

Soybean Aphids 2002

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Origin

The soybean aphid, *Aphis glycines*, was first discovered in North America in 2000 in soybean fields in eight states in the U.S. In 2001, it spread across 18 states, Manitoba and Ontario with Michigan and Ontario experiencing the heaviest infestations. Its distribution spans China, Japan, Korea, the Philippines, Australia, Thailand, Vietnam and eastern parts of Russia. It is not known how or when it actually arrived here in North America but its potential impact is certainly being investigated.

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Description and Life Cycle

The soybean aphid is a small, pale yellow aphid with black cornicles ("tailpipes") and a pale yellow tail. This insect has two primary hosts that it requires to complete its lifecycle. The soybean aphid survives overwinter as eggs on the twigs of buckthorn species. In the spring, nymphs hatch from these eggs and the aphids undergo two generations as wingless females on the buckthorn before the third generation develops winged adults for migration to soybean plants.

<p>Figure 1. Winged and wingless adults and nymphs (North Central Regional Pest Management Centre)</p>	<p>Buckthorn (<i>Rhamnus cathartica</i>)</p>

<p>Life Cycle of the Soybean Aphid (David Voegtlin)</p>	<p>Soybean aphids on underside of soybean leaf</p>

The aphids then continue to produce wingless generations until the soybean plants become crowded with aphids. Once crowded, winged forms are produced to disperse to less crowded soybean plants. There can be as many as 18 generations of aphids per year. Like most aphids, the soybean aphids are all female, born pregnant and give birth to live nymphs. Males are only born in the fall so that the females and males can mate to produce the overwintering egg.

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Crop Impact

Aphids have a tube-like mouthpart that sucks juices and nutrients from the plant. Plants may yellow and become stunted, reducing pod and seed production if aphid populations become

extremely high. Also, aphids can only digest 10% of the nutrients they take in. The rest is secreted out of their "tailpipes" as honeydew. This sticky honeydew collects on the surface of the leaves, in the absence of rain. The honeydew acts as a substrate for sooty mould to develop which turns the leaves black and rubbery.

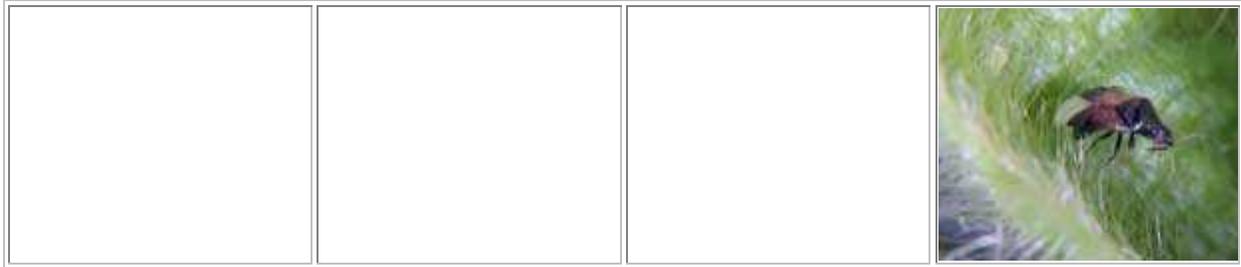
In 2001 in Ontario, the aphids were distributed across most counties in the southwest, with Kent, Lambton and Middlesex counties (in red) having fields infested with over 10,000 aphids per plant. However, these heavily infested counties were still able to yield above the provincial average, while some with lower aphid numbers did not. This indicates that other factors also contributed to yield loss including drought stress and high heat at flowering.

Biological Control

The good news is that there are some excellent natural enemies and pathogens that can control this pest. Ladybird beetles, green lacewings and minute pirate bugs can reduce the aphid population by up to 86%. Also, a natural epizootic pathogen is present in our soil that is quite effective at killing these aphids. The pathogen only needs moist, warm conditions to become established and develops as a pink fungal mass on the aphid before it explodes and spreads the spores onto other aphids. We strongly recommend scouting your fields to determine the presence of this pathogen before you make the decision to spray.

Natural pathogen that infects the aphids

Natural enemies of aphids. From left to right, ladybird beetle adults and larva, lacewing larva and minute pirate bug.



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Soybean Aphid Management Guidelines

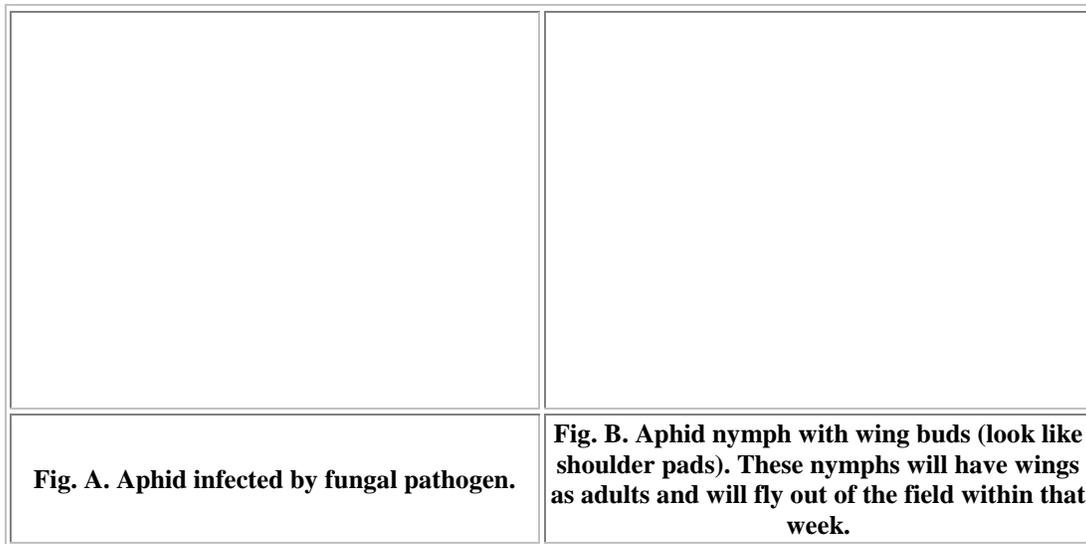
Although we still have much to learn about the behavior of the soybean aphid, appropriate timing for application of labeled insecticides, and efficacy of those insecticides under our growing conditions, our experiences in 2000 and 2001 suggest the following treatment recommendations for 2002:

1. Avoid treating aphids when they first appear in a field. Insecticide application to control low and non-damaging populations of aphids will also kill beneficial insects, allowing surviving aphids and migrants to more readily repopulate the field. Thus, early-season treatments can lead to higher populations than if the field had not been sprayed.
2. Begin intensive scouting no later than the late vegetative stages -just before bloom- and pay close attention to the upper 2-3 sets of trifoliolate leaves, where the aphids congregate during those soybean growth stages.
3. Wait to treat until aphids are abundant (leaflet rating of at least 3.0, see next page) on the upper trifoliolate leaves, petioles and stems but before plants show noticeable signs of damage. Damage symptoms include leaf distortion, plant stunting, yellowing of leaves, and leaves coated with honeydew and/or sooty mold (which grows on the honeydew). **During 2001, applying insecticides when aphids reached such populations during the R1 (flowering) growth stage provided the most consistent aphid control and yield gain.** Yield loss has been shown to be mainly due to loss in pod set. Other plant damage factors contributed very little to yield loss across the region where aphids were found. It is important then to protect the plants when pods are setting i.e. during flowering. Soybean aphids normally reach peak numbers at that time.
4. Although lady beetles, minute pirate bugs, lacewings and other predators are an important component of soybean aphid pest management, insecticide intervention will be required if aphid abundance reaches the levels described in Guideline #3, above. The predators have not been able to reduce such populations to non-damaging levels.
5. Watch for diseased aphids ([Fig. A](#)), winged aphids, and aphid nymphs with developing wings ([Fig. B, below](#)). If most of the aphids present are winged they will soon be leaving the plants and spraying probably is no longer warranted. Populations in such fields will

"crash" very suddenly. This is also true of the fungal pathogens that attack the soybean aphid; they are also capable of causing aphid populations to rapidly decline.

6. Monitor weather forecasts. Drought conditions allow aphids to thrive. In contrast, rain will wash off honeydew from the plants and will help the plant to recover from the stress induced by the aphids. Also, moist, humid conditions promote the establishment of the fungal pathogens that attack the soybean aphid.
7. It appears that late-planted or double-cropped soybeans are more attractive to migrating aphids than soybeans planted at more typical dates. In both 2000 and 2001, soybeans planted after early-June developed higher aphid populations and subsequent injury symptoms than did soybeans planted between late April and mid May.

Courtesy of Chris DiFonzo, Michigan State University



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Chemical Control

Insecticide trials have shown that the benefit to spraying for aphids depends on several factors. Yield was most impacted if infestations peaked at the R1-R2 stage. Also, those fields planted late

appear to be more susceptible to yield impact by this pest. Plots that were planted early did not show signs of stunting and stress even when under moderate aphid infestations.

The biggest concern when spraying aphids is the potential for rebounding. When aphid infestations are sprayed, those that survive are then in a less crowded environment and proceed to rebuild their populations. This has been found to occur when a product does not reduce the aphid population by 95% or better.

Cygon 480AG is the only product registered for aphids in Ontario at this time and has been found to give approximately 85% control. Strip plots results from across Ontario show that spraying for aphids is not always advantageous. We strongly recommend that the factors mentioned in the "Soybean Aphid Management Guidelines" are considered before deciding to spray.

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For more information...

Aphid updates will be available in CropPest Ontario newsletter at: <http://www.gov.on.ca/OMAF/english/crops/field/news/index.html>, or on the CropLine at 1-888-449-0937, or the Agricultural Information Contact Centre by e-mail ag.info@omaf.gov.on.ca or by phone at 1-877-424-1300 or on the OMAF website at: <http://www.gov.on.ca/OMAF/english/crops/field/soybeans.html#soyinsects>

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