



# Soybean Aphid Establishment in Georgia

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The soybean aphid, *Aphis glycines* Matsumura, has become a major new invasive pest species in North America. It was first detected on Wisconsin soybeans during the summer of 2000. By the end of the 2001 growing season, soybean aphid populations were observed from New York westward to Ontario, Canada, the Dakotas, Nebraska and Kansas and southward to Missouri, Kentucky and Virginia. By 2009 it had been detected in most of the soybean-producing states in the U.S. On September 10 and October 1, 2002, during monthly field sampling of soybeans at the Georgia Mountain Research and Education Center in Blairsville, Ga., several small colonies of soybean aphids (eight to 10 aphids per leaf) were collected. Aphid identification was verified by Susan Halbert, Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville, Fla. Soybean aphids have been observed on soybeans in Union County, Ga., (Blairsville) every year since 2002 and in several other Georgia counties in recent years.

The presence of soybean aphids in Georgia represents a new state record for this invasive soybean pest that is being regulated through USDA/APHIS personnel. The source of the initial aphid infestation in North America is not known. This pest is native to China but has spread along the western Pacific and has been reported from Korea to the Philippines. In early 2000, the soybean aphid also was introduced into New South Wales and Queensland, Australia.

## Biology

The soybean aphid has a complex life cycle that uses both buckthorn, *Rhamnus* spp., and soybean, *Glycine max* (L.) Merrill. These aphids survive from fall to spring as overwintering eggs exclusively on buckthorn. Buckthorn is a woody shrub or small tree that is found in forests and is also used as an ornamental. Buckthorn tends to be more common on upland, often rocky woodland sites as an understory tree. This could be a limiting factor for soybean aphid establishment in central and southern Georgia, where buckthorn is not common due to the clay and sandy soils and hot summer temperatures.

The eggs hatch in the spring, producing winged female aphids that migrate to soybean fields and produce live young (nymphs) through parthenogenesis (reproduction by direct

growth of egg-cells without male fertilization). Several generations of both winged and wingless female aphids are produced on soybeans during the summer. As soybeans begin to mature, both male and female winged aphids are produced. They migrate back to buckthorn where they mate and the females lay the overwintering eggs, thus starting the annual cycle all over again.



**Photo 1.** Colony of soybean aphids on a soybean leaf. (David Ragsdale, U. Minn.)

Adults are small (1/16 inch), soft bodied and a yellow-green color. Winged adults have a black head and thorax. In late summer in Georgia, adults are often white in color and even smaller than normal (dwarfs). Nymphs look like small adults. When present on buckthorn, eggs are tiny and green or black in color.

## Damage Potential

The soybean aphid feeds primarily on soybean, although some other legumes are possible hosts, including kudzu and green beans. These aphids feed by sucking plant sap from the leaves (Photo 1), stems (Photo 2) and pods. They are most commonly observed on the undersides of soybean leaves in the middle part of the plant canopy or along the soybean stem. Heavy infestations have been reported to cause leaf yellowing and curling, plant stunting, poor pod fill and reduced yields. Honeydew, a sticky substance secreted by aphids, and sooty mold growing on the honeydew are commonly observed on soybean foliage that is heavily infested with soybean aphids. Yield losses exceeding 25 percent have been reported in the upper Midwestern states when infestations exceed 250 aphids per plant. In September 2009, more than 200 aphids per plant were observed on some soybean cultivars in Georgia. These aphids are also

known to vector a number of plant virus diseases, including soybean mosaic. Soybean mosaic can cause economic losses to soybean throughout the United States due to reduced yields and seed quality.

## Identification

The soybean aphid is pear shaped and has dark tips on the cornicles (two tube-like structures on the abdomen). The cauda or tail end of the abdomen is pale and narrow with four to five pairs of setae or hair-like structures (Figure 1), and the antennae have six segments.

Another aphid species found on legumes that might be confused with the soybean aphid is the cotton aphid, also called the melon aphid, *Aphis gossypii* Glover (Figure 1). The cotton aphid is also a small, pear-shaped aphid, with adults measuring 1/16 inch in length. The cotton aphid has a broad cauda, usually with two pairs of strongly curved setae and five-segmented antennae. Cotton aphids are usually a yellow or yellow-green color when on cotton and soybeans, but can be light green mottled with dark green, pale green and even dark green in color, especially when on melons. Cornicles are all pale (cotton) or all dark (melons) compared to only dark tips on the soybean aphid (Figure 1).



**Photo 2.** Colony of soybean aphids on a leaf petiole. (D. Tuckey, VPI)

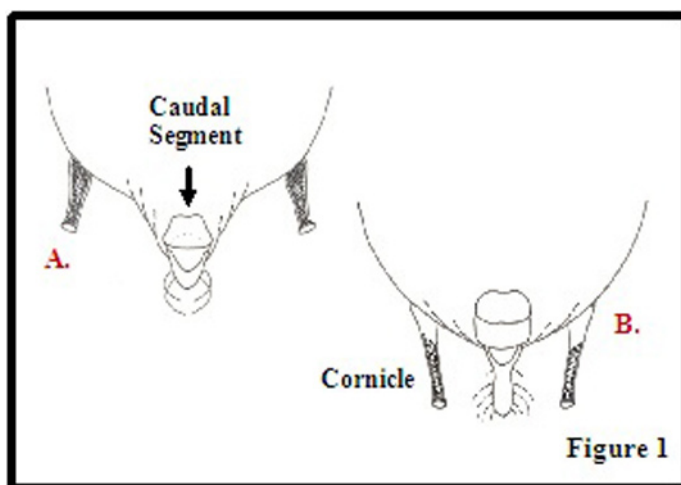
## Biological Control

It has been reported that soybean aphid-infested fields in the Midwest have large numbers of beneficial biological control organisms. Lady beetles, lacewings and syrphid fly larvae are the most abundant predatory insects observed in the aphid-infested fields. All of these species are very common in Georgia row crops. Parasitic wasps and fungal pathogens also

have been observed controlling the soybean aphid, causing dramatic reductions in aphid numbers. Parasites and fungi are also very abundant throughout Georgia; thus, the complex of biological control agents may be very beneficial in maintaining soybean aphid densities below economically damaging levels in Georgia soybeans.

## Future Implications

As with all invasive pests, the full impact of this new soybean pest will not be known for several years, but recent studies in the upper Midwestern states indicate that soybean aphids cause economic losses to the crop. Many entomologists throughout the Midwestern and eastern United States are conducting extensive research on this immigrant pest's biology, overwintering, dispersal, damage potential and management tactics. Results from these studies will provide soybean producers with the information needed to limit the economic impact of this new pest on the production and quality of the North American soybean crop.



**Figure 1.** Caudal segment and cornicles of the cotton aphid (A) and soybean aphid (B). (Angelika P. Schmid-Riley.)

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