



**N**ot every gourmet experience turns out well. One that turned out especially rotten supposedly involved a tourist buying edamame in China, carrying it back to the United States, noticing bugs in the Asian delicacy, and tossing the edamame into trash near Chicago's O'Hare airport. The bugs were soybean aphids, and thus began their spread into Midwest soybean fields. Only the rapid response from a team of field-based Extension educators, campus Extension specialists, University researchers, growers, crop consultants and other partners could help reduce the economic and environmental damage from these accidental tourists.

# Team Aphid packs a mighty punch

**The unbeatable power of University research, education and teamwork**

In Minnesota, Lisa Behnken, regional Extension educator, first learned soybean aphids were invading when a southeastern Minnesota farmer came up to her at a July 2001 field day and said, "I think I have that insect you were talking about on the radio." A few days later Extension entomologists Ken Ostlie and Dave Ragsdale and a team of University of Minnesota scientists confirmed the worst.

The situation was bleak. Soybean aphids have voracious appetites and reproduce at rates that put rabbits to shame. One 100-acre soybean field could produce 4.4 billion soybean aphids in a growing season. And in 2001, nobody in Minnesota knew beans about soybean aphids. "It was a very painful birth of a new problem," Behnken said. "Most of the research we had access to was written in Chinese, and some didn't apply to our situation. We had to kick it in high gear fast."

**Dave Ragsdale and Lisa Behnken are part of a team studying soybean aphids in the University's quarantine facility.**



Team Aphid's first job was to figure out how to kill the darned things. Spraying pesticide was the quick answer, but how much and when? Farmers and crop consultants worked with Extension and other University of Minnesota experts to develop recommendations. By 2002 a sophisticated University of Minnesota computer model combined weather information with agronomic and entomology expertise to guide growers. Ostlie estimated that in 2002 that model, combined with field scouting and Extension advice, saved growers \$200 million in crop losses and reduced pesticide needs. Since then, aphids have spread into new areas and research-based information has become even more important.

The Soybean Aphid Growth Estimator computer simulation that drives the model continues to evolve. Future versions will factor in temperature, rainfall, planting date, plant growth stage, variety, soil type and natural predators. "Growers can combine this computer prediction of aphid growth with real-time data observed with field scouting to do the right thing in the field at the right time," Ragsdale said.

Spraying is a short-term fix. Team Aphid's long-term goal: finding a way to enlist nature to destroy the aphids, reducing the need for synthetic pesticides.

In addition to interrupting the soybean aphid life cycle, researchers hope to develop soybeans that are less tasty to aphids. "Our goal is a multitactic approach that combines aphid-resistant plants, natural predators and informed spraying decisions," Ragsdale said.

The University of Minnesota soybean aphid response has attracted national recognition. But to Extension educators like Lisa Behnken it is all in a day's work.

"We shine when we pull together and work together as a team of field-based educators, state specialists and researchers to help producers make better decisions," Behnken said. "That's what we're best at doing."

For more information see [www.soybeans.umn.edu](http://www.soybeans.umn.edu)



Researchers observe soybean aphids and their natural predators, a stingless wasp, in U of M labs.

## While soybean aphids thrive in U.S. fields, they are tough to find in China.

Extension entomologist Dave Ragsdale knows why aphids don't thrive in Chinese soybean fields. "We imported the soybean aphid without its natural predator, the factor in nature that keeps it in check in China," Ragsdale said. That natural control is *Binodoxys communis*, a stingless wasp no bigger than the period at the end of this sentence. It lays its eggs inside soybean aphids; when the larva hatch, they eat the aphid's internal organs.

The soybean aphid solution isn't quite as simple as importing *Binodoxys communis* to the United States, says University entomologist George Heimpel. A foreign insect can cause more problems than it solves. Working deep inside the Insect Quarantine Facility on the St. Paul campus, Heimpel, Ragsdale and other scientists studied *B. communis* and found that it will not harm things other than soybean aphids and a few of its close relatives.

The United States Department of Agriculture and the North American Plant Protection Organization, an international governing board, are evaluating that research before approving release of the beneficial insect. If approval is received soon, the stingless wasp will be released on 30 small plots throughout Minnesota in 2007. Extension and campus researchers will work with farmers to see if the stingless wasps display the same soybean-aphid-killing prowess in Minnesota soybean fields as they do in China.

## Be prepared. Be very prepared.

Minnesota will be ready when the next soybean assassin hits. The unwelcome mat is being prepared for Asian soybean rust, a plant pathogen that has devastated South American fields and blown as far north as Illinois. The University of Minnesota, Minnesota soybean growers and the Minnesota Department of Agriculture are working as a team to prepare for soybean rust. The most visible part of this effort is the new Biosafety Level 3 Plant Pathology Research Facility on the St. Paul campus, where researchers will study plant pathogens before they reach Minnesota. Minnesota Soybean Growers Association took the lead in securing state funding for the \$5 million facility. Combined with the Insect Quarantine Facility, it gives the University plant-disease-fighting capabilities unmatched in the Midwest.

