heat.
- **Others:** Maximum of 2 applications per season. DO NOT apply to any plant in bloom. Apply to crops when bees are absent from field. Avoid contact with automobile paint and wash immediately if exposure occurs.
- **Restricted Entry Interval:** 12 hours

**Note:** Some commodities, such as canola, should not be stored in facilities recently treated with malathion. *Malathion* residue can linger in bins for up to six months after treatment and can be transferred from the bin to canola seed. Canola found with malathion residues is unacceptable for export customers.

The Pest Management Regulatory Agency (PMRA) has advised that any malathion products over one year old should not be used and should be returned as part of provincial pesticide recycling programs.

## Precautions:

*Malathion* has a low acute mammalian toxicity. Wear protective clothing to reduce skin and eye exposure.

## Environmental Hazards:

**Bees:** Toxic to bees exposed to direct treatment, drift, or residues on flowering crops or weeds. DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area.

**Aquatic organisms:** Toxic to aquatic organisms. Avoid application of this product when heavy rain is forecast.

**Others:** Toxic to birds. Toxic to certain beneficial insects.

## Hazard Rating:



Warning – Poison

Refer to the introduction for an explanation of the symbols.

# Minecto Duo 40WG

Insecticide Group  
4A and 28

## Company:

Syngenta Canada Inc. (PCP#30900)

## Formulations, Crops, Insects, Rates:

Product		Minecto Duo 40WG
Formulation and Container Size		20% thiamethoxam and 20% cyantraniliprole formulated as a wettable granule. 2 x 3.04 kg jugs
Crop	Insect	Application rate (per acre)
Potato	Aphids, Colorado potato beetle, flea beetles, potato leafhopper	178-283 g

## Application:

### *Minecto Duo*

- Can be applied by ground only. Apply by closed cab groundboom only.
- Apply as an in-furrow spray at seeding depth or in a narrow surface band above the seedline during planting.
- Apply in sufficient water volume to ensure uniform application and incorporation into the soil. Add half of the required amount of water to the mix tank. With agitator running add the *Minecto Duo* to the tank. Continue agitation while adding the remaining water. Apply once the *Minecto Duo* has completely dispersed into the water mix. Maintain agitation until all the mixture has been applied.

## How it Works:

*Minecto Duo* contains two active ingredients. Thiamethoxam is a neonicotinoid insecticide and cyantraniliprole is a diamide insecticide. Both components have systemic (within the plant) properties and interfere with neuro-transmission in insects. Mode of action is through contact or ingestion.

**Restrictions:**

- DO NOT apply by air.
- DO NOT use a foliar application of a product containing a Group 4 (neonicotinoid) or Group 28 (diamide) insecticide following in-furrow or soil application of *Minecto Duo*.
- **Restricted Entry Interval:** DO NOT enter or allow worker entry into treated areas for 12 hours.
- **Storage:** Store product in original container only, in a cool, dry place and away from food or feed. Keep container closed.

**Precautions:**

If *Minecto Duo* is to be used on a commodity that may be exported to the United States and you require information on acceptable residue levels in the United States, visit CropLife Canada's website at [www.croplife.ca](http://www.croplife.ca).

**Environmental Hazards:**

**Bees:** Toxic to bees. This product is systemic and bees can be exposed to product residues in flower, leaves, pollen and/or nectar resulting from soil applications.

**Aquatic organisms:** Toxic to aquatic organisms. Avoid application of this product when heavy rain is forecast. The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

**Hazard Rating:**

 Warning – Poison

Refer to the introduction for an explanation of the symbols.

# Minecto Pro

Insecticide Group  
6 and 28

**Company:**

Syngenta Canada Inc. (PCP#33023)

**Formulations, Crops, Insects, Rates:**

Product		Minecto Pro
Formulation and Container Size		Abamectin and cyantraniliprole formulated as a soluble concentrate. 3.78 L
Crop	Insect	Application rate (per acre)
Potato	European corn borer	150-225 mL
	Spider mites, potato psyllids, and flea beetle	150-271 mL
	Colorado potato beetle	225-271 mL

**Application:**

- **Minimum water volume:** 200 L per hectare, 80 L per acre. Apply with 0.1 to 0.5 percent v/v non-ionic surfactant (NIS).

**How it Works:**

*Minecto Pro* is a non-neonicotinoid insecticide that delivers rapid activity through two complementary active ingredients – abamectin (Group 6) and cyantraniliprole (Group 28). Both active ingredients use translaminar movement within the plant to achieve excellent coverage of the crop, providing a reservoir of activity for extended residual control of targeted pests.

**Tank Mixes:**

According to the Pest Management Regulatory Agency of Health Canada's Guidance Document on Tank Mix Labelling (March 2023), unlabelled tank mixes of this product are permitted only if the label of this product and the label of the product it might be mixed with include at least general wording on their respective labels indicating they may be mixed with other pesticides. When tank mixes are permitted, apply mixes according to the most restrictive use limitations for either product.

**Restrictions:**

- DO NOT apply by air.
- **Rainfast period:** Once dry on leaf. Avoid application if heavy rainfall is forecast.
- **Restricted Entry Interval:** 12 hours
- **Pre-harvest interval:** 14 days
- **Storage:** Store product in original container only, in a cool, dry place and away from food or feed. Keep container closed.

- **Other Restrictions:** For European corn borer, spider mites, potato psyllids and flea beetle, DO NOT make a foliar application of *Minecto Pro* for a minimum of 60 days following an in-furrow or soil application or planting of seed pieces treated with any Group 28 insecticide. For Colorado potato beetle, DO NOT apply *Minecto Pro* for Colorado potato beetle control if any Group 28 was used at planting as an in-furrow, soil or seed-piece treatment.

### Environmental Hazards:

**Bees:** Toxic to bees exposed to direct treatment or residues on blooming crops or weeds. DO NOT apply this product or allow drift to blooming crops or weeds if bees are visiting the treatment area.

**Aquatic organisms:** Toxic to aquatic organisms. Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip between the treated area and the edge of the water body.

### Hazard Rating:



Danger – Poison. Hazard to humans and domestic animals. Fatal or poisonous if swallowed. Harmful if inhaled. Avoid breathing spray mist.

Refer to the introduction for an explanation of the symbols.

# Movento 240 SC

Insecticide Group  
23

### Company:

Bayer (PCP#28953)

### Formulations, Crops, Insects, Rates:

Product		Movento 240 SC
Formulation and Container Size		240 g/L spirotetramat formulated as a suspension concentrate.
Crop	Insect	Application rate (per acre)
Potato	Aphids	89-147 mL
Beans, chickpea, lentil, peas, soybean	Aphids	75-111 g

### Application:

#### Movento 240 SC

- Ground application only in potatoes and soybeans. Ground or air application for beans, chickpea, lentil and peas. Apply in adequate water for uniform coverage, a minimum of 120 L per acre. If needed repeat application with a minimum of 7 to 10 day interval. DO NOT exceed a maximum of 292 mL per acre per season.
- For best results apply when insect populations begin to build and before a damaging population becomes established. Select the appropriate rate depending on the development stage of the insect and level of infestation.

### How it Works:

*Movento* is a systemic, tetramic acid insecticide. Following application to plant foliage *Movento* moves through phloem and xylem to all plant tissues including new shoot, leaf and root growth. Mode of action is primarily by ingestion by immature insect life stages. Insect death occurs due to the inability to progress to the next development stage. Adults produce less offspring following exposure.

### Restrictions:

- DO NOT apply this product directly to freshwater habitats (such as lakes, rivers, sloughs, ponds, creeks, marshes, streams, reservoirs and wetlands). DO NOT apply during periods of dead calm. Avoid application when winds are gusty. DO NOT apply droplets smaller than *American Society of Agricultural Engineers (ASABE) fine* classification. Boom height must be 60 cm or less above ground.
- **Re-Entry:** DO NOT enter or allow worker entry into treated areas for a period of 12 hours.
- **Re-cropping:** A plant back interval of 30 days is required for all crops not on the label.

### Environmental Hazards:

**Bees:** Toxic to bee brood. Bee brood may be exposed to residues in/on pollen and nectar brought back to the hive by bees foraging on flowering crops and weeds. DO NOT apply this product during crop flowering period or when flowering weeds are present in the treatment area.

**Aquatic organisms:** Toxic to aquatic organisms. Avoid application when heavy rain is forecast.

**Others:** Toxic to certain beneficial insects.

### Hazard Rating:



Caution – Poison

Refer to the introduction for an explanation of the symbols.

# Oberon

## Company:

Bayer (PCP#28905)

## Formulations, Crops, Insects, Rates:

Product		Oberon
Formulation and Container Size		240 g/L spiromesifen formulated as a suspension concentrate. 2 L jug
Crop	Insect	Application rate (per acre)
Alfalfa (seed production only)	Twospotted spider mite	202-405 mL
Corn	Banks grass mite, twospotted spider mite	161-242 mL
Dry beans	Spider mites	202-242 mL

## Application:

### *Oberon*

- May be applied by ground or air.
- Apply as soon as mite populations reach threshold levels. Repeat application if pest populations recover and reach economic thresholds. A minimum interval of 7 days between applications is required.
- Thorough coverage of all plant parts is important for optimum performance. Use sufficient water volumes for thorough coverage - e.g. minimum of 40 to 80 L of water per acre.
- Avoid application when heavy rain is forecast.

## How it Works:

Spiromesifen is in the Tetrionic acid class of insecticides and works by contact, inhibiting lipid biosynthesis in the insect. *Oberon* has strong adhesion to the leaf surface, and also some translaminar activity providing residual control through contact or ingestion. *Oberon* has activity on all mite developmental stages. Immature mite stages tend to be more susceptible to *Oberon* than adults.

## Restrictions:

- Alfalfa – DO NOT exceed 3 applications per season. Keep a minimum interval of 7 days between applications. DO NOT exceed a maximum of 1200 mL per acre of *Oberon* per season. Corn – DO NOT exceed 2 applications per season. DO NOT exceed 240 mL per acre per 14 day interval. DO NOT exceed 480 mL per acre per season.
- DO NOT enter or allow entry into treated areas for a period of 12 hours after application.
- *Oberon* is toxic to aquatic organisms and beneficial insects such as pollinators. DO NOT apply this product directly to freshwater habitats such as lakes, rivers, sloughs, ponds, creeks, marshes, streams, reservoirs, ditches and wetlands.
- DO NOT mix, load or clean equipment within 30 metres of wellheads or aquatic systems.
- **Rotational plant-back intervals for:**
  - *Field corn* – immediate plant back
  - *Wheat, barley and alfalfa* – 30 days
  - *All other crops* – 12 months

## Precautions:

**Storage:** Store in a cool, dry place in such a manner to prevent cross contamination with other pesticides, fertilizers, food and feed. DO NOT store below freezing.

## Environmental Hazards:

**Bees:** May be toxic to bee brood. Bee brood may be exposed to residues on pollen and nectar brought back to the hive by bees foraging on flowering crops and weeds. To minimize potential exposure to bees, avoid application if bees are visiting the treatment area.

**Aquatic organisms:** Toxic to aquatic organisms. Avoid application of this product when heavy rain is forecast.

**Others:** Toxic to certain beneficial insects.

## Hazard Rating:



Caution – Poison  
Eye Irritant

Refer to the introduction for an explanation of the symbols.

# Permethrin

Insecticide Group  
3A

## Company:

FMC of Canada (*Pounce 384 EC* – PCP#16688)

UPL AgroSolutions Canada Inc. (*Perm-UP* – PCP#28877)

AMVAC (*Ambush 500 EC*– PCP#14882)

Interprovincial Cooperative Limited (*IPCO Syncro* – PCP#33838)

## Formulations, Crops, Insects, Rates:

Product	Pounce 384 EC	Perm-UP	Ambush 500 EC	IPCO Syncro	
Formulation and Container Size	384 g/L permethrin formulated as an emulsifiable concentrate. 12 x 1 L, 2 x 10 L	384 g/L permethrin formulated as an emulsifiable concentrate. 12 x 1 L, 4 x 6 L	500 g/L permethrin formulated as an emulsifiable concentrate. 3.8 L	384 g/L permethrin formulated as an emulsifiable concentrate. 2 x 10 L, 12 x 1 L, 4 x 6 L, 2 x 7.5 L	
Crop	Insect	Application rate (per acre)			
Corn, flax, lentil, pea, potato, sunflowers (up to 5 leaves)	Cutworm	73 to 158 mL	73 to 158 mL	57 to 121 mL	73 to 158 mL
Cereals	Cutworm	73 to 158 mL	73 to 158 mL		73 to 158 mL
Canola, rapeseed (up to 5 leaves)	Cutworm	73 to 158 mL	73 to 158 mL	57 to 121 mL	73 to 158 mL
	Flea beetles	36 to 73 mL	36 to 73 mL	28 to 57 mL	36 to 73 mL
Potato	Variegated cutworm, European corn borer	73 mL	73 mL	57 mL	73 mL
	Leafhoppers	73 to 105 mL	73 to 105 mL		73 to 105 mL
	Lygus, Colorado potato beetle, potato flea beetle	73 to 105 mL	73 to 105 mL	57 to 81 mL	73 to 105 mL

## Application:

### Permethrin

- May be applied by ground or air. Apply when insects exceed economic threshold numbers and use sufficient water for good coverage. Use higher rates for heavy infestations, adult insects and dense foliage. For cutworm control application should be made under warm, moist conditions in the evening or at night. Use high rates if larvae are near maturity or soil conditions are dry. DO NOT disturb soil surface for 5 days after treatment.

## How it Works:

*Permethrin* is a synthetic pyrethroid insecticide. It is a stomach and contact insecticide with no systemic or fumigant effects.

## Tank Mixes:

*Pounce 384EC* Insecticide is registered to tank-mix with Coragen Insecticide. Apply mixes based on the most restrictive use limitations for either label. According to the Pest Management Regulatory Agency of Health Canada's Guidance Document on Tank Mix Labelling (March 2023), unlabelled tank mixes of this product are permitted only if the label of this product and the label of the product it might be mixed with include at least general wording on their respective labels indicating they may be mixed with other pesticides. When tank mixes are permitted, apply mixes according to the most restrictive use limitations for either product.

**Restrictions:**

- **Grazing:** Cover crops or crops treated with *permethrin* should not be used as a green feed for animals.
- **Pre-harvest interval:**
  - *Corn* – 30 days
  - *Sweet corn* – 1 day
  - *Lentils, peas, wheat, barley, oats, rye* – 7 days
  - *Potatoes* – 1 day
- **Storage:** Store above -12°C.
- A 16 yard (15 metres) setback distance for ground and 110 yard (100 metres) setback distance by air near water bodies or other sensitive areas.

**Precautions:**

*Permethrin* is of low acute mammalian toxicity.

**Environmental Hazards:**

**Bees:** very toxic to bees; avoid spraying when bees are foraging. Spray deposit should be dry before bees commence foraging in treated crop.

**Aquatic organisms:** Highly toxic to fish and aquatic organisms. DO NOT contaminate ponds, lakes, streams or rivers during sprayer filling or rinsing operations or while spraying.

Toxic to certain beneficial insects. Minimize spray drift to reduce harmful effects on beneficial insects in habitats next to the application site such as hedgerows and woodland. *Permethrin* may impact predatory and parasitic arthropod species used in IPM programs within the treatment area. Unsprayed refugia for beneficial species of at least 1 metre from treatment area will help maintain beneficial arthropod populations.

**Hazard Rating:**

Caution – Poison

Refer to the introduction for an explanation of the symbols.

# Plutex

Insecticide Group  
31

**Company:**

Andermatt Canada Inc. (PCP# 34785)

**Formulations, Crops, Insects, Rates:**

Product		Plutex
Formulation and Container Size		<i>Plutella xylostella</i> granulovirus (PlxyGV) isolate GV-0020. Minimum of 2.5 x 10 <sup>13</sup> occlusion bodies (OBs)/L.. 100mL-1000L
Crop	Insect	Application rate (per acre)
Canola	Diamondback moth	20-81 mL

**Application:**

- *Plutex* is for ground application only.
- Spray on plants infested with eggs or 1st instar larvae. To be effective, larvae must ingest foliage or fruits with deposits of *Plutex*.
- Apply as a full coverage spray using enough water to sufficiently cover the crop without excess run-off, minimum 200 L/ha. Re-apply every 4-8 days. Within the stated range, use the shorter re-application interval and higher application rate under high pest pressures.
- Dissolve product in the required amount in water. The pH of the solution should range between 5 and 8.5. Depending upon weather conditions and the persistence of the pest infestation, the applications may be repeated every 6-8 days. Between 2 to 5 applications may be required per generation. The use of pheromone traps is recommended to optimize application timing.

**How it Works:**

The active ingredient in *Plutex* is a naturally occurring virus of the diamondback moth (*Plutella xylostella*). It is a highly selective pathogen of the diamondback moth. It infects larvae by ingestion and passage through the digestive organs. Topical application has no effect

**Tank Mixes:**

According to the Pest Management Regulatory Agency of Health Canada's Guidance Document on Tank Mix Labelling (March 2023), unlabelled tank mixes of this product are permitted only if the label of this product and the label of the product it might be mixed with include at least general wording on their respective labels indicating they may be mixed with other pesticides. When tank mixes are permitted, apply mixes according to the most restrictive use limitations for either product.

**Restrictions:**

- **Restricted Entry Interval:** 4 hours or until sprays have dried unless wearing waterproof gloves, long-sleeved shirt, long pants, socks and shoes
- **Pre-harvest interval:** Plutex can be used up to and including the day of harvest. PHI=0 days
- As this product is not registered for the control of pests in aquatic systems, DO NOT use to control aquatic pest.
- DO NOT apply in greenhouses.
- DO NOT apply this product by any type of irrigation system.
- DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.
- DO NOT apply by air.
- **Storage:** Plutex® can be stored in the refrigerator (<5°C) for two years from the date of manufacture. Store container upright and keep tightly closed when not in use. Shake vigorously to re-suspend contents immediately prior to addition in water

**Environmental Hazards:**

To reduce runoff from treated areas into aquatic habitats, avoid application to areas with a moderate to steep slope, compacted soil or clay.

Avoid application when heavy rain is forecast.

Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative filter strip between the treated area and the edge of the water body.

**Hazard Rating:**

Not Classified; No hazardous components.

# Rimon 10 EC

Insecticide Group  
15

**Company:**

UPL AgroSolutions Canada Inc. (PCP#28881)

**Formulations, Crops, Insects, Rates:**

Product		Rimon 10 EC
Formulation and Container Size		10% novaluron formulated as an emulsifiable concentrate. 2 x 10L
Crop	Insect	Application rate (per acre)
Alfalfa (for seed)	Lygus bug nymphs	338 mL
Potato	Colorado potato beetle, European corn borer	170-330 mL

**Application:****Rimon 10 EC**

- For ground application only.
- A minimum spray volume of 40 L per acre for potatoes, a minimum spray volume of 80 L per acre for alfalfa. Higher water volumes will provide better coverage and product performance. Re-application interval of 10 to 14 days in potatoes and 7 to 10 days in alfalfa.
- Use hollow cone, disc-core hollow cone or twin jet nozzles suitable for Insecticide spraying. Drop nozzles may be required to obtain uniform coverage against certain insect pests that develop down in the canopy. Use higher application rates and spray volumes for higher insect pressure.
- Lygus bugs – application should be made when lygus bugs appear
- Colorado potato beetle – Application should be made when the majority of the population is at egg hatch to the second instar of larval development.
- European corn borer – Scout for European corn borer to monitor egg-laying and egg hatch to determine timing of application. The first application should be made just prior to egg hatch.
- Re-application on a 10 to 14 day interval will be required to protect new growth or if monitoring indicates that it is necessary to keep pest populations below economic thresholds.

**How it Works:**

*Rimon 10 EC* is an insect growth regulator that must be absorbed by eggs or ingested by insect larvae to be fully effective. The primary mode of action is by disrupting cuticle formation and deposition occurring when insects change from one developmental stage to another, resulting in death at molting. Due to this mode of action, *Rimon 10EC* does not have any effect on adult stages of insects that have completed larval development.

**Restrictions:**

- DO NOT make more than 2 applications per year per crop per season. DO NOT apply more than 664 mL of *Rimon 10 EC* per acre per season in potatoes. DO NOT apply more than 676 mL of *Rimon 10 EC* per acre per season in alfalfa. DO NOT apply within 14 days of harvest (Pre-harvest interval).

**Precautions:**

- **Restricted Entry Interval:** DO NOT re-enter treated areas for a period of 12 hours after application.
- **Buffer Zone:** An untreated buffer zone between the last spray swath and the edge of aquatic systems (such as rivers, streams, lakes, and other water bodies) must be established. Refer to label for specific buffer zone requirements.
- **Storage:** To prevent contamination, store this product away from food or feed.

If this product is to be applied to a product destined for export to the United States, information on acceptable residue levels are available at [www.croplife.ca](http://www.croplife.ca).


**Environmental Hazards:**

**Bees:** May be toxic to bee colonies exposed to direct treatment, drift, or residues on flowering crops or weeds. Avoid applying this product to flowering crops or weeds if bees are visiting the treatment area.

**Aquatic organisms:** Toxic to aquatic organisms. Avoid application of this product when heavy rain is forecast. DO NOT apply directly to water or to areas where surface water is present.

**Others:** *Rimon 10 EC* is toxic to immature insects. Minimize spray drift in habitats next to the application site (e.g. hedgerows and woodlands) to reduce harmful effects on beneficial insects.

**Hazard Rating:**

-  Warning – May cause substantial but temporary eye injury. Harmful if absorbed through skin. DO NOT get on eyes or clothing.

Keep out of reach of children.

Refer to the introduction for an explanation of the symbols.

# Scorpio Ant and Insect Bait

Insecticide Group  
5

**Company:**

W. Neudorff GmbH KG (PCP#33306)

Distributed in Canada by Belchim Crop Protection Canada

**Formulations, Crops, Insects, Rates:**

Product		Scorpio Ant and Insect Bait
Formulation and Container Size		0.07% spinosad formulated as an emulsifiable concentrate. 1 to 800 kg
Crop	Insect	Application rate (per acre)
Potato, dry bean, faba, chickpea, lentil, field pea, soybean	Black cutworm, reduces damage caused by wireworm*	10 to 20 kg

**Application:**

- Granular Bait – Spreader. DO NOT place in piles.
- \* To reduce damage caused by wireworm: Incorporate into the soil at planting to a depth of 10 to 20 cm at a rate of 25 to 50 kg per hectare (2.5 to 5.0 g per square metre). Use the high rate when wireworm pressure is expected to be high.
- Black cutworm – Reapply after heavy rain or watering. Reapply as the bait it is consumed or every 4 weeks.

**How it Works:**

*Scorpio Ant and Insect Bait* in the spinosyn class of insecticides. It is a stomach insecticide.

**Effects of Weather:**

Avoid application when heavy rain is forecast.

**Restrictions:**

- **Pre-harvest Interval:**
  - *Potatoes* – 7 days
  - *Dry bean, faba bean, chickpea, lentil, field pea, soybean* – 28 days
- **Storage:** To prevent contamination store this product away from food and feed.
- **Other:** Maximum of 2 applications per year. DO NOT apply by air.

**Precautions:**

Avoid contact with eyes, skin and clothing. DO NOT allow adults, children or pets in treatment areas during application. Wash immediately after using this product. Wear long-sleeved shirt, long pants, chemical-resistant gloves, shoes plus socks during loading, application, clean-up and repair.


**Environmental Hazards:**

**Bees:** Toxic to bees.

**Aquatic organisms:** Toxic to aquatic organisms. To reduce runoff from treated areas into aquatic habitats avoid application to areas with a moderate to steep slope, compacted soil, or clay. Avoid application when heavy rain is forecast. Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip between the treated area and the edge of the water body.

**Others:** Toxic to certain beneficial insects.

**Hazard Rating:**

 Warning – May be harmful if swallowed. May be harmful in contact of skin. Causes mild skin irritation. Causes eye irritation. May be harmful if inhaled.

Refer to the introduction for an explanation of the symbols.

# Sefina

Insecticide Group  
9

**Company:**

BASF (PCP#33265)

**Formulations, Crops, Insects, Rates:**

Product		Sefina
Formulation and Container Size		50 g/L afidopyropen formulated as a dispersible concentrate. 2 x 3.24 L jug
Crop	Insect	Application rate (per acre)
Soybean	Soybean aphid	81 mL
Alfalfa, clover ( <i>Trifolium</i> spp., <i>Melilotus</i> spp.), lupin, sainfoin, trefoil, vetch (crown, milk)	Leafhoppers	81 to 162 mL
	Pea aphid, spotted alfalfa aphid	81 mL
	Pea aphid, blue alfalfa aphid (suppression), spotted alfalfa aphid (suppression),	81 to 162 mL
Grass forage, fodder, hay	Pea aphid, blue alfalfa aphid (suppression), spotted alfalfa aphid (suppression),	81 to 162 mL
	potato leafhopper (suppression)	
Potato	Aphids	81 mL

**Application:****Sefina**

- May be applied by ground or air.
- Apply *Sefina* at rates listed in the crop specific application rate tables when insect thresholds are reached. Ensure adequate water volumes are used for optimum coverage.
- **Soybean and Potato:**
  - **Ground** – Apply in a minimum of 40.5 to 81 L of water per acre.
  - **Air** – Apply in a minimum of 20.2 L of water per acre.

## How it Works:

*Sefina* is classified as an IRAC Group 9D insecticide with no known cross resistance to other chemistries. It is a contact insecticide that stops aphid feeding quickly and can provide control for up to 21 days.

## Effects of Weather:

Apply only when meteorological conditions at the treatment site allow for complete and even crop coverage. DO NOT apply during periods of dead calm. Avoid application of this product when winds are gusty. This product has the potential for run-off. Avoid application when heavy rain is forecast.

## Restrictions:

- **Restricted Entry Interval:** DO NOT enter or allow worker entry into treated areas for a period of 12 hours after application.
- Allow a minimum of 7 days between applications.
- **Storage:** Store the leftover product in original, tightly closed container. DO NOT ship or store the product near food, feed, seed and fertilizers. Store the product in cool, dry, locked, well-ventilated area without floor drain.
- **Others:**
  - DO NOT apply more than a maximum seasonal rate of 1 L per acre (potato), 0.16 L per acre (soybean), or 0.5 L per acre (alfalfa, clover, lupin, sainfoin, trefoil, vetch).
  - DO NOT apply within 7 days of harvest.
  - DO NOT feed or graze soybean hay or forage.
  - DO NOT apply less than 7 days before harvest for potato and soybean.
  - DO NOT apply more than 2 applications per year (soybean), or 4 applications per year (potato, alfalfa, clover, lupin, sainfoin, trefoil, vetch)
  - DO NOT make more than 2 sequential applications of *Sefina* insecticide before using an insecticide with a different mode of action.

## Precautions:

Wear a long-sleeved shirt, long pants, chemical-resistant gloves, socks and shoes during mixing, loading, application, clean-up and repair. Gloves are not required during application within a closed cab and/or cockpit. Wash hands before eating, drinking, smoking or using the toilet. Change out of work clothes and take a bath or shower after handling or spraying the product. Launder protective clothing before re-use.

A Vegetative Filter Strip (VFS) of at least 10 metres wide must be observed. The VFS is required between the field edge and adjacent, downhill aquatic habitats to reduce risk to aquatic organisms from run-off. The VFS is to be composed of grasses and may also include shrubs, trees, or other vegetation.

Allow a minimum of 7 days between applications.

## Environmental Hazards:

**Bees:** Application during the crop blooming period may be made only in the evening when most bees are not foraging. Minimize spray drift to reduce exposure to bees in habitats close to the application site.

**Aquatic organisms:** Toxic to aquatic organisms. Observe buffer zones and vegetative filter strips specified under directions for use.

## Hazard Rating:



Caution – Poison

Refer to the introduction for an explanation of the symbols.

# Sevin XLR

Insecticide Group  
1A

## Company:

Tessenderlo Kerley, Inc. (PCP#27876)

## Formulations, Crops, Insects, Rates:

Product		Sevin XLR
Formulation and Container Size		466 g carbaryl per litre formulated as a liquid suspension
Crop	Insect	Application rate (per acre)
Beans	Leafhoppers, lygus bugs, climbing cutworm	2.12 to 2.59 L
	Potato leafhopper	1.01 L
Canola	Flea beetles	0.202 L
Forage grasses	Grasshoppers	0.49 to 1.42 L
Ditchbanks, field borders, headlands, pastures, rangelands, rights-of-way, wastelands	Grasshoppers	486 to 931 mL (for nymphs or sparse vegetation) 931 mL to 1.4 L (for adults or dense vegetation)
Peas	Alfalfa looper	1.90 L
Potato	Leafhoppers, potato flea beetle	1.01 L
	Colorado potato beetle	0.51 L
	Lygus	2.12 to 2.59 L
	Variiegated cutworm	45 mL/100 m of row
	European corn borer	1.01 to 2.12 L

## Application:

- Ground application only, except for canola.
- For grasshoppers, lower rates can be used for nymphs or sparse vegetation, and higher rates for adults and application to dense vegetation.
- In canola, applications can be made up to 4 weeks following plant emergence.

## How it Works:

*Sevin XLR* is a carbamate insecticide that works by contact and ingestion.

## Restrictions:

- **Storage:** DO NOT store in areas where temperatures frequently exceed 38°C. Store in original container in a cool dry area out of reach of children and animals and away from food and feed.
- **Restricted-Entry Intervals:**
  - *Beans* – 7 days for high contact activities such as scouting
  - *Canola* – 0.5 days
  - *Forage grasses and pastures* – 2 days
  - *Potatoes* – 0.5 to 6 days depending on the activity (see label).
- **Number of applications per year:** maximum of 2 applications per year in canola, beans, and potatoes.


## Environmental Hazards:

**Bees:** This product is highly toxic to honey bees exposed to direct treatment on blooming crops or weeds. For applications on crops that are highly attractive to pollinators DO NOT apply during the crop blooming period.

**Aquatic organisms:** Toxic to aquatic organisms. Avoid application of this product when heavy rain is forecast.

**Plants:** To avoid possible injury to tender foliage, do not apply to wet foliage or when rain or high humidity is expected during the next 2 days. *Sevin XLR* injures Boston ivy, Virginia creeper and Maidenhair fern.

**Others:** Toxic to birds and mammals.

**Hazard Rating:**
 Warning – Poison

Refer to the introduction for an explanation of the symbols.

# Silencer Duo

**Insecticide Group**  
3A, 28

**Company:**

ADAMA Agricultural Solutions Canada (Silencer Duo A - PCP#35602, Silencer Duo B – PCP#35637)

**Active Ingredients:**

Chlorantraniliprole, Lambda-cyhalothrin

**Formulations, Crops, Insects, Rates:**

Product		Silencer Duo A	Silencer Duo B
Formulation and Container Size		200 g/L chlorantraniliprole formulated as a suspension. 2 x 6.06 L	120 g/L lambda-cyhalothrin formulated as an emulsifiable concentrate. 2 x 4.03
Crop	Insect	Application rate (per acre)	
Canola	Bertha armyworm, cabbage seedpod weevil <sup>1</sup> , diamondback moth, crucifer flea beetle, grasshoppers, Lygus <sup>2</sup>	51 ml	34 ml
Corn (field, popcorn, seed, and sweet)	Corn earworm, European corn borer	116 mL	76 mL
Lentils, chickpeas, field peas, dry beans, soybeans	Soybean aphid <sup>1</sup> , pea aphid <sup>1,3)</sup>	116 mL	76 mL
	Grasshoppers, pea leaf weevil <sup>1</sup> , soybean aphid <sup>1</sup> , pea aphid <sup>1,3)</sup>	51 ml	34 mL
Wheat, barley, oats	Grasshoppers, armyworm	51 ml	34 mL
Flax	Grasshopper, armyworm, Lygus	51 ml	34 ml

**Application:**

- Minimum water volume: 40 L/ac minimum
- Aerial application: 20 L/ac minimum
- Avoid application when heavy rain is forecast.

**How it Works:**

Silencer Duo insecticide works through contact and ingestion. It provides rapid knockdown and residual control of lepidopteran (e.g. moth larvae) and sucking and chewing insects. After foliar application most of the insecticide stays on the leaf surface with a small amount penetrating the leaf tissue. Initial and residual control is dependent on thorough coverage of the crop. Silencer Duo is most effective against early developmental stages of surface feeding insects and adults of pest that deposit eggs within plant parts. Insecticide components: lambda-cyhalothrin is a synthetic pyrethroid insecticide and chlorantraniliprole is a diamide insecticide.

**Restrictions:**

- **Rainfast period:** Do not apply in heavy rain is forecasted.
- **Re-entry interval:** 12 hours.
- **Canola**
  - Make only 1 application per season by either ground or air for cabbage seedpod weevil. DO NOT make more than 3 applications per season by ground application. DO NOT make more than 1 application per season by air
- **Corn (field, popcorn, seed and sweet)**
  - DO NOT make more than 2 applications per year.
- **Flax**
  - DO NOT make more than 3 applications per season by ground application. DO NOT make more than 1 application per season by air

- **Lentils, Chickpeas, Field Peas, Dry Beans and Soybeans**
  - *Ground* – DO NOT apply more than 3 times per season
  - *Air* – DO NOT apply more than once per season
- **Wheat, Barley, Oats**
  - *Ground* – DO NOT use more than 3 applications per year. Allow a 7-day interval between treatments.
  - *Air* – DO NOT make more than 2 applications by air.
- **Grazing interval:** DO NOT graze treated fields.
  - Grain/seed and meal from Canola, Cereals, Field Corn, Soybeans and Legume Vegetables (including pulses) treated with SILENCER® DUO can be fed to livestock. DO NOT feed other parts of treated crops to livestock.
  - DO NOT cut treated fields for silage/forage.
  - For grasses/non-grasses grown for seed production only, DO NOT feed seed screenings and aftermath to livestock.
- **Pre-harvest interval:**
  - *Cereals (Wheat, Barley, Oats)* – 28 days
  - *Corn (Field, Popcorn, Seed)* – 21 days
  - *Corn (Sweet)* – 1 day
  - *Pulses (Chickpeas, Lentils, Field Peas, Dry Beans, Soybeans)* – 21 days
  - *Oil Seeds Group (Canola, Flax, Mustard)* – 7 days
- **Storage:** DO NOT use or store in or around the home. Store unused product away from feeds, seeds, fertilizer, plants and foodstuffs. Silencer Duo must be stored above freezing. In pulse crops (pea, lentil, chickpea, beans and faba beans) if applied according to label rates early in the crop year at a vegetative stage or during flowering there is no need for MRL concerns. In cases of later application during pod development or seed fill to maturity (e.g. late season grasshopper control), consult with your exporter/ processor.
- DO NOT make a foliar application of Silencer Duo for a minimum of 60 days following an in-furrow or soil application or planting of seed treated with any Group 28 insecticide.
- **Buffer zones:** The buffer zones specified for this product are required between the point of direct application of Silencer Duo and the closest downwind edge of sensitive freshwater habitats (e.g. lakes, rivers, sloughs, ponds, prairie potholes, creeks, marshes, streams, reservoirs and wetlands). Spray drift buffer zones can be modified based on weather conditions and spray equipment.

## Environmental Hazards

Toxic to bees. To reduce runoff from treated areas into aquatic habitats avoid application to areas with a moderate to steep slope, compacted soil, or clay. Toxic to certain beneficial insects.

## Hazard Rating:



Danger – Poison Potential skin sensitizer.

Refer to the Introduction for an explanation of the symbols.

# Sivanto Energy

Insecticide Group  
3,4D

## Company:

Bayer (PCP#35668)

## Active Ingredient:

Flupyradifurone, Deltamethrin

## Formulations, Crops, Insects, Rates:

Product		Sivanto Energy
Formulation and Container Size		75 g/L Flupyradifurone and 10 g/L Deltamethrin formulated as an emusifiable concentrate. 9.12 L
Crop	Insect	Application rate (per acre)
Canola, Mustard seed (oilseed and condiment), oil radish, Brassica carinata (oilseed production only), cultivars and/or hybrids of these.	Flea Beetles	304 ml

## Application:

Minimum application volumes: 40 L/ac (Ground); 8 L/ha (Aerial).

- Do not apply after 6-leaf stage.
- Minimum application volumes: 40 L/ac (Ground); 8 L/ha (Aerial).

- Maximum Sivanto Energy allowed per crop per year: 303 mL/ac .
- Maximum flupyradifurone allowed per crop per year: 40 g a.i./ac
- Foliar Application Notes: Apply when pest pressure necessitates treatment. Apply as a directed foliar spray ensuring thorough coverage.
- DO NOT harvest or use leaves, stems, or other plant parts of Brassica carinata for food or feed.

### How it Works:

Deltamethrin insecticides controls insects through contact and/or ingestion. Flupyradifurone controls insects through ingestion and o/ contact caused by listed chewing and sucking insects through contact and systemic activity

### Tank Mixes

According to the Pest Management Regulatory Agency of Health Canada's Guidance Document on Tank Mix Labelling (March 2023), unlabelled tank mixes of this product are permitted only if the label of this product and the label of the product it might be mixed with include at least general wording on their respective labels indicating they may be mixed with other pesticides. When tank mixes are permitted, apply mixes according to the most restrictive use limitations for either product.

### Restrictions

- **Rainfast period:** Do not apply in heavy rain is forecasted.
- **Re-entry interval:** 12 hours.
- **Pre-harvest interval:** Do not apply after the -leaf stage of crop development. 100 days.
- **Storage:** Store this product away from food or feed. Store in cool, dry place and in such a manner as to prevent cross contamination with other pesticides, fertilizers, food, and feed. Store in original container and out of reach of children, preferably in a locked storage area.

### Environmental Hazards

Toxic to small wild mammals.

Toxic to aquatic organisms. Observe spray buffer zones specified under DIRECTIONS FOR USE.

Toxic to certain beneficial arthropods (which may include predatory and parasitic insects, spiders, and mites). Minimize spray drift to reduce harmful effects on beneficial arthropods in habitats next to the application site such as hedgerows and woodland. Deltamethrin may impact predatory and parasitic arthropod species used in IPM programs within the treatment area. Unsprayed refugia for beneficial species of at least 1 metre from treatment area will help maintain beneficial arthropod populations.

### Hazard Rating (Mammalian Toxicity)

Danger – Poison

Refer to the introduction for an explanation of the symbols.

# Sivanto Prime

Insecticide Group  
4D

### Company:

Bayer (PCP#31452)

### Active Ingredient:

Flupyradifurone

### Formulations, Crops, Insects, Rates:

Product		Sivanto Prime
Formulation and Container Size		200 g Flupyradifurone per litre formulated as a liquid suspension. 2 L
Crop	Insect	Application rate (per acre)
Potato	Colorado potato beetle	304 to 405 mL
Corn	Aphids	202 to 304 mL
Chickpea, dry bean, faba bean, field pea, lentil, soybean, alfalfa (forage, silage and hay production only), potato	Aphids, leafhoppers	202 to 304 mL

## Application:

- Apply once the target pest population has reached economic threshold according to local recommendations.
- DO NOT apply within 1 hour of rain. Avoid application when heavy rain is forecast.
- **Potato:**
  - **Application interval** – 10 days
  - **Ground** – Apply as a directed foliar spray ensuring thorough coverage. Minimum 40 L per acre.
  - **Air** – Minimum 8 L per acre. DO NOT apply during periods of dead calm. Avoid application of this product when winds are gusty.
  - **Pre-harvest interval** – 7 days
  - **Grazing interval** – DO NOT graze.
- **Corn:**
  - **Application interval** – 7 days
  - **Ground** – Apply as a directed foliar spray ensuring thorough coverage. Minimum 40 L per acre.
  - **Air** – Minimum 8 L per acre. DO NOT apply during periods of dead calm. Avoid application of this product when winds are gusty.
  - **Pre-harvest interval** – 7 days (sweet corn, forage, silage, hay cutting); 21 days (grain, stover)
  - **Grazing interval** – 7 days
- **Chickpea, dry bean, faba bean, field pea, lentil, soybean:**
  - **Application interval** – 10 days
  - **Ground** – Apply as a directed foliar spray ensuring thorough coverage. Minimum 40 L per acre.
  - **Air** – Minimum 8 L per acre. DO NOT apply during periods of dead calm. Avoid application of this product when winds are gusty.
  - **Grazing interval** – 7 days
- **Alfalfa (forage, silage and hay production only):**
  - **Application interval** – 10 days
  - **Ground** – Minimum 40 L per acre
  - **Pre-harvest interval** – 7 days, except – soybean grain 21 days
  - **Grazing interval** – 7 days

## How it Works:

*Sivanto Prime* is a broad spectrum systemic insecticide that works by contact and ingestion.

## Restrictions:

- **Storage:** Store in cool, dry place and in such a manner as to prevent cross contamination with other pesticides, fertilizers, food, and feed
- **Restricted-Entry Intervals:** 12 hours.
- **Number of applications per year:** maximum of 809 mL per acre per year.

## Tank Mixes:

DO NOT tank mix with azole fungicides during bloom. According to the Pest Management Regulatory Agency of Health Canada's Guidance Document on Tank Mix Labelling (March 2023), unlabelled tank mixes of this product are permitted only if the label of this product and the label of the product it might be mixed with include at least general wording on their respective labels indicating they may be mixed with other pesticides. When tank mixes are permitted, apply mixes according to the most restrictive use limitations for either product.

For tank mixes, consult the labels of the tank-mix partners and observe the largest (most restrictive) buffer zone of the products involved in the tank mixture and apply using the coarsest spray (ASAE) category indicated on the labels for those tank mix partners.


## Environmental Hazards:

**Bees:** Toxic to adult bees in laboratory studies via oral exposure; however, not toxic to bees through contact exposure, and field studies conducted with this product have shown no effects on honeybee colony development. Minimize spray drift to reduce exposure to bees in habitats close to the application site. Application during the crop blooming period, and when flowering weeds are present may only be made in the early morning and the evening when most bees are not foraging. Toxic to certain beneficial insects. Minimize spray drift to reduce harmful effects on beneficial insects in habitats next to the application site such as hedgerows and woodland.

**Aquatic organisms:** Toxic to aquatic organisms. The buffer zones for this product can be modified based on weather conditions and spray equipment configuration by accessing the Buffer Zone Calculator on the Pest Management Regulatory Agency website.

**Others:** *Sivanto Prime* is of low acute mammalian toxicity. Toxic to certain beneficial insects.

## Hazard Rating:

 Warning – May cause an allergic skin reaction. Harmful if inhaled.  
Refer to the introduction for an explanation of the symbols.

# Sluggo Professional

Molluscicide –  
no group

## Company:

Belchim Crop Protection (PCP#30025)

## Formulations, Crops, Insects, Rates:

Product		Sluggo Professional
Formulation and Container Size		0.76% ferric phosphate in a granular formulation. 5, 25 kg bags
Crop	Insect	Application rate (per acre)
Field crops	Slugs and snails	Apply bait evenly at a rate of 4.9 to 20.2 kg / acre (1.2 to 5 g per square metre).

## Application:

### Sluggo

- Apply in the evening as slugs and snails travel and feed mostly at night or early morning. DO NOT place in piles. For best results the ground should be moist but with little or no standing water.
- For broadcast application, standard broadcast spreaders may be used. For row application, standard granular spreaders may be used.
- At seeding and later stages, apply the bait between rows and around the perimeter of the field. Treating around the perimeter of crop areas may intercept slugs or snails migrating from daytime refuge sites.
- Apply at the higher rate within the recommended rate range if the infestation is severe, if the area is heavily watered or after long periods of heavy rain.
- Re-apply as the bait is consumed or at least every two weeks if slugs and snails continue to be a problem.

## How it Works:

*Sluggo* must be consumed by the slugs or snails to be effective. After ingesting the bait, slugs and snails stop feeding providing immediate protection to plants. Affected slugs and snails die within 3 to 6 days.

## Precautions:

Avoid contact with eyes. May cause eye irritation.

Wear chemical resistant gloves during mixing and loading activities and when applying by hand.

## Environmental Hazards:

**Aquatic organisms:** This product may be toxic to fish and other aquatic organisms. Avoid direct application to ponds, streams and lakes.

## Hazard Rating:



Warning – Contains the Allergen Wheat

Refer to the introduction for an explanation of the symbols.

# Success Insecticide

Insecticide Group  
5

## Company:

Corteva Agriscience (PCP#26835)

## Formulations, Crops, Insects, Rates:

Product		Success Insecticide
Formulation and Container Size		480 g/L spinosad formulated as a suspension concentrate. 1 L jug
Crop	Insect	Application rate (per acre)
Potato	Colorado potato beetle larvae	34 to 67 mL
	European corn borer larvae	51 mL

## Application:

### Success 480 SC

- Apply when scouting indicates the target pest species have reached economic threshold levels. For Colorado potato beetle, target eggs at hatch or small larvae. For control of European corn borer, time the application to coincide with peak egg hatch. Use higher application rate for higher pest pressure or when extended egg hatch is anticipated. If pest populations persist, a repeat application 7 to 10 days after the initial application may be necessary.
- Spinosyns require a spray solution pH between 6 to 8. This is important for the efficacy of the product. It is recommended that growers test the pH of the spray solution prior to adding a spinosyn to the spray tank.

## How it Works:

Success 480 SC is in the spinosyn class of insecticides. It is a contact and stomach insecticide. It is derived from the fermentation of *Saccharopolyspora spinosa*.

## Effects of Weather:

This product has the potential for run-off. DO NOT spray immediately after a rainfall or if rain is forecast within 48 hours after application.

## Restrictions:

- **Restricted Entry Interval:** DO NOT enter or allow worker entry into treated areas for a period of 12 hours after application.
- **Storage:** Avoid freezing. DO NOT store or ship with food, feeds, drugs or clothing.
- **Others:**
  - **Potatoes** – DO NOT apply more than a maximum seasonal rate of 100 mL per acre. DO NOT apply within 7 days of harvest.

## Precautions:

May cause eye and skin irritation.

**Buffer Zones:** For ground applications, a buffer zone of 2 metres (early season) or 1 metre (late season) is required between downwind edge of spray boom and sensitive aquatic habitats. Avoid contact with eyes, skin, and clothing.

## Environmental Hazards:

**Bees:** Highly toxic to bees exposed to direct treatment, drift or residues on blooming plants. DO NOT apply this product or allow it to drift to blooming plants if bees are visiting the treatment area.

**Aquatic organisms:** Highly toxic to aquatic invertebrates. DO NOT contaminate aquatic habitats, such as lakes, rivers, sloughs, ponds, coulees, prairie potholes, creeks, marshes, streams, reservoirs, and wetlands, when cleaning and rinsing spray equipment or containers.

**Others:** Harmful to parasitoids and predatory mites and slightly harmful to foliage-dwelling predators.

# Superior 70 Oil

Insecticide Group  
NA

## Company:

Loveland Products Canada Inc. (*Superior 70 Oil* – PCP#14981)

N.M. Bartlett Inc. (*Superior "70" Oil* – PCP#9542)

## Formulations, Crops, Insects, Rates:

Product	Superior 70 Oil	
Formulation and Container Size	Mineral Oil, 99%, emulsifiable concentrate. 10 L, 200 L and 1000 L	
Crop	Insect	Application rate (per acre)
Potato	Reduce the spread of Potato Virus Y (PVY) transmitted by aphids.	4 L

## Application:

### *Superior 70 Oil*

- Maximum 10 applications when aphids first appear; Pre-harvest interval: 14 days. Ground application only. DO NOT apply by air.
- DO NOT use the spray mixture before the oil has been properly emulsified. Spray at one week intervals as soon as aphid vectors are present.
- Thorough coverage of the plants is essential. Apply at a 10 percent rate (e.g. 10 L per 1000 L water). Boom height must be 60 cm or less above ground or crop canopy.

## How it Works:

The mineral oil reduces the spread of potato virus Y (PVY) disease vectored by aphids. The mineral oil does not kill the aphids.

## Tank Mixes:

According to the Pest Management Regulatory Agency of Health Canada's Guidance Document on Tank Mix Labelling (March 2023), unlabelled tank mixes of this product are permitted only if the label of this product and the label of the product it might be mixed with include at least general wording on their respective labels indicating they may be mixed with other pesticides. When tank mixes are permitted, apply mixes according to the most restrictive use limitations for either product.

## Effects of Weather:

Avoid application when heavy rain is forecast.

DO NOT apply on drought stressed plants, in hot sun or when there is a risk of freezing temperatures.

DO NOT apply during periods of dead calm. DO NOT apply when winds are gusty or wind speed is greater than 16 km/h.

## Restrictions:

- **Maximum number of applications:** 10 per season
- **Restricted Entry Interval:** DO NOT re-enter treated areas within 12 hours of application.
- **Pre-harvest interval:** 14 days
- **Storage:** Store in original tightly closed container in a cool dry, well-ventilated area away from feed and foodstuffs. DO NOT store below 0°C.

## Precautions:

DO NOT use within 30 days before or after using Sulfur.

## Environmental Hazards:

**Aquatic organisms:** DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

## Hazard Rating:



Danger – Poison, Eye Irritant

Refer to the introduction for an explanation of the symbols.

# Thimet 20G

Insecticide Group  
1B

## Company:

AMVAC Chemical Corporation (PCP#29000)

This product is ONLY for retail sale to and use by individuals holding an appropriate provincial pesticide applicator certificate or license.

## Formulations, Crops, Insects, Rates:

Product		Thimet 20G
Formulation and Container Size		20% phorate formulated as a granular. 22 kg SmartBox closed loading system
Crop	Insect	Application rate (per acre)
Potato	Reduction of wireworm damage	105 g/100 m in sandy or light soil 161 g/100 m in silt or heavy soils

## Application:

### *Thimet 20G*

- Ground application only at seeding time: This is a restricted product and can only be applied with a *SmartBox* pesticide application system properly calibrated to ensure accurate placement and rate. Distribute granules evenly in furrow at planting time only. Use low rate for sandy or light soils and high rate for silt or heavy soils. For use ONLY in potato fields where wireworm populations have been observed.

## How it Works:

Phorate is an organophosphate insecticide that works as a systemic poison, with effective initial residual activity on soil and foliar insects.

## Restrictions:

- DO NOT apply *Thimet* more than once per season.
- DO NOT apply *Thimet* to saturated soils or in wet conditions that may prevent the equipment from covering pesticide granules. DO NOT apply while precipitation is occurring and conducive to run-off from treated areas. DO NOT apply if intense or sustained precipitation is forecast to occur within 48 hours as this will favour run-off.
- Leave a 20 metre (66 feet) buffer area if used on highly erodible land adjacent to aquatic bodies. DO NOT apply within 15 metres (50 feet) of any drinking water well.
- **Storage:** DO NOT store in or around the home. Store away from food or feed. All *SmartBox* containers must be returned per instructions provided.
- **Others:** DO NOT use in muck soils. DO NOT apply later than at planting time. Will provide reduction of wireworm damage.
- DO NOT use on muck soils.
- A plant-back interval of 6 months is required for all crops except potatoes is required. There is no plant-back restriction for potatoes.
- DO NOT enter or allow workers to enter into treated areas for a period of 48 hours. DO NOT harvest potatoes before 90 days after planting time.

## Precautions:

*Thimet* is of high acute mammalian toxicity. DO NOT allow product to contact eyes and skin. Poisonous by skin contact, inhalation or swallowing. DO NOT breath dust. Repeated inhalation or skin contact with *Thimet 20G*, other organophosphorus or carbamate insecticides may, without symptoms, progressively increase susceptibility to poisoning. Wear freshly-laundered, long-sleeved work clothing daily. DO NOT handle *Thimet* with bare hands. Use rubber gloves when transferring from package to equipment. Sleeve cuffs should be worn over gloves to prevent granules from falling into the gloves. Rubber gloves should be washed with soap and water after each use. Destroy and replace gloves frequently. In case of contact, immediately remove contaminated clothing and wash skin thoroughly with soap and water.

## Environmental Hazards:

**Aquatic organisms:** Toxic to aquatic organisms. DO NOT apply while precipitation conducive to runoff is occurring or while conditions favor runoff from the treated area. DO NOT apply when forecasted precipitation event favors runoff from treated area.

**Others:** Toxic to earthworms. Toxic to birds and small wild mammals. Any spilled or exposed granules must be incorporated into the soil or otherwise cleaned-up from the soil surface. One granule is sufficient to kill a small bird or small mammal.

## Hazard Rating:



Danger – Poison

Refer to the introduction for an explanation of the symbols.

# Vayego 200 SC

Insecticide Group  
28

## Company:

Bayer (PCP#33711)

This product is ONLY for retail sale to and use by individuals holding an appropriate provincial pesticide applicator certificate or license.

## Formulations, Crops, Insects, Rates:

Product		Vayego 200 SC
Formulation and Container Size		Tetraniliprole at 200 g/L, formulated as a suspension concentrate. 0.25 L to 1000 L
Crop	Insect	Application rate (per acre)
Potato	Foliar application: Colorado potato beetle, European corn borer, flea beetles, aphids (suppression)	61 mL
	In-furrow (at planting): Colorado potato beetle, flea beetle	6.75 mL/100 m of row
Corn	European corn borer, corn earworm, cutworms, armyworms, flea beetles, aphids (suppression)	61 mL
Soybean	Cutworms, armyworms	61 mL

## Application:

### vayego 200 SC

- **Potato**
  - **Foliar:** Minimum application volume:
    - *Ground* – 40.5 L per acre
    - *Aerial (potatoes only)* – 20.2 L per acre
    - *Maximum foliar application of vayego 200 SC per crop season:*
      - *Potatoes, soybean* – 121.4 mL per acre (24.3 g ai/acre)
      - *Corn* – 242.8 mL per acre (48.6 g ai/acre)

## How it Works:

Tetraniliprole disrupts muscle activity in the insects, resulting in paralysis. Treated pests stop feeding quickly after ingestion, become lethargic and lose mobility.

## Restrictions:

- **Foliar application:** DO NOT apply more than twice per year in potatoes or soybean, four times per year in corn.
- **Minimum interval between applications:** 10 days for potatoes, 14 days for corn and soybeans.
- **Rainfast period:** 1 hour
- **Restricted Entry Interval:** 12 hours
- DO NOT graze after treatment.
- **Pre-harvest interval:** 14 days
- **Storage:** To prevent contamination, store this product away from food or feed. Keep in a closed container.

## Precautions:

Wear a long-sleeved shirt, long pants, chemical-resistant gloves, socks and shoes during mixing, loading, application, clean-up and repair. Gloves are not required during application within a closed cab and/or cockpit. Follow manufacturer's instructions for cleaning and maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry. 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. Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

## Environmental Hazards:

**Bees:** Toxic to bees. DO NOT apply during crop blooming.

**Aquatic organisms:** Toxic to aquatic organisms. DO NOT apply while precipitation conducive to runoff is occurring or while conditions favor runoff from the treated area. DO NOT apply when forecasted precipitation event favors runoff from treated area. Observe buffer zones specified under directions for use.

**Others:** Toxic to certain beneficial insects. Minimize spray drift to reduce harmful effects on beneficial insects in habitats next to the application site such as hedgerows and woodland.

**Hazard Rating:**

Low toxicity.

# Verimark

Insecticide Group  
28**Company:**

FMC of Canada (PCP#30892)

**Formulations, Crops, Insects, Rates:**

Product		Verimark
Formulation and Container Size		Cyantraniliprole at 200 g/L, formulated as a suspension concentrate. 4 x 2.365 L per case
Crop	Insect	Application rate (per acre)
Potato	Colorado potato beetle, potato flea beetle	In-furrow application: 6.75 to 9 mL/100 m of row (303 to 404 mL/acre based on 90 cm row spacing).

**Application:***Verimark*

- Apply as a narrow band in-furrow. For best results, direct spray on the seed pieces in the furrow.

**How it Works:**

The active ingredient cyantraniliprole is a systemic insecticide from the diamides chemical class. Although it has contact activity, it is most effective through ingestion of treated plant material.

**Restrictions:**

- **Foliar application:** DO NOT make more than 1 soil application per year. DO NOT exceed a total of 0.6 L of *Verimark* per acre per year. Use only a closed treatment system.
- **Minimum interval between applications:** DO NOT make a subsequent foliar application of any Group 28 insecticide for a minimum of 60 days following an in-furrow application of *Verimark* insecticide.
- **Restricted Entry Interval:** 12 hours

**Precautions:**

Wear a long-sleeved shirt, long pants, chemical resistant gloves, socks and shoes while mixing/loading, applying and during clean up and repair. Follow manufacturer's instructions for cleaning/maintaining personal protective equipment (PPE). If no such instructions for washables are available, use detergent and hot water. Keep and wash PPE separately from other laundry. 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. Store product in original container only, away from other pesticides, fertilizer, food or feed. DO NOT use or store in or around the home. Keep container closed. To prevent contamination, store this product away from food or feed.

**Colorado potato beetle resistance management:** DO NOT apply any Group 28 insecticide for Colorado potato beetle control if *Verimark* insecticide was used at planting as an in-furrow treatment.

**Environmental Hazards:**

Avoid application when heavy rain is forecast. DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes. To reduce runoff from treated areas into aquatic habitats, avoid application to areas with a moderate to steep slope, compacted soil, or clay. Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip between the treated area and the edge of the water body.

**Bees:** Toxic to bees. This product is systemic, and bees can be exposed to product residues in flower, leaves, pollen and/or nectar resulting from soil applications. However, when this product is applied and used according to label directions, the risk to bees is expected to be negligible.

**Aquatic organisms:** Toxic to aquatic organisms.

**Hazard Rating:**

Low toxicity.

# Voliam Xpress

Insecticide Group 3A  
28

## Company:

Syngenta Canada Inc. (PCP#30325)

## Formulations, Crops, Insects, Rates:

Product		Voliam Xpress
Formulation and Container Size		50 g/L lambda-cyhalothrin and 100 g/L chlorantraniliprole formulated as a suspension concentrate. 4 x 3.78 L pack
Crop	Insect	Application rate (per acre)
Bean, chickpea, faba bean, lentil, pea, soybean	Grasshoppers, Lygus bugs, potato leafhopper	91 mL
Bean, chickpea, faba bean, pea, soybean	Armyworm, cabbage looper, European corn borer, corn earworm	202 mL
Bean, chickpea, faba bean, lentil, pea, soybean	Pea aphid	91 to 223 mL
Faba, pea	Pea leaf weevil	91 mL
Soybean	Soybean aphid	91 to 223 mL
	European corn borer, corn earworm	202 mL
Canola, rapeseed, oilseed mustard	Flea beetle, lygus bug, cabbage seedpod weevil, imported cabbageworm, diamondback moth, cabbage looper, bertha armyworm, grasshoppers	91 mL
Corn	Armyworm, corn earworm, European corn borer	202 mL
Potato	Armyworm, corn earworm, beet armyworm, leafminers, psyllids, variegated cutworm, black cutworm	202 mL
Flax	Bertha armyworm, grasshoppers, Lygus bugs	91 mL

## Application:

### Voliam Xpress

- May be applied by ground or air.
- Timing of applications should target the pest and when populations are in a damaging life stage and at economic levels. Ensure adequate water volumes are used for optimum coverage.
- **Potatoes and Corn**
  - **Ground** – Apply in a minimum of 60 L of water per acre.
  - **Air** – Apply in a minimum of 16 L of water per acre.
- **Bean, chickpea, faba bean, lentil, pea, soybean, canola, rapeseed, mustard (oil seed), sunflower** – Apply when insect feeding is first seen on foliage. Reapply after 7 days if populations reach economic threshold levels.
  - **Ground** – Apply with a minimum of 40 – 80 L water per acre.
  - **Air** – Apply with a minimum of 16 L of water per acre.

## How it Works:

*Voliam Xpress* insecticide works through contact and ingestion. It provides rapid knockdown and residual control of Lepidopteran (e.g. moth larvae) and sucking and chewing insects. After foliar application most of the insecticide stays on the leaf surface with a small amount penetrating into the leaf tissue. Initial and residual control is dependent on thorough coverage of the crop. *Voliam Xpress* is most effective against early developmental stages of surface feeding insects and adults of pest that deposit eggs within plant parts. Insecticide components: lambda-cyhalothrin is a synthetic pyrethroid insecticide and chlorantraniliprole is a diamide insecticide.

## Restrictions:

- DO NOT make a foliar application of Voliam Xpress for a minimum of 60 days following an in-furrow or soil application or planting of seed treated with any Group 28 insecticide.
- **Bean, chickpea, lentil, pea, soybean**
  - **Ground** – DO NOT apply more than 3 times per season
  - **Air** – DO NOT apply more than once per season.
  - DO NOT graze or harvest treated forage, straw or hay for livestock feed. A 7 day interval is required between applications. ◦ Pre-harvest interval – 14 days except – Soybean pre-harvest interval – 21 days.
  - DO NOT exceed the following amount of product per season. This includes Voliam Xpress as well as other Group 3 and/or Group 28 insecticides. Consult the label of other products containing these active ingredients prior to treatment to ensure the annual maximum is not exceeded:
    - 90 g chlorantraniliprole per acre by ground or aerial application and; ◦ 30 g lambda-cyhalothrin per acre by ground application or;
    - 10 g lambda-cyhalothrin per acre by air.
- **Canola, rapeseed, mustard (seed), sunflower**
  - **Application interval** – 7 days
  - **Pre-harvest interval** – 7 days
  - Make only 1 application per season by either ground or air for cabbage seedpod weevil. DO NOT make more than 3 applications per season by ground application.
  - DO NOT make more than 1 application per season by air
- **Corn**
  - DO NOT make more than 2 applications of Voliam Xpress per year. ◦ Application interval – 7 days
  - **Pre-harvest interval** – 14 days if crop is harvested for silage and 21 days for field corn. DO NOT exceed – 90 g chlorantraniliprole per acre by ground or aerial application and; ◦ 27.6 g lambda-cyhalothrin per acre by ground application or;
  - 20 g lambda-cyhalothrin per acre by air.
- **Potato**
  - DO NOT apply Voliam Xpress Insecticide, which contains a Group 28 insecticide, following a seed piece, in-furrow, or soil application of any Group 28 insecticide.
  - DO NOT make more than 2 applications of Voliam Xpress per year.
  - **Application interval** – 7 days
  - **Pre-harvest interval** – 7 days
- **Buffer Zones:** The buffer zones specified for this product are required between the point of direct application of *Voliam Xpress* and the closest downwind edge of sensitive freshwater habitats (e.g. lakes, rivers, sloughs, ponds, prairie potholes, creeks, marshes, streams, reservoirs and wetlands). Spray drift buffer zones can be modified based on weather conditions and spray equipment.
- **Storage:** DO NOT use or store in or around the home. Store unused product away from feeds, seeds, fertilizer, plants and foodstuffs. *Voliam Xpress* must be stored above freezing. In pulse crops (pea, lentil, chickpea, beans and faba beans) if applied according to label rates early in the crop year at a vegetative stage or during flowering there is no need for MRL concerns. In cases of later application during pod development or seed fill to maturity (e.g. late season grasshopper control), consult with your exporter/processor.

## Precautions:

As a result of the completed re-evaluation of lambda-cyhalothrin by the Pest Management Regulatory Agency (PMRA), effective April 29, 2023, changes will affect how all lambda-cyhalothrin-based products may be used in Canada.

DO NOT apply during periods of dead calm or when winds are gusty.

Avoid application at temperatures above 25 degrees C. Control of insects may be reduced at higher temperatures. DO NOT enter or allow entry into treated areas for a period of 24 hours after application of *Voliam Xpress*.

If *Voliam Xpress* is to be applied to a commodity destined for export to the United States, visit Crop Life Canada's website [HYPERLINK "http://www.croplife.ca/"](http://www.croplife.ca/) [www.croplife.ca](http://www.croplife.ca/) for information on acceptable residue limits.

## Environmental Hazards:

**Bees:** Toxic to bees when exposed to direct treatment, drift, or residues on flowering crops or weeds. DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area. Spray deposits should be dry before bees commence foraging in treated crop.

**Aquatic organisms:** Toxic to aquatic organisms. Avoid application when heavy rain is forecast. The use of this product may result in contamination of groundwater, particularly in areas where soil is permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

**Others:** Toxic to certain beneficial insects.

## Hazard Rating:



Danger – Poison Potential skin sensitizer.

Refer to the Introduction for an explanation of the symbols.