Biological Control of Soybean Aphid

The 2003 growing season left no doubt that the soybean aphid is capable of causing major yield reductions. Many producers across the Midwest resorted to aerial applications of insecticide; others suffered rather than resort to pesticides. Are those the only two choices? With Leopold Center support, ISU entomologist Junwei Zhu is working with PFI to investigate biological controls for the aphid.

Biological control uses natural predators or parsasites of the aphid. There are lots of them, too, including lady beetles, lacewings, syrphid flies, some tiny wasps, and something called the aphid midge. But the aphids have an unfair advantage. They can go into a rapid multiplication phase in which females produce young aphids asexually (without male aphids). Once aphid numbers start multiplying like this, the beneficial insect populations can't keep up without help.

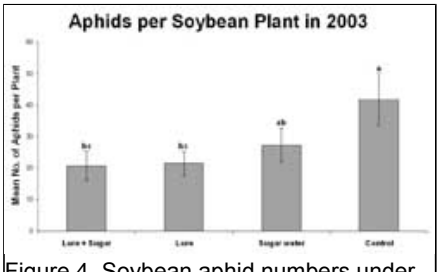

Figure 4. Soybean aphid numbers under three alternative treatments in 2003.

One strategy involves sounding the alarm ahead of the outbreak. In 2003, Dr. Zhu tested two ways to attract beneficial insects. The first method was spraying sugar water on the soybeans. Sugar water is like the "honeydew" that aphids excrete when they feed on the soybean, and this is a signal to the beneficial insects that aphids are present. As Fig. 4 indicates, the sugar water treatment was associated with a modest reduction in the number of aphids.

The second method for attracting beneficial insects was to use a lure that emits the same compounds that plants give off when they are attacked by the aphid. Fig. 4 shows that the lure reduced aphid numbers even more than the sugar water, and Fig. 5 shows that soybean pod weight was significantly increased by use of the lure. Using sugar water along with the lure brought no additional advantage.

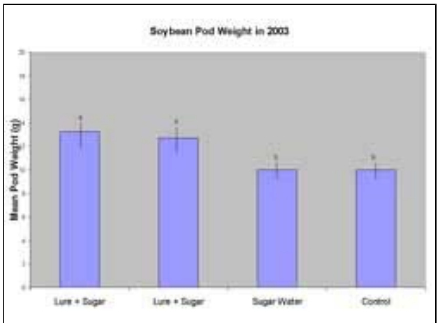

Figure 5. Effect of alternative aphid treatments on soybean pod weight in 2003.

These strategies are likely to be more effective where the farm provides a diversity of habitats for the beneficial insects. But it's still tough to stay ahead of the aphid explosion. So in 2004, Junwei Zhu is working with PFI farms to test a three-part program of biological control. The summer part is use of the lures for beneficial insects. But that is preceded by spring trapping of the winged female aphids and followed by fall trapping of winged aphids in order to make it harder for the aphid population to get to the explosive phase in the summertime. The field day July 21, 2004, near Decorah will demonstrate these and other options in development against the soybean aphid.