Canadian Agronomist

DIGGING INTO RESEARCH

Pea aphid thresholds in faba bean

CATEGORY **insects** | ***July 9, 2026***

The average economic threshold (ET) was calculated at 34 to 50 aphids per main stem. This ET offers a 7-day lead time prior to aphid populations exceeding the economic injury level of 96 to 142 aphids per faba bean main stem.

A major insect pest of faba bean is pea aphid, *Acyrthosiphon pisum*. They cause damage by feeding on phloem sap, and can cause yield losses of up to 100 per cent. In western Canada, economic injury levels (EILs) and economic thresholds (ELs) had not been established.

A research study was conducted at two sites in 2019 and four sites in 2020 near Saskatoon, Sask to determine the EIL and ET for pea aphid in tannin and low-tannin faba bean, and the optimum insecticidal application timing. The EIL is the smallest number of insects that will cause yield losses equal to the insect management costs. The ET is defined as the pest density when control should be implemented to prevent an increasing pest population from reaching the EIL, and also accounts for the cost of the insecticide.

In 2019, CDC Snowdrop was seeded in field plots between yellow field pea and red lentils. In 2020, CDC Snowdrop was planted beside lentil and canola crops at all sites.

Five different aphid densities and four insecticide treatments within each aphid density were compared. Insecticides were sprayed in 2019 when pea aphid densities on faba bean stems reached 40–140, 141–200, 1000–1250, 1251–1500 aphids. There was also an untreated control where pea aphid densities reached more than 1500 aphids per plant in 2019.

In 2020, pea aphid thresholds when insecticides were sprayed were lowered to 40–80, 90–140, 150–200, 210–260 aphids, with an untreated control reaching more than 7500 aphids per plant.

The three insecticides compared to the untreated control were Matador (lambda-cyhalothrin), Voliam Xpress (lambda-cyhalothrin + chlorantraniliprole), and Exirel (cyantraniliprole). Application rates were the intermediate label rate recommended for pea aphid control in pulses.

Insecticide efficacy and yield

Pea aphid populations were higher in 2019 than in 2020. In 2019, pea aphids appeared in the middle of July at the late vegetative (GS1[N]; last recorded node) to early reproductive GS 201 stages. Populations at the Llewellyn site in 2019 reached peak populations of around 1400 aphids per main stem and started declining in middle to late August when faba beans were at the full pod filling stage of GS207 to GS209.

The USask Goodale site in 2020 had the lowest pea aphid populations of all site-years with a maximum density of 200 aphids per plant at full pod filling stage (GS 207) in mid-August. Two other sites reached peak populations in 2020 around 600 pea aphids per main stem at the full pod filling stage.

The pea population growth rate was calculated to be 0.149 ± 0.005 aphids per day. Under field conditions, pea aphid doubling time was every 5.25 ± 0.19 days

All three insecticides reduced pea aphid densities measured at 10 days after application. Matador (90.4%) and Voliam Express (85%) had significantly higher average corrected insecticide efficiency than Exirel (66.4%).

All insecticide treatments had higher yield than the untreated plots. In the lower aphid pressure year in 2020, each insecticide produced similar yields. Under higher aphid pressure in 2019, Voliam Express and Matador had significantly higher yield at the two lowest aphid thresholds of 100-150 and 250-500 aphids per plant than Exirel. Above 1000 aphids per plant, total yield loss occurred for all three insecticide treatments indicating that the yield damage had already occurred prior to insecticide application.

Economic threshold and economic injury levels determined

The economics thresholds were based on the cost of registered insecticides at $6.50, $11.25 and $21.03/ac ($16.06, $27,80 and $51.50/ha) and the average of three benchmark prices of $46.80, $8.20, and $10.10/bu ($250, $300, $370/t) of faba bean from January 2018 to July 2021.

The researchers calculated the economic injury level (EIL) of 96 to 142 aphids per faba bean main stem. To provide a seven day lead time for insecticidal application, the average economic threshold (ET) when insecticides could be applied was calculated to be 34–50 aphids per main stem of a plant.

A laboratory greenhouse trial was also conducted with no-choice bioassays to assess whether pea aphid population growth was affected by tannin and low-tannin varieties. It found no significant effect of faba bean type on pea aphid growth. This means the economic thresholds can be applied to both tannin and low-tannin faba bean types.

This work was supported by the Agriculture Development Fund and the Western Grains Research Foundation.

Ningxing Zhou, Tyler Wist, Sean M. Prager. Economic thresholds and economic injury level for pea aphid in tannin and low tannin faba bean, Crop Protection, Volume 186, 2024, 106919, OPEN ACCESS: https://doi.org/10.1016/j.cropro.2024.106919

Photo courtesy Matt Remenda