Aphids in Field Crops

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Although aphids have not historically been a major crop pest in Saskatchewan (except for annual infestations in canaryseed) there have been some serious infestations in the past few years, most notably in 2003 where the insects affected many crops, especially pea. High numbers of aphids were also found in crops in 2004. The eastern half of the province has been most affected but high populations were also found in fields in western regions. There have already been reports of aphids in pea in 2005.

Aphids are soft bodied insects of the Order Homoptera, Family Aphididae and feed with piercing-sucking mouthparts that they insert into plant tissue to withdraw plant sap. There are 11 aphids known to use peas as a host crop. The pea aphid (*Acyrthosiphon pisum*) appeared to be the most common species found infesting pea crops in 2003. Control measures would be the same for other aphid species.

Symptoms and damage from the aphids and other sucking insects are more difficult to discern compared to damage from chewing insects in which actual plant tissue is removed. Lygus bugs are another example of sucking insects. Aphids are much smaller than Lygus bugs and consequently their "beaks" are smaller and cannot penetrate the tissues as deeply as Lygus bugs. Insertion points of the mouthparts are invisible without magnification. Leaf mottling will be a more obvious sign of aphid feeding. High numbers of aphids feeding at the base of flowers and developing pods may result in abortion of flowers and reduced filling and possibly fewer seeds per pod. However if there is sufficient moisture the plants can compensate for some of the fluid loss to the aphids. Aphids will more adversely affect a crop under moisture stress.

The **growth stage of the crop** is important. Since the plant sap has to be actively flowing in the plant for the aphids to feed, by the end of the milky stage and into the soft dough the plants are no longer susceptible to economic damage from the aphids. An insecticide application at this point would not be cost-effective.

Pea aphids have many **predators** that can help to reduce populations, including ladybird beetle adults and larvae, lacewings, ambush bugs, minute pirate bugs, and hover flies. In addition, several species of tiny wasps lay their eggs in pea aphid nymphs, killing the nymph and forming shiny pearl-like aphid "mummies", from which the wasp adult emerges. In humid conditions, an *entomophthoran* disease is capable of killing large numbers of aphids. These natural control agents may not be effective in reducing large infestations but when aphid numbers are around threshold levels, bio-control may provide a better alternative to insecticide control. Because of their ability to rapidly increase numbers, aphids have been known to rebound to high levels several weeks after insecticide application. For either management strategy, it is important to monitor aphid population levels regularly in a number of areas in a field.

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Being soft-bodied, aphids are very sensitive to physical disturbance. A heavy rain or severe wind can dislodge aphids and reduce their numbers in a crop. When the crop ceases to be lush and actively growing, a new generation of aphids may emerge in a winged form allowing for migration to greener pea crops or to alfalfa.

As with all **economic thresholds** there are a number of factors to consider. The current threshold in field pea is two to three aphids on the top 20 cm of the plant tip, of the main stem. However, this is based on research conducted on older varieties of large-seeded peas and may not be the same on the newer pea varieties that researchers feel can tolerate higher numbers of aphids. Good moisture conditions will mean less damage as the plant can compensate for sap loss.

Cost of control – Insecticides with the active ingredient dimethoate (Cygon, Lagon and dimethoate generic products) provide both contact and systemic activity. Since aphids are soft bodied and prone to desiccation, they tend to hide under leaves and other parts of the plant that can provide protection from contact insecticides. An insecticide with systemic activity would be desirable in that the plants will absorb the chemical and the aphids will also be affected when sucking out plant juices.

Value of the crop – True economic thresholds should take the market value of the crop into account. The price of pea is currently quite low and therefore the economic threshold is at slightly higher than the levels described above.

Sampling - As with all insect pests, sampling a number of locations in a field will provide a more reasonable estimate and location of infestations. Targeting the insect where it is present in a field can help to reduce input costs. For example, if only half a field is infected and treated, this will save on insecticide and labour costs.

The diagram shows the general morphology and life cycle of aphids. ☼

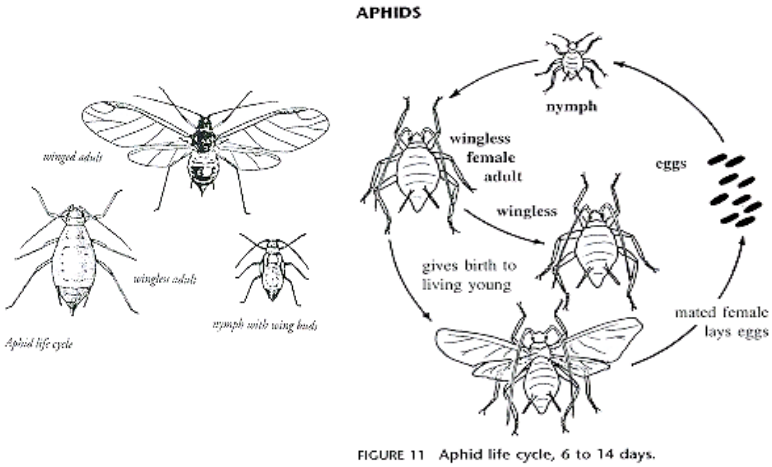

FIGURE 11 Aphid life cycle, 6 to 14 days.