



# SOYBEAN FACTS

Updated June 2011

## Soybean Aphid Management in Michigan

Published by the Michigan Soybean office based on information provided by C.D. DiFonzo, Entomology Dept, Michigan State University

### HISTORY OF SOYBEAN APHID (SBA) IN THE U.S.

- ✓ Native to Asia; Discovered in North America (and Michigan) in 2000
- ✓ Now widely distributed from the Dakotas to New Jersey, and Canada south to Georgia
- ✓ Outbreaks (sprayable populations) occurred in 2000, 2001, 2003, 2005, and 2007 in many parts of the Midwest

### LIFECYCLE

SBA overwinters as eggs on buckthorn, an introduced invasive shrub, commonly found in treelines and right-of-ways in Michigan. In the spring, eggs hatch into female aphids, which reproduce for several generations on buckthorn. With each generation, a portion of the adult aphid population is winged. The winged adults leave buckthorn to find their summer host, soybean. By the third generation, most or all of the SBA have left buckthorn.

The first aphids leaving buckthorn probably do not find soybean, and many of these first migrants die. But as the season progresses, aphids find fields to colonize. In parts of Michigan where buckthorn is common (for example, SE & central MI) SBA may colonize VI plants that are just emerging.

Areas lacking buckthorn (for example, SW MI) are colonized later. The SBA colonizing these fields are produced in soybean fields in June, perhaps many miles away. Aphids may even be carried on weather fronts from other states. In any case, any soybean field in the state of Michigan is potentially at risk from SBA by mid to late July.

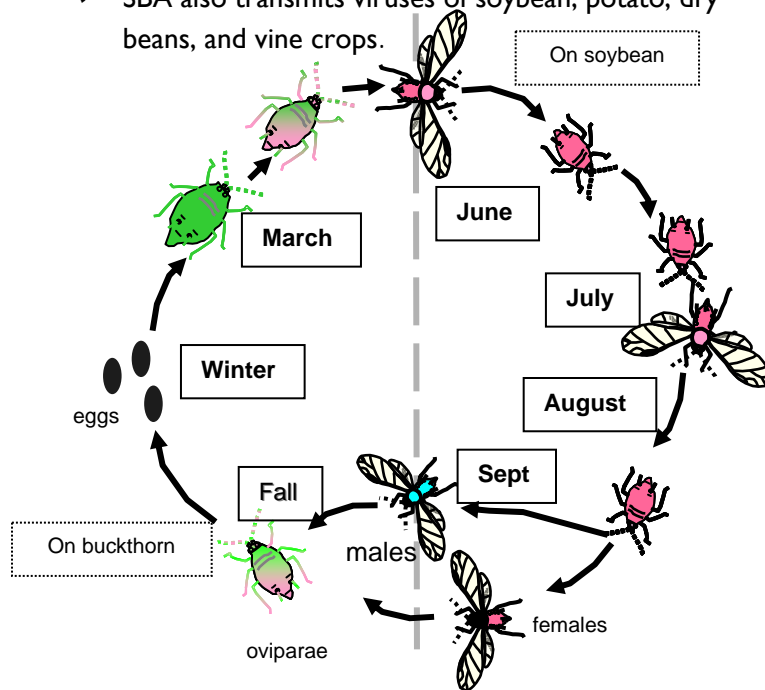
### IMPACT ON SOYBEAN

Once aphids colonize soybean, populations may increase rapidly under favorable conditions.

- ✓ SBA sucks plant sap; there may be thousands of aphids per plant during outbreaks
- ✓ Honeydew secreted by SBA coats leaves & promotes growth of black sooty mold on leaves
- ✓ Many aspects of plant growth are affected by SBA feeding, depending on aphid number, plant stage, and the timing of infestation:

- Shorter plants with fewer nodes
- Fewer flowers & pods per plant
- Fewer beans per pod
- Smaller bean size
- Change in oil or protein content

- ✓ SBA also transmits viruses of soybean, potato, dry beans, and vine crops.



## SCOUTING

Begin in late June or the first week of July in SE/ central MI. You may have to visit fields several times in July to determine if aphid numbers are increasing towards the threshold. If you have limited time, continue to check untreated fields in favor of revisiting treated fields. Examine whole plants, as aphids prefer different parts of the plant depending on plant stage.

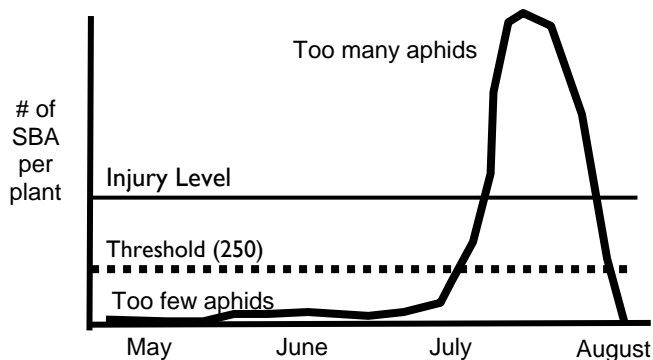
Pay special attention to:

- ✓ fields in areas with heavy buckthorn growth (may be colonized early in the season)
- ✓ late-planted fields (often have higher aphid populations later in the season)
- ✓ fields planted in potassium deficient soils (aphid populations are higher under these conditions)

## SOYBEAN APHID MANAGEMENT

**Natural Control** – There are many predators that eat SBA, as well as fungi that infect and kill aphids under warm, wet conditions. Although in some years aphid outbreaks occur, in other years (such as 2006 to 2010 in Michigan) SBA numbers were held in check primarily by natural biological controls.

**Use a threshold** – University research across multiple states, years, and varieties shows spray applications should be targeted when aphids reach 250 per plant, and populations are actively *increasing*. You have 5 to 7 days to make an application before aphid numbers reach the injury level of 660 per plant, where actual economic yield loss occurs. In practical terms, populations are at or near threshold when at least 90% of plants are infested, and the new growth is covered with aphids.



The bar graph at the right shows why it is important to treat aphids at threshold. Plots sprayed on threshold (July 28) had the best yield compared to an untreated check. Plots sprayed later (August 4th or 11th) when aphid numbers were high had lower yield due to aphid damage. Plots sprayed too early before the population reached the threshold (July 8 or 21) also suffered yield loss. Natural enemies were killed and residual from the early application already broke down, so SBA populations rebounded quickly after spraying. In practical terms, fields sprayed too early often must be treated again, or risk yield loss.

**Choosing an insecticide** – There are many foliar insecticides registered for aphid control (see MSU Bulletin E-1582, “Insect, Nematode and Disease Control in Michigan Field Crops” for a complete list). All are restricted use pesticides. Most pyrethroids have long residual control, 10-14 days or more depending on environmental conditions. However, excellent control depends on excellent coverage. Pyrethroids also kill beneficial insects for days after application. Lorsban has a shorter residual (less than a week), but exhibits a ‘fuming’ action under hot conditions, so control may reach nearly 100%. Several seed treatments are also registered for aphid control. However they begin to lose effectiveness 35-40 days after planting and are thus recommended only where other early-season pests (such as grubs or bean leaf beetle) are a problem.

### Improving insecticide performance

The bottom line is that many insecticides will do a good job controlling aphids, as long as timing and coverage are optimal. The goal is to deliver insecticide to all aphid-infested surfaces. To improve coverage:

- ✓ Use a minimum of 20 gallons per acre and increase spray pressure
- ✓ Use nozzles designed for insecticide or fungicide application, not herbicide application
- ✓ To minimize crop damage from driving over soybeans, plant in 30-inch rows or leave skip-rows in drilled beans.

Common foliar-applied insecticides			PHI
Trade name	Type	Rate/acre	(days)
Asana XL	Pyrethroid	5.8 oz	21
Baythroid 2	Pyrethroid	2.8 oz	30
Chlorpyrifos 4E	OP	1 pint	28
Lorsban 4E	OP	1 pint	28
Mustang Max	Pyrethroid	4 oz	21
Proaxis	Pyrethroid	3.2 oz	30
Warrior	Pyrethroid	3.2 oz	30

Yield, bu/acre, Sanilac County MI, 2005.

