July 2019

Flax on the Farm

Insect Monitoring and Control

Even though flax is susceptible to attack by a number of insects, economic losses tend to be minimal except in a few cases. The only insect pest of flax that is unique to the crop is the flax bollworm. All other pests are generalists, meaning that they feed on multiple host species, and most tend to prefer crops other than flax.

Methods of insect control

- Chemical
  - Scouting for insects and the accurate identification of them is critical before making chemical application decisions.
  - A pest population must be above a certain level to cause economic losses and for chemical control to be worth the time and cost.
  - An economic threshold is the pest population or level of crop damage at which the cost of controlling the pest is less than the value of the crop that would be destroyed without any control measures. Therefore, economic thresholds provide a guide to indicate when chemical control of a pest is economical. Economic thresholds are available for the following insect pests of flax (see Table 1):
    - Beet webworm
    - Bertha armyworm
    - Cutworms (army, armyworm, clover, darksided, dingy, early, pale western, redbacked, variegated)
    - Flax bollworm
    - Grasshopper
    - Potato aphid
  - Follow best practices for chemical control of insect pests. Using the right product at the proper stage during optimal conditions and at the recommended rate will maximize the efficiency of control and prevent the development of resistance.
  - Only four groups of insecticides are registered for use on flax, so chemical rotation is important to reduce the risk of the development of resistance.
  - Always follow the most restrictive label directions and use precautions when tank mixing.
  - Consult product labels and provincial crop protection guides for application rates and restrictions related to environmental conditions, personal protective equipment (PPE), water volume, number of applications, application intervals, sequential applications, tank mixes, crop and pest staging, pest specificity, beneficial insects, re-entry periods, buffer zones, re-cropping and pre-harvest intervals.
  - The use of pest control products that are not registered for use on flax or that are applied outside of the recommended pre-harvest interval can result in marketing and trade issues related to maximum residue limits (MRLs).
- Cultural
  - Includes mechanical, environmental or other non-chemical or non-biological methods of controlling a pest.
- Biological
  - Refers to natural enemies of the pest.
  - Can include parasitoids, predators and diseases.
  - These organisms play a largely behind the scenes role in controlling the populations of many pest species on the Prairies and are often collectively referred to as ‘beneficials’.

MAN FLAX SaskFlax Flax Council of Canada

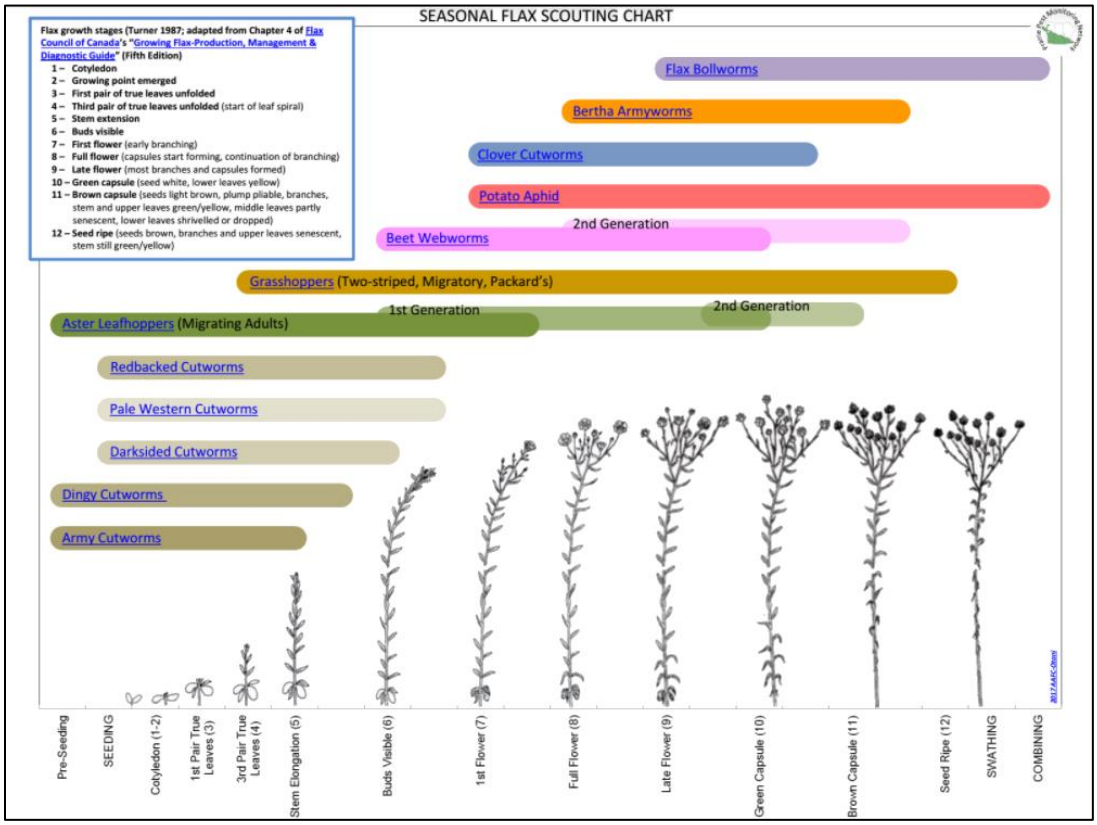
Integrated Pest Management (IPM)

- Integrated Pest Management is the practice of evaluating all available methods of pest control (chemical, cultural and biological) and making decisions on which single or combination of methods to use based on economics, environmental safety, and efficacy.
- With general public concern over the safety of pesticides and their effect on beneficial insects, this crop management practice has gained prominence in recent years.
- Six elements of IPM:
    - Prevention of pest problems
    - Accurate identification and knowledge of pests, their damage and natural enemies
    - Surveillance of pests, pest damage, natural enemies and weather conditions
    - Application of economic thresholds
    - Suppression of pest populations
    - Evaluation of results

Scouting

- Continuous monitoring of insects throughout the growing season is important for the effective implementation of control measures.
- Scouting should be done on a weekly basis and more frequently when conditions are favourable for an outbreak or when pest levels are getting close to the economic threshold.
- Sampling methods for insects are dependant on the characteristics of the pest. Specifics can be found in the provincial crop protection guides and field guides listed on the last page of this article.

Figure 1. Flax Insect Scouting Chart



Courtesy of the Prairie Pest Monitoring Network. Version with hyperlinks to Field Crop and Forage Pests and their Natural Enemies in Western Canada: http://prairiepestmonitoring.blogspot.com/search/label/Flax

The accurate identification of insects, knowledge about their lifecycles and methods of control are key to making good crop management decisions. For example, a grasshopper is not a pest if it is flying before June, its hind wings are highly visible (i.e. colourful) in flight or if it makes noise in flight or on the ground. Additionally, anticipating what insects to keep an eye out for this season can help to prioritize scouting activities.

Flax Insect Pest Outlook

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Bertha armyworm populations are beginning to emerge in some parts Saskatchewan. Numbers were slightly elevated relative to last year suggesting that we may be in an upswing in population growth. Population densities of these insects are cyclical and typically cycle between maxima and minima every 8-10 years. Bertha trap catches will be posted on the Ministry of Agriculture Saskatchewan Ministry of Agriculture website and the Prairie Pest Monitoring Network Blog. High numbers of adults captured can be an indication of local pressures. It'll be important for growers to scout for larvae in late July and August.

Grasshopper nymphs, primarily the slant-faced grasshopper, *Aeropedellus clavatus*, are beginning to emerge in large numbers in the Saskatoon - Rosetown corridor. Some reports of spraying for damage to pastures associated with nymphs have come in. Members of the *Melanopus* (spur-throated and clear wing grasshoppers) are also currently hatching. These are the species that are typically considered to be pests in Saskatchewan. Given the sustained dry period, these insects may be released from the diseases that normally limit population growth. Last years' provincial survey indicated low levels of grasshopper pressure over much of the province. However, reports of spraying still occurred. It'll be very important for growers to monitor for these insects throughout the year, particularly if dry conditions continue and as bolls form. The threshold is two per square metre in flax.

Last year was characterised by very low aster leafhopper populations. Trap catches are indicating another year with little pressure so far.

Several reports of spraying for cutworms in several crops have come in so far this year. Although successive dry years favour outbreaks of pale western cutworm, many reports of redbacked cutworm are coming in.

Beet webworm, *Loxostege sticticalis*, populations were low last year. Mating and population growth is negatively affected by dry conditions. However, this species is capable of long-distance migrations so predictions of pressures based on local conditions is difficult.

Flax bollworm, *Heliothis ononis*, populations are generally kept down by predators, parasites and disease. Last year saw low numbers and we do not expect a major increase in the coming year.

High winds and prolonged high temperatures (>26°C) can negatively impact potato aphid, *Macrosiphum euphorbiae*, populations. The insects fly into fields early July, and peak late July - early August (boll development). Monitoring should occur during this period.

Sporadic reports of dirt-coloured seed bug, *Peritrechus convivus*, nymphs in flax have been received. These insects are piercing-sucking feeding and can cause wilting and plant death when in high numbers. They form dense aggregations near the base of plants and can occur at very high numbers. No products are currently registered for controlling this insect in flax

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Below are descriptions of the insects that you may come across in your flax crop and the methods that can be used to control them if necessary.

Table 1. Insect pests of flax

Insect	Characteristics	Crop damage	Natural enemies	Cultural control	Chemical control	Economic concern?	Economic threshold	Comments
Aphid, potato (*Macrosiphum euphorbiae*)	sucking insect, overwinters as eggs on the stems of woody perennials (particularly roses), many generations per year, highest populations typically occur in late July/early August, winged forms appear when populations get too high or a new host plant is required, many generations per year	not typically noticeable because feeds on sap of leaves, stems and bolls	prone to attack by a fungus especially if moist and humid in late June and July, predatory mites, beetles (ladybird, rove), green lacewings, spiders (harvestman, wolf), syrphid/hover flies, bugs (assassin, big-eyed, damsel, minute pirate), wasps (aphid, braconid, chalcid, ichneumonid, trichogrammid), aphid midge, snakeflies	reduce populations of nearby summer hosts weeds (nightshade, ragweed, lamb's quarters, jimsonweed, pigweed, shepherd's purse) and avoid growing near summer host crops (potato, tomato)	dimethoate	yes	3 healthy aphids per main stem at full flower, 8 healthy aphids per main stem at the green boll stage	if aphids appear unhealthy when scouted during full bloom, count again at the green boll stage as this may mean that a natural enemy is effectively controlling the population, can reduce yield by 20% when population reaches 50 aphids per plant
Armyworm, bertha (*Mamestra configurata*)	climbing cutworm, larva of a noctuid moth, overwinters as pupae, larvae appear in early June, 1 generation per year	feeds on flowers, developing bolls, the bract-like calyx below late stage bolls and occasionally the stems of bolls, can cause boll drop	susceptible to a viral disease, beetles (ground, rove), flies (bee, robber, snipe, tachnid), bugs (assassin, damsel, minute pirate), wasps (braconid, chalcid, ichneumonid, trichogrammid), green lacewings, snakeflies, harvestman spiders, birds	crop rotation with non-susceptible crops (cereals, legumes except for peas), good control of weedy hosts (lamb's quarters, kochia, pigweed, Russian thistle), early swathing to reduce larval feeding, fall cultivation to expose pupae to the environment	chlorpyrifos, Coragen, deltamethrin, Matador 120EC, Voliam Xpress	rarely	4-5/m^2 (nominal), 25-30% stand reduction	used to be a significant pest of flax before canola and mustard were widely grown, tends to only become a problem if nearby canola, mustard or alfalfa fields have been swathed or harvested and the flax field is still green, the most damage occurs when late-instar larvae (mature) feed on flowers and newly formed bolls, populations typuically well controlled by a virus
Bollworm, flax (*Heliothis ononis*)	climbing cutworm, larva of a noctuid moth, overwinters as pupae, larvae appear in early May, 1 generation per year	feeds on the inside of developing bolls and then emerges to feed on other bolls	beetles (ground and rove), flies (bee, robber, snipe, stiletto, tachnid), bugs (damsel, minute pirate), wasps (braconid, chalcid, ichneumonid, trichogrammid), green lacewings, snakeflies, harvestman spiders, birds	fall cultivation to expose pupae to the environment	Coragen, deltamethrin, Matador 120EC	very rarely	3% or more of bolls damaged	eggs laid in open flowers, population effectively regulated by diseases, predators and parasitoids in most years
Bug, lygus (*Lygus* spp.)	sucking insect, overwinters as adults, 1 or 2 generations/year, sometimes concentrated at field edges	feeds on the sap of stems, leaves, growing points, buds and flowers, causes bud abortion, growing point deformation and stunting	tachnid flies, bugs (assassin, damsel), wasps (chalcid, ichneumonid, trichogrammid), jumping spiders	seed early	Decis 5 EC, Voliam Xpress	no	not established	eggs laid in stems and leaves, typically completes one generation on an alternative host before moving to flax, often moves into a flax crop when buds begin to develop, symptoms similar to thrip damage, flax is very tolerant to feeding damage under good growing conditions even when populations are high, late-seeded croops more susceptible to damage, most common species found on flax is the tarnished plant bug
Caterpillar, zebra (*Melanchra picta*)	larva of a noctuid moth, overwinters as larvae, 1 to 2 generations/year	feeds on leaves	beetles (ground and rove), flies (robber, bee, stiletto, tachnid), bugs (assassin, damsel, minute pirate), wasps (braconid, chalcid, ichneumonid, trichogrammid), green lacewings, snakeflies, harvestman spiders, birds	none	none registered	very rarely	not established	incidence often corresponds with that of bertha armyworms and variegated cutworms, damage usually isolated to patches along the edges of the field
Cutworm, army (*Euxoa auxiliaris*)	above-ground cutworm, larva of a noctuid moth, overwinters as larvae, 1 generation/year	feeds on leaves	susceptible to a viral disease, beetles (ground, rove), flies (robber, bee), flies (snipe, stiletto, tachnid), bugs (assassin, damsel, minute-pirate), wasps (braconid, chalcid, ichneumonid, trichogrammid), snakeflies, harvestman spiders, birds	seed crops later (after mid-May) to avoid larvae, good weed control in fallow and after harvest will reduce egg laying, spring and fall cultivation to expose larvae to natural enemies	chlorpyrifos, Coragen, deltamethrin, Matador 120EC, permethrin	occasionally	4-5/m^2 (nominal), 25-30% stand reduction	early seeded crops at high risk because overwinters as larvae, higher populations often present the year after an abnormally dry July followed by a wet fall, 10 or more larvae/m^2 can cause significant damage, apply insecticide in late evening or early morning when larvae most active

Table 1. Continued

Insect	Characteristics	Crop damage	Natural enemies	Cultural control	Chemical control	Economic concern?	Economic threshold	Comments
Cutworm, armyworm (*Mythimna unipuncta*)	climbing cutworm, larva of a noctuid moth, migratory, adults arrive in mid-April and larvae appear in early June, 2 generations/year	feeds on leaf margins, growing points and flowers	susceptible to a viral disease, beetles (ground, rove), flies (robber, bee), flies (snipe, stiletto, tachnid), bugs (assassin, damsel, minute-pirate), wasps (braconid, chalcid, ichneumonid, trichogrammid), snakeflies, harvestman spiders, birds	good control of grassy weeds before adults arrive	chlorpyrifos, Coragen, deltamethrin, Matador 120EC	no	4-5/m^2 (nominal), 25-30% stand reduction	first generation causes the greatest damage, apply insecticide in late evening or early morning when larvae most active
Cutworm, clover (*Discestra trifolii*)	climbing cutworm, larva of a noctuid moth, overwinters as pupae, larvae appear in mid to late June, 2 generations/year	feeds on leaves	susceptible to a viral disease, beetles (ground, rove), flies (robber, bee), flies (snipe, stiletto, tachnid), bugs (assassin, damsel, minute-pirate), wasps (braconid, chalcid, ichneumonid, trichogrammid), snakeflies, harvestman spiders, birds	crop rotation with non-susceptible crops (cereals, legumes), good control of weedy hosts (flixweed, mustards, shepherd's purse, stinkweed, wild radish), early swathing to reduce larval feeding, fall cultivation to expose pupae to the environment	Coragen, deltamethrin, Matador 120EC	rarely	20-30/m^2	also known as the nutmeg moth, flax is a major host, first generation most critical to control, apply insecticide in late evening or early morning when larvae most active
Cutworm, darksided (*Euxoa messoria*)	climbing cutworm, larva of a noctuid moth, overwinters as eggs, larvae appear in late April, 1 generation/year	feeds on leaves and stems	susceptible to a viral disease, beetles (ground, rove), flies (robber, bee), flies (snipe, stiletto, tachnid), bugs (assassin, damsel, minute-pirate), wasps (braconid, chalcid, ichneumonid, trichogrammid), snakeflies, harvestman spiders, birds, small rodents	none	chlorpyrifos, Coragen, deltamethrin, Matador 120EC, permethrin	rarely	5-6/m^2	look very similar to the redbacked cutworm, apply insecticide in late evening or early morning when larvae most active
Cutworm, dingy (*Feltia jaculifera*)	climbing cutworm, larva of a noctuid moth, overwinters as larvae, 1 generation/year	feeds on leaves and occasionally stems	susceptible to a viral disease, beetles (ground, rove), flies (robber, bee), flies (snipe, stiletto, tachnid), bugs (assassin, damsel, minute-pirate), wasps (braconid, chalcid, ichneumonid, trichogrammid), snakeflies, harvestman spiders, birds	good weed control in fallow and after harvest will reduce egg laying, spring and fall cultivation to expose larvae to natural enemies	Coragen, deltamethrin, Matador 120EC	rarely	25-30% stand reduction	can't be avoided by early seeding because larvae present until mid-July, apply insecticide in late evening or early morning when larvae most active
Cutworm, early (*Euxoa tristicula*)*	subterranean cutworm, larva of a noctuid moth, overwinters as eggs, larvae appear in late April, 1 generation/year	feeds on leaves of seedlings before they emerge, feeds on leaves and severs the stems of newly emerged seedlings	susceptible to a viral disease, beetles (ground, rove), flies (robber, bee), flies (snipe, stiletto, tachnid), bugs (assassin, damsel, minute-pirate), wasps (braconid, chalcid, ichneumonid, trichogrammid), snakeflies, harvestman spiders, birds		Coragen, deltamethrin, Matador 120EC	rarely	4-5/m^2 (nominal), 25-30% stand reduction	
Cutworm, pale western (*Agrotis orthogonia*)*	subterranean cutworm, larva of a noctuid moth, overwinters as eggs, larvae appear in late April, 1 generation/year,	feeds on roots and leaves of seedlings before they emerge, feeds on leaves and severs the stems of newly emerged seedlings	susceptible to a viral disease, beetles (ground, rove), flies (robber, bee), flies (snipe, stiletto, tachnid), bugs (assassin, damsel, minute-pirate), wasps (braconid, chalcid, ichneumonid, trichogrammid), snakeflies, harvestman spiders, birds	weed free fallow fields from July to mid-September and good in-crop weed control significantly reduces egg laying	chlorpyrifos, Coragen, deltamethrin, Matador 120EC, permethrin	yes	4-5/m^2	preferred host is cereals so monitor volunteer cereals for presence early in the season, larval parasitism very common and effective at controlling many outbreaks, apply insecticide in late evening or early morning when larvae most active
Cutworm, redbacked (*Euxoa ochrogaster*)*	above-ground cutworm, larva of a noctuid moth, overwinters as eggs, larvae appear in late April, 1 generation/year	feeds on leaves of seedlings before they emerge, feeds on leaves and severs the stems of newly emerged seedlings	susceptible to a viral disease, beetles (ground, rove), flies (robber, bee), flies (snipe, stiletto, tachnid), bugs (assassin, damsel, minute-pirate), wasps (braconid, chalcid, ichneumonid, trichogrammid), snakeflies, harvestman spiders, birds	weed free fallow fields from August to mid-September and good in-crop weed control significantly reduces egg laying	chlorpyrifos, Coragen, deltamethrin, Matador 120EC, permethrin	yes	4-5/m^2	a population of 12 larvae/m^2 can cause 10% yield loss and a population of 32 larvae/m^2 can destroy a flax field, apply insecticide in late evening or early morning when larvae most active

Table 1. Continued

Insect	Characteristics	Crop damage	Natural enemies	Cultural control	Chemical control	Economic concern?	Economic threshold	Comments
Cutworm, variegated (*Peridroma saucia*)	climbing cutworm, larva of a noctuid moth, migratory and overwinter as pupae, adults arrive in mid-April and larvae appear at the end of May, 2 to 3 generations/year	feeds on leaves, buds, flowers and bolls	susceptible to a viral disease, beetles (ground, rove), flies (robber, bee), flies (snipe, stiletto, tachnid), bugs (assassin, damsel, minute-pirate), wasps (braconid, chalcid, ichneumonid, trichogrammid), snakeflies, harvestman spiders, birds	good weed and volunteer host control, fall cultivation to expose pupae to the environment	chlorpyrifos, Coragen, deltamethrin, Matador 120EC	no	4-5/m^2 (nominal), 25-30% stand reduction	apply insecticide in late evening or early morning when larvae most active
Grasshopper	chewing insect, overwinters as eggs that begin to hatch when the soil temperature reaches 4.5°C, 1 generation/year	feeds on buds, flowers and the stems of bolls, can cause bolls to drop	susceptible to a fungus, wolf spiders, flies (bee, robber, stiletto, tachnid), birds, small rodents, coyotes	good control in nearby crops will reduce the risk	Coragen, deltamethrin, lambda-cyhalothrin, malathion, Voliam Xpress	yes	2/m^2 if boll drop occurring, 15 adults/m^2 otherwise	grasshoppers present prior to May will not cause economic damage to the crop, tends to only feed on flax late in the season when other food sources dwindle, 19 grasshoppers/m^2 can cause 22% yield loss, adults are more resistant to chemicals than earlier instars, most common species attacking flax is the two striped grasshopper
Leafhopper, aster (*Macrosteles quandrilineatus*)	sucking insect, adults migrate into Canada from the US in the spring via southerly winds, transmits the pathogens causing aster yellows and crinkle diseases, 2 generations/year	not typically noticeable because feeds on plant sap (refer to disease table for symptoms of aster yellows and crinkle diseases)	spiders (harvestman, jumping, wolf), predatory mites, bugs (assassin, damsel), wasps (chalcid, ichneumonid, trichogrammid), green lacewings	seed early	none registered	rarely	not established	also called the six-spotted leaf hopper, low levels of infection occur every year
Thrips (*Frankliniella tritici*, *Thrips tabaci* and *T. nigropilosus, T. vulgatissimus*)	rasping-sucking insect, overwinter as adults or larvae in plant debris or adults migrate into Canada from the US in the spring via southerly winds, several generations per year	feeds on the sap of young leaves, growing points, buds and flowers, causes bud abortion, stunted growth, silvering of leaves, twisted leaves, deformation of the growing point and very upright main stem	ladybird beetles, anthocorid bugs, predatory thrips *modify to make same as others	sow after cereals and not peas or mustard	none registered	rarely	not established	easily drowned by heavy rain, readily reproduce in warm dry weather, highly attracted to the colour white, symptoms similar to damage caused by lygus bug
Variegated fritillary (*Euptoieta claudia*)	larva of a migratory brush-footed butterfly, rarely overwinters in Western Canada, 2 generations/year	feeds on leaves, flowers and seeds, may cause boll drop	flies (robber, tachnid), bugs (assassin, damsel), wasps (braconid, chalcid, ichneumonid, trichogrammid), green lacewings, snakeflies, spider (crab, harvestman, jumping), birds	none	none registered	very rarely	not established	populations hardly ever high enough to cause economic losses
Webworm, beet (*Loxostege stricticalis*)	larva of a crambid snout moth, overwinters as larvae and pupae, 2 generations/year	feeds on foliage, stems and flowers	beetles (ground, rove), flies (bee, robber, snipe, stiletto, tachnid), bugs (assassin, damsel, minute pirate), wasps (braconid, chalcid, ichneumonid, trichogrammid), green lacewings, snakeflies, spiders (crab, harvestman, jumping), birds	the process of harvesting kills a large number of larvae, good weed control of preferred weeds (lamb's quarters, Russian thistle) within and surrounding the crop	deltamethrin	rarely	10-11/m^2	spins web among the leaves on upper parts of plants, prefers weeds (lamb's quarters, Russian thistle) to flax, causes more damage in hot, dry years, only the 2nd larval generation causes crop damage and these appear in mid-July, apply insecticide only if a significant number of bolls are being damaged
Wireworm (*Agriotes* spp.)	larva of a click beetle, overwinter as adults and larvae, 1 generation per year	feeds on germinating seeds and the underground parts of young seedlings	susceptible to a fungus, beetles (ground, rove), flies (stiletto)	seed early, follow seeding practices that promote rapid germination and seedling growth, keep summer fallow brown in June and July to starve larvae	none registered	very rarely	not established	populations have significantly increased in recent years due to the loss of effective insecticides and the transition to conservation tillage

Compiled from the following publications: Cutworm Pests of Crops on the Canadian Prairies, Field Crop and Forage Pests and their Natural Enemies in Western Canada, Flax The Genus Linum, Grasshopper Identification and Control Methods, Growing Flax, Insect Management in Oilseed Crops in Western Canada and Insects of Canola, Mustard and Flax in Canadian Grasslands and NDSU Flax Insect Pest Management.

Table 2. Insecticide options for flax

Active(s)	Product(s)	No. applications allowed[α]	Tank mix partners	Group(s)	aphids, potato	bollworm, flax	bug, lygus	armyworm, bertha	caterpillar, zebra	cutworm, army	cutworm, armyworm	cutworm, clover	cutworm, darksided	cutworm, dingy	cutworm, early	cutworm, pale western	cutworm, redbacked	cutworm, variegated	fritillary, variegated	grasshoppers	leafhopper, aster	thrips	webworm, beet	wireworm
chlorantraniliprole	Coragen*	3	Acapela, Assure II, MCPA ester and amine	28		√		√		√	√	√	√	√	√	√	√	√		√				
chlorpyrifos	various[§]	1	Proline 480 SC**	1B				√		√	√		√			√	√	√						
deltamethrin	Decis 5 EC, Poleci 2.5 EC	3	Buctril M, MCPA, Headline**, Pardner, Proline 480 SC**	3A		√	√**	√**		√	√	√	√	√	√	√	√	√		√			√	
dimethoate	Cygon 480-AG, Cygon 480 EC, Lagon 480 E	1		1B	√																			
lambda-cyhalothrin	Matador 120EC, Silencer 120 EC	3	Proline 480 SC**	3A		√**		√**		√**	√**	√**	√**	√**	√**	√**	√**	√**		√				
lambda-cyhalothrin, chlorantraniliprole	Voliam Xpress	3		3A ,28			√	√												√				
malathion	Malathion 85E, Malathion 500	1		1B																√				
permethrin	Ambush 500EC, Pounce 384EC, Perm-UP	none listed		3A						√			√			√	√							

Compiled from the 2019 AB, SK and MB crop protection guides. Check product labels for application rates and restrictions (environmental conditions, PPE, water volume, number of applications, tank mixes, crop and pest staging, pest specificity, beneficial insects, re-entry periods, buffer zones, and pre-harvest intervals).

*safe for bees and many beneficials

**certain products only

[α]ground application only. Check guide for aerial application restrictions.

[§]Citadel 480EC, Lorsban 4E, Lorsban NT, MPower Krypton, Nufos 4E, Pyrinex 480EC, Sharphos, Warhawk 480 EC

- If you need help identifying an insect (or weed, disease or environmental disorder) in your flax crop you can:
  - Speak to a Crop or Pest Specialist at your regional Provincial Ministry of Agriculture Office
  - Consult your Agronomist
  - Submit a plant or insect sample to a Provincial Laboratory
    - Saskatchewan
    - Manitoba

For more information on insect pests of flax contact the following:

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AgInfo Centre
Alberta Agriculture and Forestry
(403) 310-3276
aginfocentre@gov.ab.ca

Useful links:

1. Provincial Crop Protection Guides:
   - Alberta
   - Saskatchewan
   - Manitoba

2. PMRA Pesticide Product Label Search:
   - Online
   - App

3. Provincial Government Pest Management Websites:
   - Alberta
   - Saskatchewan
   - Manitoba

4. Insect Identification and Management Information:
   - General:
     - Field Crop and Forage Pests and their Natural Enemies in Western Canada: Identification and Management
     - University of Manitoba Pest & Crop Management App:
       - Google Play
       - App Store
     - Insect Management in Oilseed Crops in Western Canada
   - Cutworms:
     - Cutworms in Field Crops-Manitoba Agriculture
     - Cutworm Pests of Crops on the Canadian Prairies
   - Grasshoppers:
     - Grasshopper Identification & Control Methods to Protect Crops and the Environment

5. Beneficial Insects
   - Field Heroes
   - Natural Enemies of Pests Associated with Prairie Crops
   - Biological Control Website-Cornell University

6. Pest Monitoring Networks and Reporting Tools:
   - Prairie Pest Monitoring Network Blog
   - Alberta Pest Monitoring Network
   - Alberta Agriculture and Forestry Cutworm Reporting Tool