

# Stay alert for Soybean Aphid



## A formidable foe

You should know that:

- Every soybean aphid in a soybean field is female and pregnant.
- A single soybean aphid produces up to eight offspring each day.
- A soybean aphid can produce offspring daily for 10 to 20 days.
- Soybean aphids can produce 15 to 18 generations per year.
- Soybean aphid numbers can double in 72 hours in ideal conditions.

## Strategies toward management

Armed with new tools and proven strategies, soybean farmers are winning the battle against the soybean aphid (*Aphis glycines*). Over the past decade, the soybean aphid has proven to be an adaptable, formidable pest; severe infestations can reduce yields by as much as 40 percent.

The direct damage caused by high numbers of aphids sucking out plant sugars is amplified by the proliferation of sooty mold which grows on honeydew excreted by aphids and blocks photosynthesis. Insecticide costs and the time required to manage this pest chip away further at profitability.

Fortunately, more than a decade of highly focused soybean checkoff funded research has yielded tools that can help diminish the impact of the soybean aphid, including:

- A better understanding of the aphid's life cycle and behavior;
- Field-proven management strategies using insecticides; and,
- New soybean varieties with yield-saving natural genetic resistance, sometimes called host plant resistance.

Vigilance and realistic expectations of how well host plant resistance works in the field are the keys to staying ahead of aphids.

## Host plant resistance

Several seed companies have released soybean varieties with host plant resistance to aphids. Many varieties feature the non-genetically engineered *Rag1* or *Rag2* traits.

Aphid-resistant soybean varieties, containing the *Rag1* or *Rag2* traits, suppress aphid growth and reproduction on the plant, causing soybean aphid populations to increase more slowly compared to growth on susceptible varieties. This type of resistance is called antibiosis. During outbreaks, aphid-resistant varieties can yield more than susceptible varieties even without the use of insecticides.

Resistant plants will have fewer aphids compared to susceptible plants, but will not be aphid-free. Farmers should regularly scout fields to determine aphid population densities.

The most important thing about host plant resistance, notes Kelley Tilmon at South Dakota State University, is not expecting too much from it. "It's not a silver bullet, because you can get high enough populations, in *Rag1* anyway, to cause economic damage," she says.

Resistant varieties can fit into soybean aphid management plans by allowing growers to buy time, staving off insecticide applications for weeks, or even for the whole season, adds Chris DiFonzo at Michigan State University.



Soybeans with the *Rag1* or *Rag2* genes will not be aphid-free.



▲ Iowa State University Extension field demonstrations showcase new management tools like aphid-resistant soybeans. Aphid-resistant soybeans are not a silver bullet, but one of a number of promising management tools.



▲ Scouting and knowing what is going on in your fields is the first step in recognizing an aphid problem.

*This fact sheet was prepared under the supervision of Drs. Erin Hodgson and Matt O'Neal, Iowa State University. Photos courtesy of Iowa State University.*

## Population variation

Soybean aphid populations are highly variable. Populations exceeding 1,000 aphids per plant are common, while populations in nearby fields can be smaller and very patchy. Aphid populations are also highly variable from year to year. For example, approximately 2.9 million acres in Iowa were sprayed with insecticides in 2003 to reduce aphid populations. In contrast, only 50,000 acres were treated for soybean aphid in 2004.

Predicting aphid outbreaks has proven difficult. One way to predict if aphid will be problematic in any particular year is by monitoring winged soybean aphids as they fly between soybean fields during the summer and to buckthorn in the early fall. A suction trap network across the Midwest is used to monitor winged aphids ([www.ncipmc.org/traps/](http://www.ncipmc.org/traps/)). Suction traps help estimate overwintering population densities, providing insight into yearly population variation. However, other factors may influence whether any particular year or location will have an outbreak of soybean aphid.

## Managing soybean aphids

Optimal soybean aphid control and yield protection includes using the appropriate insecticides, applying them properly and applying them at the right time, notes Erin Hodgson at Iowa State University. Foliar insecticide applications should manage more than 98 percent of the aphids.

The economic threshold is the smallest number of insects at which a management action should be taken to prevent an increasing pest population from reaching the economic injury level. The economic threshold for soybean aphid is 250 aphids per plant with increasing aphid populations. Regular sampling is necessary to determine whether populations are increasing or decreasing within a field. This threshold applies until fields reach the R5.5 growth stage, when seeds are expanding in the pod. The economic threshold should provide a seven-day lead time before the aphid population is expected to exceed the economic injury level and cause economic damage.

High spray volume (15 to 20 gallons per acre for ground applications and 3 to 5 gallons per acre for aerial applications) and droplet size have the greatest impact on coverage. Choose a nozzle that produces medium to fine droplet sizes of 350- to 200-microns at the appropriate ground speed, pressure and spray volume.

Success starts with staying alert, says Tilmon in South Dakota. "In my experience, this is just a very unpredictable pest," she says. "Scouting is the key—knowing what's going on in your fields is the best defense you have."

*For more information on managing the soybean aphid review the Soybean Aphid Field Guide, from Iowa State University and the Iowa Soybean Association.*



*Insecticides and fungicides require smaller droplet size than herbicides and thorough coverage for best results.*

