

Beneficial Insects: It's Not All Rosy For The Soybean Aphid

DR. DOUGLAS B. JONES

MT. VERNON, ILL.



The soybean aphid (*Aphis glycines*) has been a pest of soybeans in the United States since the summer of 2000. This "millennium bug" can surge to large populations in a relatively short time by asexual reproduction (cloning). They feed by inserting their straw-like stylets (mouth parts) into the phloem of the plant, sucking essential plant nutrients while simultaneously injecting salivary secretions. The soybean plant suffers because photosynthetic material and other plant resources are lost to the aphid. Plant metabolism is further altered by salivary components that make the plant juices more nutritious for the feeding aphid. All of these actions reduce plant vigor and resources that ultimately result in lower yields.

When the soybean aphid appeared in North America, it found favorable environmental conditions, large quantities of its preferred host plants (namely soybeans and wild buckthorn), and few natural enemies. Because of these favorable factors, some soybean fields were reported to have as many as 5,000 aphids per plant, with yield losses over 50 to 60 percent.

However, life is becoming more difficult for the soybean aphid. Native predators such as pirate bugs, green and brown lacewings, many lady beetle species, and a few generalist Hymenopteran parasitoids have been picking up the slack.

While they are tiny (~ 3mm long), minute and insidious, pirate bugs, *Orius* spp., are some of the most effective native predators of the soybean aphid. Through an irony of nature, adults and juvenile pirate bugs turn the tables by inserting their straw-like stylets into the aphids and suck them dry of bodily fluids. Pirate bugs are able to reproduce quickly when there is sufficient food (soybean aphids) and have been observed to suppress soybean aphid populations below economic injury levels (the population level above which yield losses will surpass control expenses).

Immature green and brown lacewings are generalist predators that often feed on aphids. Termed aphid lions, they attack aphids with

their sickle-like jaws and suck the aphids dry by extracting the aphid's bodily fluids using an open tube that extends through the middle of each jaw. Adults do not feed. Their eggs are easily recognized because they are laid on the end of a long stalk that holds the egg high above the plant leaf.

Lady beetles are also generalist predators. Immature and adults both feed on aphids and other small insects. These predators feed by simply grinding aphids up using their strong jaws and leaving nothing behind.

More recently, in a classical biological control effort, an exotic parasitoid, *Binodoxys communis* (a parasitic wasp) has been imported from parts of Asia and released in several states. Parasitoids like *B. communis* are not considered predators, though they do eat aphids. The difference is that each wasp must consume only one aphid in order to complete its life cycle. A female wasp lays an egg into an aphid. The egg hatches and grows inside the aphid for a few days. When it has reached a certain point of development, it kills the aphid, cuts a hole in the aphid, and attaches the aphid to the plant with silk. Then it twists, turns and pushes the aphid's skin outward into a round ball. Now called a "mummy," the wasp larva pupates inside the aphid and upon completion of its development, emerges as an adult to repeat the cycle.

Research about these beneficial insects and their utility for control of soybean aphids is but one of many managed research areas of the National Soybean Research Laboratory. For 2008, research is being funded to examine soybean cultivars that exhibit resistance to soybean aphids. Additionally, effects of seed-applied insecticides for control of soybean aphids and their impacts on these natural enemies are being assessed.

Finally, monitoring will be conducted to help determine if the parasitic wasp, *Binodoxys communis*, has become established after its release in 2007. Visit the National Soybean Research Laboratory website, www.nsrl.uiuc.edu, to discover more. Δ

Dr. Douglas B. Jones Ph.D., is Extension Specialist, Integrated Pest Management with the University of Illinois at the Mt. Vernon Extension Center.