

Chapter 7: Field Insect Pests

Various insects will be present in fields of flax from emergence to maturity. Some insects will be beneficial, while others may feed on the crop and at high enough levels, management of such insects may be cost effective. To keep damage low, fields should be examined regularly and controls applied when insect populations reach economic threshold levels. The following species will all feed on flax. Some may reach economic thresholds warranting pesticide application, while others, although visible on the crop, usually remain at too low a level to cause economic loss.

Refer to the Guide to Crop Protection publication available on provincial department of agriculture websites. The Guide to Crop Protection is updated annually and contains pertinent additional information on insect control management including a listing of currently registered insecticides.

Belowground and seedling feeders

CUTWORMS

The redbacked, *Euxoa ochrogaster*, and the pale western, *Agrotis orthogonia*, are two of the more common species of cutworms that will feed on flax (Photos 7-1 and 7-2). Larvae will feed on many different types of crops and weeds. The adults are moths that lay eggs in late-summer. Eggs overwinter and larvae hatch and feed on crops and other plants in the spring. Larvae may feed on weeds before flax seedlings emerge. Larvae of the army cutworm, *Euxoa auxiliaris* (Grote), will also feed on flax and many other crops, in years when their populations are high. They overwinter as partially grown larvae, and can be an important pest in southern Alberta, to a lesser extent in southern Saskatchewan, and rarely in Manitoba.

Monitoring: Young larvae of some species climb plants and feed mainly on leaves, while older larvae eat into the stems and often sever them. Look for severed or partially severed plants on the soil surface. In fields with small hills or knolls, damage may first appear in the highest areas of the field. Larval densities can be estimated by sifting the top 5 cm of soil near the margin of the damaged area using a hand trowel and #5 to #8 mesh sieve. Another method is to inspect loose soil around plants showing cutworm damage. This method requires a measuring of row spacing by length of row inspected to determine larval density. When disturbed, larvae curl up.

Economic thresholds: Economic thresholds for cutworms in flax have not been developed. A nominal threshold of 4-5 larvae/m² in flax has been suggested. The loss of some flax plants may be partially compensated by a small increase in yield of remaining plants.

Management options: Insecticide applications, if needed, should be made late in the afternoon or evening. It may be most economical to just treat infested patches and not entire fields.

WIREWORMS

Wireworms, although potential pests of cereal grains in the seedling stage, seldom damage flax (Photo 7-3). No insecticides are registered to control wireworms in flax.



Photo 7-1—Redbacked Cutworms



Photo 7-2—Pale Western Cutworms



Photo 7-3—Wireworms





Photo 7-4–Potato Aphids

Sap feeders

POTATO APHID (*Macrosiphum euphorbiae*)

One species of aphid, the potato aphid, commonly occurs in flax (Photo 7-4) and can reduce the plant's ability to set healthy seed. They use their mouthparts to pierce and extract sap from stems, leaves and developing bolls. Potato aphids fly from winter host plants into flax in late June to early July, go through a number of generations and depending on natural controls, may reach peak densities in late July or early August. There is a rapid drop in aphid populations in flax fields in mid-August, when winged adult aphids migrate back to winter host plants. Farmers need not sample or control potato aphids in flax after mid-August.

Monitoring: The easiest way to check for the presence of aphids in flax is to sample the upper portions of the plants with a sweep net. If aphids are found, fields need to be inspected closer by randomly collecting plants when the crop reaches the full bloom or early green boll stage. To collect plants, stems should be severed at the base. Aphids can be counted by lightly tapping the severed plants on a hard surface, such as a tray, to dislodge the aphids. To determine if the economic thresholds are exceeded, at least 25 plants at full bloom or 20 plants at early green boll stage should be randomly collected.

Economic threshold: The economic threshold varies with the value of the crop and cost of control, but generally if aphid densities exceed three per plant when the crop is in full bloom, or eight per plant at the green boll stage, insecticidal control is cost effective. The yield loss of flax is 0.3346 bushel/acre per aphid per plant for flax sampled at full bloom, and 0.1275 bushel/acre per aphid per plant for crops sampled at the green boll stage.

Management options: Insecticides are registered for control of potato aphids in flax. Potato aphids are highly susceptible to attack by pathogenic fungi, especially in years with high rainfall and humidity in late June and July. A number of predators such as lady beetles, lacewings, hover fly larvae and parasitic wasps attack potato aphids.

LYGUS BUGS

In Manitoba, three species of Lygus bugs were found in flax (Photo 7-5), although the most common species was the tarnished plant bug (*Lygus lineolaris*). Adults move into flax from nearby host plants in July when flax produces buds and flowers. Feeding by Lygus bugs can cause buds to become necrotic and abscise, and may result in flower abortion.

Monitoring: Lygus bug levels can be assessed using a sweep net. Research in England found that Lygus bugs were more numerous close to field edges.

Economics of feeding: Although Lygus bugs can reach high densities in flax; flax is tolerant of their feeding damage under good growing conditions. A study in Manitoba found that under good growing conditions, populations of up to 100 per 10 sweeps were not economical to control. Whether this tolerance extends to flax growing under less favourable conditions is uncertain.

Notes: Flax can compensate for insect injury by producing additional flowers.

ASTER LEAFHOPPER (*Macrosteles quadrilineatus*)

The aster leafhopper feeds by sucking juices from flax plants (Photo 7-6). Leafhoppers can carry aster yellows phytoplasma and crinkle virus and can infect the plants with these diseases while feeding.



Photo 7-5–Lygus bug



Photo 7-6–Aster leafhopper

Defoliators

GRASSHOPPERS

Grasshoppers may feed on flax (Photo 7-7), particularly after other food sources have become scarce. The two-striped grasshopper, *Melanoplus bivittatus*, is the most common species that periodically can damage flax by feeding on flowers and buds and by cutting off the capsules.

Monitoring: While walking through the crop, estimate the average number of grasshoppers per m², both along the edge and into the field, and the amount of boll clipping that has occurred.

Thresholds: A nominal threshold of about two grasshoppers per m² on average has been suggested if grasshoppers are clipping bolls.

Management options: In years of high grasshopper populations, damage to flax can be reduced by controlling young grasshoppers in surrounding crops and vegetation before they begin to migrate. If grasshoppers start to clip flax bolls late in the season, harvesting the crop as soon as possible may help minimize damage.

DEFOLIATING CATERPILLARS ON FLAX

Although several species of caterpillars will feed on flax, they rarely are at levels that result in economic damage. Specific economic thresholds for these caterpillars in flax are not available.

BERTHA ARMYWORM (*Mamestra configurata*)

Bertha armyworm was a regular pest of flax before canola and mustard were grown on the Prairies (Photo 7-8). However, since the widespread introduction of the *Brassica* crops, bertha armyworm rarely causes economic damage to weed-free flax fields. If bertha armyworm-infested canola fields are swathed and green flax fields are nearby, flax can suffer significant damage from invading larvae. When abundant, bertha armyworms cause serious damage by chewing through the stems below the bolls, causing bolls to drop to the ground. Young bertha larvae are green but larger larvae are usually velvet-black.

CLOVER CUTWORM (*Discestra trifolii*)

Although flax is one of the crops that clover cutworms will feed on, this insect occurs only sporadically at densities that can cause economic damage.

BEET WEBWORM (*Loxostege sticticalis*)

The beet webworm is a slim, active, dark-green caterpillar which eats leaves, flowers and patches of bark from flax stems and branches (Photo 7-9). Larvae will often consume weeds before feeding on flax. Higher levels of beet webworm in flax may occur in years when weed growth is reduced by hot, dry summer weather. Determine if a significant number of bolls are being damaged before applying insecticides. Beet webworm is attacked by a number of species of parasitic insects.



Photo 7-7—Two-striped grasshopper



Photo 7-8—Larvae of bertha armyworm



Photo 7-9—Beet webworm

7



Photo 7-10–Zebra caterpillar

ZEBRA CATERPILLAR (*Melanchra picta*)

The zebra caterpillar is another species which feeds on flax as well as many other plants (Photo 7-10). This is not normally a significant pest.

VARIEGATED FRITILLARY (*Euptoieta claudia*)

Larvae of the variegated fritillary will feed on flax, including flowers and seeds. However, larvae of this migratory butterfly are usually not sufficiently abundant to cause economic damage (Photo 7-11).

FLAX BOLLWORM (*Heliothis ononis*)

Flax bollworm is a climbing cutworm. It has other host plants but prefers flax over other crops. The moths deposit their eggs in the open flowers and the young larvae eat the developing seed within the boll (Photo 7-12). The older green and white-striped worms leave the bolls and complete development by feeding on other bolls from the outside. Economic infestations of this insect have been limited. Populations are usually kept low by parasites and disease.



Photo 7-11–Variegated fritillary

Chemical Control of Insects

Extra considerations are needed when applying insecticides to flax that is flowering or when getting close to swathing.

Pollinators: Flax is a self-pollinating species and inadequate pollination is not usually a factor limiting yield. However, honey bees will forage in flax fields, so efforts should be taken to minimize harm to bees during flowering.

Pre-harvest intervals: The number of days that must pass between application of a pesticide and when flax is swathed, can vary from 1 to 40 days for insecticides registered in flax. Ensure the pre-harvest interval required for the insecticide will not be greater than the anticipated number of days until swathing.

Current recommendations for chemical control of insects of field crops are published annually as 'Guides to Crop Protection', by most provinces. For more information on insects and their damage, and for up-to-date information on control, consult your local agronomist, provincial Agrologist or provincial entomologists.

NOTE: Information on storage insect pests will be dealt with in the section Storage of Seed

Photos are courtesy of Dr. John Gavloski, Extension Entomologist with MAFRD.



Photo 7-12–Flax bollworm