# Follow insect thresholds

**KEY PRACTICE:** Follow insect thresholds to manage input costs against potential yield response. Conserve and protect natural enemies and beneficial insects by using economic thresholds to determine the need and timing for insecticidal controls.

**KEY RESEARCH:** Bracken, G.K. and Bucher, G.E. "An Estimate of the Relation Between Density of Bertha Armyworm and Yield Loss on Rapeseed, Based on Artificial Infestations." *Journal of Economic Entomology* (1977).

Carcamo, Hector, Agriculture and Agri-Food Canada (AAFC). "Refine and Validate Economic Threshold for Lygus Bugs in Canola Production in Alberta." project.

Wise, I.L. and Lamb, R.J. "Economic Threshold for Plant Bugs, Lygus spp. (*Heteroptera: Miridae*), in Canola." *The Canadian Entomologist* (1998).

Prevention of significant insect infestation is an essential long-term component of integrated pest management. Economic thresholds determine the need and timing for insecticidal controls based on potential yield reductions from insect damage while helping to conserve and protect natural enemies and beneficial insects.

If insect counts are at the threshold, yield benefit from an insecticide spray will be enough to cover the product and application cost of the spray on a breakeven basis. When insect numbers rise above the threshold, there will be a return on investment.

Lygus and bertha armyworm thresholds are based on research that measured how much yield loss can be attributed to each insect. The "nominal" thresholds used to manage all other insects in canola are based on experience but not research to quantify impact on the crop.

"An Estimate of the Relation Between Density of Bertha Armyworm and Yield Loss on Rapeseed, Based on Artificial Infestations," published by Bracken and Bucher, provides the basis for current bertha armyworm thresholds. They found that each bertha armyworm larvae per square metre could cause a 0.058 bu./ac. loss.

The thresholds table is based on how many bertha armyworms can be present per square metre before a spray becomes economical, adjusted for spray cost and canola price. Once bertha numbers are at or over the economic threshold, spray as soon as they start feeding on pods.

Lygus thresholds are based on "Economic Threshold for Plant Bugs, Lygus spp. (Heteroptera: Miridae), in Canola," published by Wise and Lamb. They found that one lygus could cause a 0.1235 bu./ac. loss at the late flowering to early pod stages and a 0.0882 bu./ac. loss at the late pod stage. At later stages of canola, insecticide applications would not be economical.

Threshold tables are based on lygus adults and late instar nymphs per 10 sweep-net sweeps and vary based on cost of application and the price of canola. For example, if canola is worth $12 per bushel and spray costs $8 per acre, the threshold at the early pod stage is five per 10 sweeps.

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## Bertha armyworm thresholds in canola

| Spraying cost – $/acre | Expected seed value – $/bushel | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| | Number of Larvae/metre² | | | | | | | | | | |
| 7 | 20 | 17 | 15 | 13 | 12 | 11 | 10 | 9 | 9 | 8 | 8 |
| 8 | 23 | 20 | 17 | 15 | 14 | 13 | 11 | 11 | 10 | 9 | 9 |
| 9 | 26 | 22 | 19 | 17 | 16 | 14 | 13 | 12 | 11 | 10 | 10 |
| 10 | 29 | 25 | 22 | 19 | 17 | 16 | 14 | 13 | 12 | 11 | 11 |
| 11 | 32 | 27 | 24 | 21 | 19 | 17 | 16 | 15 | 14 | 13 | 12 |
| 12 | 34 | 30 | 26 | 23 | 21 | 19 | 17 | 16 | 15 | 14 | 13 |
| 13 | 37 | 32 | 28 | 25 | 22 | 20 | 19 | 17 | 16 | 15 | 14 |
| 14 | 40 | 35 | 31 | 27 | 24 | 22 | 20 | 19 | 17 | 16 | 15 |
| 15 | 43 | 37 | 32 | 29 | 26 | 23 | 22 | 20 | 19 | 17 | 16 |

*This bertha armyworm threshold table, from MAFRD, is based on Bracken and Bucher's research from 1977. For more on bertha armyworm thresholds and other insect thresholds, go to www.canolawatch.org and search for the article "Thresholds: insect management tools."*

Courtesy of MAFRI

## FOLLOW INSECT THRESHOLDS

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Current thinking is that five lygus per 10 sweeps is far too few to warrant a spray and that the threshold is likely higher, especially for canola growing strong with decent moisture.

Wise and Lamb acknowledged this in their research paper, stating, "When precipitation is greater than 100 mm (4") from the onset of bud formation to the end of flowering, the crop may partially compensate for plant bug damage."



Canola Council of Canada agronomist Keith Gabert confirms this based on recent fieldwork in central Alberta. "In areas where moisture is generally adequate and we have frequent lygus infestation, it has become normal to double or triple the threshold charts we have for lygus," Gabert says. This is likely due to potential improvements in economic return and a lack of yield response in previous years when spraying lighter infestations.

Canola plants are bigger and hardier than in the mid-1990s when Wise's and Lamb's studies were conducted. Current hybrids may be able to compensate for more lygus feeding.

Hector Carcamo with Agriculture and Agri-Food Canada (AAFC) is leading new research to refine and validate economic thresholds for lygus bugs in canola production in Alberta. He writes: "It is anticipated that such improved decision making tools will help canola growers to reduce the business risk of canola production by improving management of lygus bugs, as well as increase its economic viability and environmental sustainability by reducing unnecessary pesticide sprays." ●