

National Pest Alert

Soybean Aphid

Aphis glycines Matsumura

Distribution of Soybean Aphid in North America

The presence of the soybean aphid has been confirmed in Delaware, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New York, North Dakota, Ohio, Pennsylvania, South Dakota, Tennessee, West Virginia, and Wisconsin and in the Canadian provinces of Quebec, Ontario, and Manitoba.

Origin of Soybean Aphid

The soybean aphid is a native of China and Japan, as is its host plant, soybean. It is found from the Philippines to Korea and recently has been found in Australia.

Description of Soybean Aphid

The soybean aphid is a small, yellow aphid with distinct black cornicles ("tailpipes" on the tip of the abdomen). This aphid can be found on stem apices and young leaves of growing soybean plants, and on the undersides of leaves of mature plants. Because there are no other aphid species that develop colonies on soybean in North America, it is safe to assume that colonies of tiny yellow aphids on soybean are indeed the soybean aphid. Several other aphid species feed on soybean, but they are migratory and do not colonize soybean.

Life Cycle

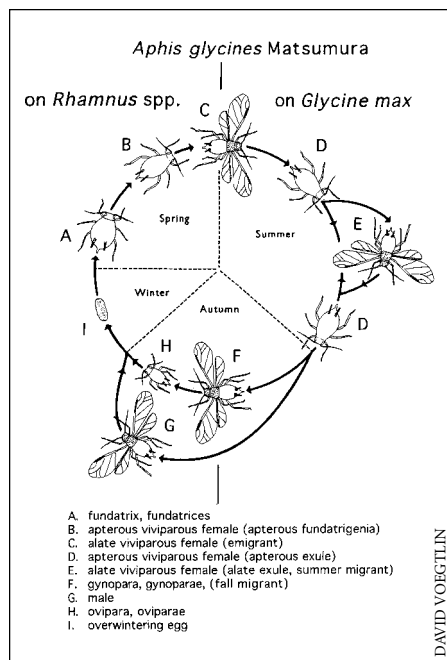
The soybean aphid has a complex life cycle with as many as 15 to 18 generations annually. Two very different types of host plants are required by the soybean aphid to complete its life cycle. Winter survival is by overwintering eggs on species of *Rhamnus* (buckthorn). Nymphs hatch in the spring

and after two generations of wingless females, a generation of winged females is produced that migrates from buckthorn in search of soybean. On soybean, the summer is spent in a repeated series of wingless generations followed by a winged generation that disperses from its crowded hosts in search of other soybean plants. In the fall, there is a migration back to buckthorn by winged females that produce a generation of egg-laying wingless females. Males develop on soybean and search for buckthorn and mate with the wingless females, which lay the overwintering eggs along side the buds on buckthorn twigs.



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Wingless adults and nymphs of *Aphis glycines* on the underside of a soybean leaf.



Of the several species of *Rhamnus* found in North America, only *R. davurica* and *R. cathartica* have been shown to be acceptable winter hosts. Both of these species are exotic and tests have not yet been conducted to see whether any of the other introduced or native species of *Rhamnus* are acceptable winter hosts for the soybean aphid. The only confirmed summer host in North America is *Glycine max*, the cultivated soybean. Based on literature from Asian countries, legumes such as *Desmodium* spp. (tick clovers, many native species) and

Diagram of life cycle of *Aphis glycines* including the names of its various seasonal forms.

Pueraria spp. (kudzu, exotic) may prove to be acceptable hosts. There are no literature records of this species living on cultivated beans (*Phaseolus vulgaris*).

Plant Symptoms

Aphid infestations that peak at the R1–R2 growth stage of the host may cause stunted plants with reduced pod and seed counts, resulting in lower yields. Leaves may express symptoms of distortion. Later in the growing season, heavily infested plants may have distorted and yellowed leaves. Charcoal-colored residue on stems, leaves, and pods is sooty mold that grows on honeydew, a by-product excreted by aphids.

The soybean aphid is capable of transmitting a number of viruses present in the United States that naturally infect soybean, including alfalfa mosaic, soybean mosaic, bean yellow mosaic, peanut mottle, peanut stunt, and peanut stripe. Transmission of these viruses by the soybean aphid has not been documented in the United States. Viruses cause various symptoms, including mosaic and mottling of leaves (mixture of chlorotic and green leaf tissue), leaf distortion, reduced pod number, and deformed pods, and discolored seed. It is not possible to prevent the spread of these viruses by controlling aphids with insecticides.

Monitoring Soybean Fields

It is not known when the soybean aphid will begin its migration from buckthorn to soybean in a midwestern environment. Soybean should be monitored at specific growth stages rather than calendar date. Growth stages differ by planting date and other factors that affect soybean development. Soybean aphid populations build and peak during the period between late seedling stage (V2, two fully expanded trifoliolate leaves) to blooming stage (R1–R2) of soybean. Colonies concentrate on new terminal trifoliolate leaves and new leaves on side branches. In late July, the top growing point of soybean stops growing and the aphids move from the top of the plant to middle or lower areas of the canopy to the undersides of soybean leaves, petioles, and pods. At this time of the year, soybean aphids are much smaller and more yellow than forms found earlier in the growing season. From late August to early September the aphid colonies begin to multiply rapidly again. Honeydew and sooty mold on all plants stages is evidence of soybean aphid presence.

Control Recommendations

A combination of natural enemies, including lacewings (Chrysopidae), multicolored Asian lady beetle (*Harmonia axyridis*), minute pirate bug (*Orius tristicolor*), syrphid spp., parasitic wasps, and fungal pathogens have been observed in soybean fields

colonized by the soybean aphid. Aphids killed by fungal pathogens are brown to reddish brown and usually are found on the undersides of leaves. The importance of natural enemies is still being evaluated and their presence should be considered when determining if chemical controls should be applied. Contact your local extension office for control recommendations for your state.

(right) Eggs of *Aphis glycines* on *Rhamnus cathartica*.

(below) Winged and wingless adults and nymphs of *Aphis glycines* on soybean leaf.



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Rhamnus cathartica, the overwintering host of *Aphis glycines*.

For more information on soybean aphid, visit our Web site at <http://www.ncpmc.org/NewsAlerts/soybeanaphid.html>

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