Lygus Bugs in Field Crops

- Lygus Bug on Sunflowers
- Tarnished Plant Bug on strawberries

The term lygus bug refers to any member of plant bug in the genus *Lygus*. Lygus bugs have piercing and sucking mouthparts, with which they puncture plant tissues, inject digestive enzymes, and suck the plant juices in the area. They prefer to feed on the nitrogen-rich growing points and reproductive parts of the plant such as buds, flowers and young seeds. Many plants can compensate well for feeding to buds and flowers, provided there is adequate soil moisture. Feeding on seeds can cause visible damage to the seed because of the enzymes in the saliva that are left behind.

Host Crops

Lygus bugs feed on many plants; crops, weeds and wildflowers. Some of the crops that they potentially can be of greatest economical concern in Manitoba include alfalfa seed, canola, sunflowers, beans, quinoa, buckwheat, and strawberries. Lygus bugs will also feed on flax and wheat, but feeding in these crops does not appear to be economical. Lygus bugs are regularly found on hemp crops, but injury potential remains unclear. Some weed hosts of lygus bugs include chickweed, dandelion, red clover, red root pigweed, lamb's quarters, plantain, goldenrod, and asters.

Figure 1. *Lygus lineolaris* adult

Figure 2. *Lygus lineolaris* fifth instar nymph

Figure 3. *Lygus lineolaris* second instar nymph

Figure 4. *Lygus lineolaris* first instar nymph

Figures 1 to 4 from Tharshi Nagalingam, University of Manitoba.

Biology

Species of Lygus

Although there are 14 species of plant bugs in the genus *Lygus* in Manitoba, 3 of these can be common on many crops in Manitoba. *Lygus lineolaris*, commonly called the tarnished plant bug, is often the most abundant of these three species of lygus bugs. The other two species that can be common on crops are *Lygus borealis*, and *Lygus elisus*, commonly called the pale legume bug. These species are all native to North America. In addition, the closely related alfalfa plant bug, *Adelphocoris lineolatus*, which was accidentally introduced from Europe to North America, can also be common in Manitoba but is relatively restricted to alfalfa.

Identification

Appearances can vary between and even within species of lygus bugs. Below is a generalized description of lygus bugs.

Eggs are creamy white and about 1 mm long. They are flask shaped with the wider end having a flat cap. They are inserted into plant tissue with only the cap exposed.

The young **nymphs** (Figures 2-4) are pale-green and look like aphids except that they are more active, and lack cornicles (small tubes at the back of the abdomen in aphids). They develop through five instars before they become adults. The fourth and fifth instars have four black spots on the thorax and one on the abdomen (Figure 2). Fully grown nymphs have wingpads and are about 4 to 4.5 mm long.

Adult lygus bugs (Figure 1) are about 5 mm (1/4 in.) long and 2.5 mm (1/8 in.) wide, oval, and slightly flattened. They vary in colour from pale green to reddish-brown. They have a distinctive yellow triangle or "V" mark on a triangular region (called a scutellum) about one-third of the distance down the back, just in front of the wings. The legs and antennae are relatively long. In some species the males may be darker than the females.

Lifecycle

The adults overwinter, hidden in protective hedgerows, fallen leaves and other plant debris. Emerging in mid-April to late May, they feed on host weeds. Lygus bugs prefer to lay eggs on plants that are about to flower, and move from host to host depending on the timing of bloom. The eggs are laid on the stems and petioles of these hosts. About 10 days later, the eggs hatch and the nymphs feed.

The 1st-generation adults appear in mid-June to mid-July. Once able to fly, adult lygus will disperse into crops from adjacent ditches and hedgerows. The 2nd-generation nymphs feed on the host plants during August, potentially causing economic damage. The adults produced by this generation emerge in late August and September.

May	June	July	August	September
Overwintering adults become active, feed, lay eggs	Nymphs feed, new adults emerge	New adults mate, feed, lay eggs, nymphs feed	Nymphs feed, new adults emerge	Adults begin to overwinter

Sampling Techniques and Economic Thresholds

Canola

Susceptible Stages: Canola is most susceptible to lygus injury during the pod stage. Even though canola can compensate for bud and flower loss so there is no or minimal net reduction in the number of pods, seed yield can decline because of lygus injury because the plant can not compensate for collapsed seeds. Research in Alberta found that low levels of lygus bug feeding from bud to early flower stage induced greater branching and thicker stems compared to plants without lygus bugs, and may increase seed yield.

Monitoring: Thresholds are based on the number of lygus bugs sampled per 10 net sweeps (with a 38 cm diameter sweep net). Sampling should ideally be done in the late morning or early afternoon after the dew has evaporated, when lygus bugs are active in the upper part of the canopy. Canola should be sampled as flowering ends (stage 4.4), particularly if precipitation is low. If densities are near but less than the threshold at stage 4.4, canola should be resampled at stage 5.1 (when seeds in the lower pods are full size, translucent). If densities are sufficiently high, control is still warranted at stage 5.2 (seeds in lower pods green). The first two instars are not taken into account in the economic threshold calculations, because they do not appear to have the ability to puncture the seed.

Lygus bug densities should be determined from a minimum of 15 samples of 10 sweeps or 10 samples of 20 sweeps per field. Samples can be collected from along the edge or at right angles from the edge of the field. Research has shown that samples taken along the edge of commercial fields and at various distances into the field all gave similar estimates of plant bug density. Sampling along the edge reduces effort during years when thick crop growth impedes access to the field. For edge sampling, the area selected for sampling should be at a crop stage similar to that in the main part of the field.

Economic thresholds: A threshold of 20-30 Lygus bugs 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.

Pods are the focus for crop protection efforts against lygus in canola. The most vulnerable crop stage for lygus feeding is after flowering and when seeds are enlarging on lower pods. 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.

Sunflowers

See the factsheet "Lygus Bugs on Sunflowers" at: http://webpublishing.mbgov.ca/en/agriculture/crops/insects/Pages/lygus-bug-sunflowers.aspx for information on scouting and thresholds for lygus in sunflowers.

Flax

Adult lygus bugs 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. Flax can compensate for insect injury by producing additional flowers.

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 in flax.

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. Whether this tolerance extends to flax growing under less favourable conditions in uncertain.

Alfalfa Seed

Susceptible stages: Reduced seed yield is usually from damage to flowers and young seeds. Feeding can cause shrunken, nonviable seed.

Monitoring: In fields of alfalfa for seed, make five 180º sweeps with a 38 cm (15-inch) 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 thresholds in seed alfalfa are:

8 lygus bugs/sweep (40 in 5 sweeps) or 4 alfalfa plant bugs/sweep (20 in 5 sweeps) or 5 nymphs/sweep (25 in 5 sweeps) of any or all species of plant bugs, when the alfalfa is in bud or in bloom.

Chemical application should be timed so that the majority of nymphs are third instars or older. Research in Manitoba has found that applying an insecticide in August or September to control late-season plant bugs in seed alfalfa is not economical.

Control is not recommended in alfalfa grown for hay.

Figure 5. Alfalfa plant bug adult

Figure 6. Alfalfa plant bug nymph

Pulse Crops

Dry Beans: Damage by lygus bugs to dry beans varies with the plant stage. Feeding at flowering to pod initiation can cause abortion of flowers or pods, although plants can sometimes compensate for the injury. During seed development and filling, feeding can cause shriveled seeds and pods and result in reduce harvested seed weight. At seed maturity, feeding on seeds can cause pits in the seed coat, which can reduce yield quality. Economic thresholds have not been established for lygus bugs in dry beans.

Faba beans: Lygus bugs can cause hull perforations in faba beans. A nominal threshold to prevent downgrading is 10 to 15 lygus bugs per 10 sweeps at the early pod stage. Pollinators are important for seed set in faba beans, and should be taken into consideration when making management decisions.

Figure 7. Lygus bug injury to faba beans.
Mike Dolinski - Sticky Wisdom Inc.

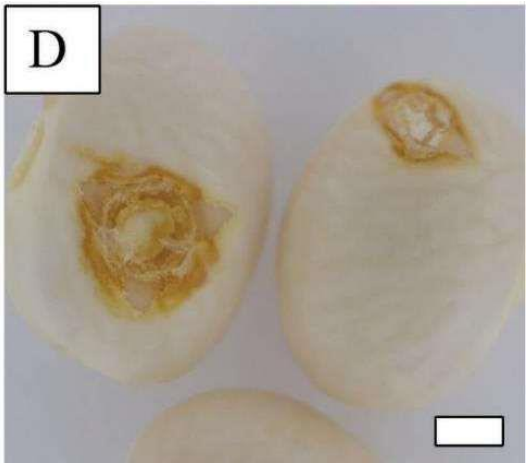

Figure 8. Lygus bug injury to navy beans.
Tharshi Nagalingam – University of Manitoba

Lentils: A nominal threshold for lygus bugs in lentils is 7 to 10 lygus bugs in 25 sweeps. Lygus bug feeding in lentils can result in pitted, crater-like depressions in the seed coat, with or without a discoloured chalky appearance. This feeding in lentils is referred to as chalky spot syndrome.

Buckwheat

Yields can potentially be reduced mainly by feeding from the lygus nymphs at the flowering stage. This feeding can result in decreased seed weight, flower and seed numbers, and increased percentages of shriveled seeds. Lygus bug populations can be monitored using a sweep net. Economic thresholds for lygus bugs on buckwheat are not available. Extra considerations are needed when applying insecticides to buckwheat that is flowering. Buckwheat requires cross-pollination, and honey bees, leafcutting bees, and other insect pollinators may be present on flowering buckwheat. Efforts should be taken to minimize harm to pollinators during flowering.

Control

Insecticides: If insecticide is required during the bloom stage, early morning or late evening applications should be targeted to minimize possible bee kill. In canola, spraying is best done at "post-petal fall" to minimize the effects of the insecticide on pollinators, which can increase yield and reduce the flowering period. Protecting pollinators is very important in alfalfa seed production, and pollination by bees is important for good yield in faba beans. The only insecticide registered for lygus bugs in field crops which is not toxic to bees is flonicamid (Beleaf), which, although not registered in canola, is registered for lygus bugs in alfalfa, clover, dry beans and faba beans.

Planting Date: Research in southern Alberta found Lygus bugs were generally below economically damaging levels in canola fields that were seeded in April.

Weather: Heavy rainfall may reduce levels of early-instar nymphs of lygus bugs. A study in alfalfa found heavy rainfall reduced first generation nymphs of *Lygus lineolaris* by 50%.

Biological Control: Nymphs of Lygus bugs may be killed by parasitic wasps in the genus *Peristenus* (Hymenoptera: Braconidae); with parasitism being common in weedy alfalfa stands or uncultivated weedy sites but very low in canola. Damsel bugs, assassin bugs, lacewing larvae, big-eyed bugs and crab spiders can prey on lygus bugs. Protecting these natural enemies by avoiding unnecessary insecticide applications may also help to reduce the impact of lygus bugs.

Figure 9. Lacewing larva eating lygus bug

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