



Insects and Mites

Soybean aphids exceed the economic threshold in northeast Iowa

by Marlin E. Rice and Matt O'Neal, Department of Entomology

The soybean aphid population at the research site in northeastern Iowa near Decorah exceeded the economic threshold of 250 aphids per plant the first week in July. According to information provided by Brian Lang, extension field agronomist, the population jumped from 30 per plant on June 28 with 95 percent of the plants infested to 405 per plant on July 5 and 100 percent of the plants infested. The population trend is not as great as the outbreak year of 2003, but it certainly is tracking to be a bigger aphid year than in 2005 (Table 1).

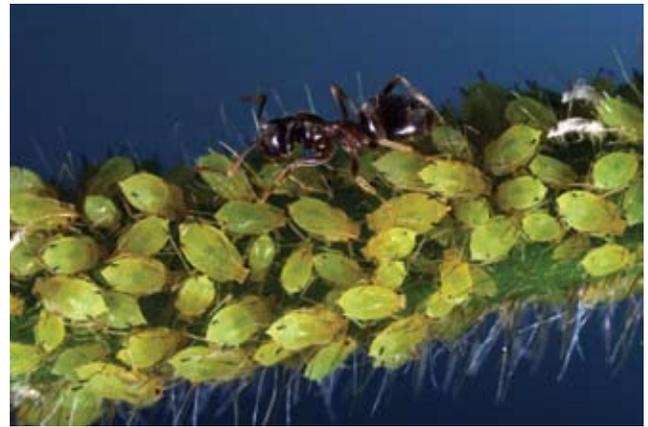
Table 1. Soybean aphid population trends, Decorah, 2002–2007 (ISU Extension Soybean Aphid Research Site).

| Date | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---------|-----------------------------|------|------|------|------|------|
| | ----- Infestation (%) ----- | | | | | |
| June 1 | — | — | 0 | 6 | 0 | 2 |
| June 7 | — | — | 0 | 15 | 2 | 23 |
| June 14 | — | 40 | 0 | 33 | 6 | 56 |
| June 21 | 7 | 90 | 0 | 31 | 12 | 59 |
| June 28 | 15 | 100 | 0 | 85 | 13 | 95 |
| July 5 | 70 | 100 | 4 | 99 | 24 | 100 |
| July 12 | 93 | 100 | 8 | 100 | 71 | |

| Date | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---------|--------------------------|-------|------|------|------|------|
| | ----- Aphids/Plant ----- | | | | | |
| June 1 | — | — | 0 | 0.1 | 0 | 0.1 |
| June 7 | — | — | 0 | 1.4 | 0.4 | 3.4 |
| June 14 | — | 10 | 0 | 2.5 | 0.3 | 5.8 |
| June 21 | 1 | 115 | 0 | 4.0 | 0.8 | 6.6 |
| June 28 | 2 | 341 | 0 | 48 | 0.7 | 30 |
| July 5 | 14 | 745 | 0.5 | 179 | 1.8 | 405 |
| July 12 | 25 | 2,803 | 1 | 713 | 6.6 | |

Now is the time to start scouting soybean fields for aphids, but at the same time, it is critical to understand several important factors regarding insect pest management: economic thresholds and scouting.

Economic thresholds. Two concepts are very important in integrated pest management for understanding pest and yield loss relationships. These are the economic injury level and the economic threshold. The economic injury level is the lowest population of insects that will cause economic damage, i.e., yield loss that equals the cost of control. In 2003, a preliminary economic injury level of 1,000 aphids per plant was



Soybean aphids and an ant on a soybean stem. (Marlin E. Rice)



Look for the multicolored Asian lady beetle, a major predator of soybean aphids. (Marlin E. Rice)

reported based on research from the University of Minnesota. Since then, data from additional states, including Iowa, have refined both with the economic injury level at 654 aphids per plant during the R1–R5 growth stages for 30-inch-row soybeans.

The economic threshold is a similar concept, but it is the pest density at which management action should be taken to prevent an increasing pest population from reaching the economic injury level. Based on data from multiple states over several years, the suggested economic threshold is approximately 250 aphids per plant.

The economic threshold of 250 aphids per plant and increasing in size is the number that should be used to justify an insecticide application to a soybean field. This economic threshold incorporates a 5- to 7-day lead time before the aphid population would be expected to pass

the economic injury level—and cause economic damage. Populations that average less than 250 aphids per plant should not be sprayed; there is little to no evidence that populations below 250 aphids result in yield loss. Fields with small aphid populations should be scouted every 2–3 days to determine if they reach the economic threshold. Heavy rains and beneficial insects may reduce low or moderate populations. Insecticides are most likely the only option for control once the population reaches the economic threshold. Control aphid populations before the symptoms of heavy honeydew, sooty mold, and stunted plants appear in the field. An insecticide may still be of value after these conditions occur, but the optimum time for treatment has passed. The benefit of any insecticide application is reduced after soybeans reach the R5.5 growth stage.

Field scouting. It is imperative that field scouting be conducted to determine if aphid populations are reaching the economic threshold. Begin scouting for soybean aphids now if you have not already done so, especially in northeastern Iowa. Check the upper two or three trifoliolate leaves and stem for aphids first. Aphids are most likely to concentrate in the plant terminal early in the growing season. Scout five

locations per 20 acres. Also, look for ants or lady beetles on the soybean plant—they are good indicators of the presence of aphids. Lady beetles feed on aphids while ants tend the aphids and “milk” them for honeydew. Regular field scouting should occur weekly until plants reach the mid-seed stage (R5.5) or the field is sprayed.

Speed scouting. When aphids are found, estimate the population size per plant. Count all the aphids on several leaves and plant terminal to establish what 100 or 250 aphids look like and then use this as a mental reference for gauging populations on other plants. A quicker scouting method, called speed scouting, has been developed at the University of Minnesota. See www.soybeans.umn.edu/crop/insects/aphid/aphid_sampling.htm regarding how to employ speed scouting—including a training video game. Speed scouting uses the number of infested plants (40 or more aphids per plant = an infested plant) as a guide for determining whether an insecticide application is justified. This is not a new threshold but rather a sampling tool that helps determine if the soybean aphid population within a field is above the 250 aphid per plant threshold.

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Crop Production

Too early to harvest dry corn for early silage, but do consider nitrate accumulation risks

by Stephen K. Barnhart, Department of Agronomy

When the weather turns dry and the corn leaves begin to roll from heat and moisture stress, producers sometimes begin to think about “salvaging” the crop as an early silage harvest. Conditions probably don’t merit that drastic decision yet.

It is not, however, too early to consider elevated levels of nitrate in harvested grass forages. Plants (usually grasses and some broadleaf weeds) will continue to take up soil nitrate during drought and stress periods but not metabolize it into protein and normal plant constituents. The accumulation of nitrate is not damaging to the plant but can be a physiological

risk to livestock that eat it. Nitrates are often of concern in drought-stressed corn being harvested early as silage but also can be a risk in small grains and emergency warm-season annual forage grasses being grazed or harvested during moisture deficit periods. The standing crop can be sampled and tested for nitrate concentration. Nitrate levels do not diminish when cut and stored as dry hay but can be significantly lower following ensiling. If there are concerns about high nitrate levels in forage crops, contact your forage-testing lab for sampling instructions and have the forage tested before feeding.

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