

Pea Aphids on Peas, Faba Beans and Lentils



The pea aphid (*Acyrthosiphon pisum*) was introduced to North America from Europe, first reported in Illinois in 1878, and near the turn of the century they were found near Ottawa, Ontario. It is now widely distributed in Canada, ranging from the Atlantic to Pacific coasts in areas with a temperate climate. It has been collected as far north as Churchill, Manitoba.

Host Crops

Field peas, alfalfa and clovers are the main hosts of the pea aphid. Other legumes, including lentils, faba beans, vetches, sweet clover, sweet peas, trefoil and dry beans are also hosts.

Biology

Identification: Adult pea aphids are soft-bodied, slow-moving, and range in colour from light to dark green. Although less common there is also a pale pink or red colour morph. They are pear shaped, about 4.5 to 5 mm long and about 1.5 mm wide, with long slim legs. Pea aphids have long cornicles (a pair of tubes at the end of their abdomen), which are darker at the tips. Pea aphid eyes are red and prominent. The antennae of the pea aphid show narrow dark bands at the tip of each segment. The nymphs are smaller but closely resemble the adults. The pea aphid has four nymphal instars.



Figure 1. Aphids on peas



Figure 2. Green and pink colour morphs of pea aphid

Lifecycle: Pea aphids feed on the sap of host plants. They overwinter as eggs on leaves and stems of perennial legumes (ex. on the crowns of clover or alfalfa). In the spring, when plants resume growth, a small, light green, wingless female hatches from each egg. These aphids, which are all females and called "stem mothers", can reproduce without mating. They feed on the growing plants and give birth to female young. Some aphids of the second and third generations become winged and migrate to field peas and other acceptable host plants. There they feed and produce wingless females that give rise to winged and wingless females.

Females begin producing offspring 7 to 15 days following birth. The optimum temperatures for rapid development of pea aphids range from about 23 - 28°C. All pea aphids are female throughout spring and summer. A summer

female can produce 50-150 young during her life. If the host crop is cut during spring or summer, the winged aphids leave to search for new plants on which to live.

In late September or October, winged males and wingless females are produced. These mate and the females lay eggs on leaves and stems. There may be 7 to 15 generations per year.

Table 1. Lifecycle of Pea Aphids

| May | June | July | August | September |
|--------------------------|---|---|---|---|
| Overwintering eggs hatch | Feeding by nymphs begins, new adults emerge | New adults disperse and lay eggs, nymphs feed | New adults disperse and lay eggs, nymphs feed | Adults disperse, lay eggs that overwinter |

Scouting for Aphids in Field Peas

Field peas should be checked for aphid levels at the beginning of flowering. Take 180° sweeps or check at least 5, 8-inch (20 cm) plant tips along four well-spaced stops in the field.

Counts should be at least 50 m (150 ft.) apart and observations should be made well into the centre of the field. The number of aphids per sweep and aphids per tip in field peas are related. Either technique can be used to determine if the economic threshold has been exceeded.

Economic Thresholds for Aphids in Field Peas

Sampling to determine aphid density should be done when 50 to 75% of the pea plants are in flower. Economic thresholds may vary depending on the value of the crop and cost of control, as well as variation in potential seed weight caused by variation in precipitation and heat stress. The economic threshold in peas at \$0.21/kg (\$5.71 per bushel) and average control cost of \$16.63-\$22.86/ha (\$6.73-\$9.25/acre) is 2 to 3 aphids per 8-inch (20 cm) plant tip, or 9 to 12 aphids per sweep, at flowering. If the economic threshold is exceeded, a single application of insecticide when 50% of plants have produced some young pods will protect the crop against yield loss and be cost-effective. Cultivars of peas may also vary in their tolerance to feeding by pea aphids, thus economic injury levels may differ between cultivars. The economic thresholds presented above were developed using "Century" field peas.

Research in Manitoba has shown that insecticides applied when pods first form protects pea yield better than earlier or later applications. Control at the early pod stage provides protection through the pod formation and elongation stages, which are very sensitive to aphid damage.

Aphid feeding on peas in the flowering and early pod stage can result in lower yields due to less seed formation and smaller seed size. Protein content and other quality issues do not appear to be affected.

Environmental factors can also play a role in the severity of pea aphid injury. Aphid injury can be made worse by hot, dry summers. Under these conditions the plants are heat stressed and aphids may reproduce rapidly.

The following table relates the yield loss in peas for average aphid counts per sweep or per 20-cm tip of a field pea stem when about 25 percent of the crop has begun to flower.

Table 2. Yield loss in peas at different aphid densities

| Aphids per sweep | Aphids per tip | % yield loss |
|------------------|----------------|--------------|
| 7 | 1 | 3.4 |
| 10 | 2 | 4.9 |
| 12 | 3 | 6.1 |
| 15 | 4 | 7.1 |
| 16 | 5 | 8.0 |
| 18 | 6 | 8.8 |
| 20 | 7 | 9.6 |
| 21 | 8 | 10.3 |

Economic Threshold for Aphids in Lentils

For pea aphids in lentils, the economic threshold varies depending on environmental conditions, and ranges from 20 to 66 aphids per 180° sweep with a 38 cm diameter (15-inch) sweep net. This provides a 7-day lead time before aphid populations reach the economic injury levels of 78 aphids per sweep. When a high potential yield is expected, an economic threshold of between 20 and 30 aphids per sweep should be considered. A higher economic threshold of 46 to 66 aphids per sweep is recommended for hot and dry years with lower yield potential. If management action can be taken immediately, the economic threshold for pea aphids in lentils is 70 aphids per sweep.

Pea Aphids on Faba Beans

In faba beans, aphids usually hide under the leaves and cluster on areas of new growth. Monitor pea aphids frequently from the end of July to mid-August.

The economic threshold for pea aphids in faba beans is 34 to 50 aphids per main stem of a plant. This provides a 7-day lead time before aphid populations are expected to exceed the economic injury level of 96 to 142 aphids per faba bean main stem. This economic threshold is applicable to both tannin and low tannin varieties of faba beans.

Pollination by bees is important for good yields in faba beans, and faba beans can have a long flowering period. Thus, pollinators should be considered if aphid control is needed while faba beans are flowering.

Management Tips

Biological Control

Predators: Some biological control of aphids occurs by predators such as lady beetles, larvae of syrphid flies, minute pirate bugs and damsel bugs.

Parasitoids: At least five species from a subfamily of parasitic wasps known as aphid mummy wasps (Braconidae: subfamily Aphidiinae) are known to attack pea aphids in Manitoba. The most common of these is a species known as *Aphidius ervi*.

Pathogens: A fungal disease may sometimes reduce levels of pea aphids in warm, moist weather.

Rain and windstorms may also reduce pea aphid levels by washing or knocking individuals from host plants.

Cultural Control

Seeding early in the spring may reduce yield loss due to pea aphids in some cultivars of peas. The older the plant is prior to infestation the better able it is to withstand aphid injury.

Insecticides

Table 3. Insecticides for control of aphids in field peas, faba beans and lentils in Canada

| Insecticide | Crops | Rate/Acre | Pre-harvest interval (days) |
|---|---------------------------------|----------------------------|---|
| Carbine | Field peas, faba beans, lentils | 49-65 g | 7 |
| Movento | Field peas, lentils | 75 - 111 ml | 7 |
| Sivanto Prime | Field peas, faba beans, lentils | 202-304 ml | 7 |
| Matador, Silencer, Labamba, Zivata | Field peas, faba beans, lentils | 34 - 94 ml | 14 (Matador, Labamba); 21 (Silencer, Zivata) |
| Voliam Xpress | Field peas, faba beans, lentils | 91 – 223 ml | 14 |
| Malathion 85E | Field peas | 445 ml | 3 |
| Cygon 400EC, Lagon, Diamante 4 | Field peas | 134-185 ml 110 - 150 ml | 3 – 21 (see labels) |

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