

Pest-resistant soybeans grow out of MSU research lab

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Crop and Soil Sciences associate professor Dechun Wang inspects soybean plants. Photo by G.L. Kohuth

(PhysOrg.com) -- Two lines of pest-resistant soybean painstakingly developed by a Michigan State University scientist promise healthier harvests for growers and a little green for the university too.

“Sparta - the [Soybean Aphid](#) Shield” is the new trade name for genetics developed by Dechun Wang. The associate professor of crop and [soil science](#) tested some 2,000 strains of soybeans against aphids to isolate four with different resistant genes. From those he developed germplasm, or seeds to breed into varieties suited to Michigan’s shorter growing season.

“The final goal,” Wang said, “would be to have one variety that has all those resistant genes,” maximizing protection against different biotypes of aphids and perhaps other pests such as Japanese beetle.

Soybean aphids suck plant sap and secrete sticky honeydew that promotes sooty black mold, and when they sprout wings can transmit plant viruses widely. Fifteen generations of aphid can live on a [soybean plant](#) in the summer, with eggs overwintering on nearby buckthorn.

“In the field, we will inoculate a plant with just two aphids, and the entire plant will be totally covered by aphids in a few weeks,” Wang said. “It takes aphids just five days to produce more babies, and aphids are born pregnant, so the regeneration cycle is incredibly fast.”

Soybean has been cultivated in Asia for thousands of years, but in America only since 1904. It is chiefly processed here into animal feed and vegetable oil. Tiny soybean aphids, also native to Asia, were first identified in Wisconsin in 2000, but quickly cut a wide swath until beaten back mostly with [chemical pesticides](#). Unchecked, aphids can lay waste to half the output of a field, but one application of insecticide might add 10 percent to the cost of production - and kill beneficial insects as well.

“That really has been our only answer until this new host plant material,” said Keith Reinholt, field operations director for the Michigan Soybean Promotion Committee. His group invested about \$250,000 in grower assessment revenue since 2002 to fund Wang’s research, earning first claim on licensing rights after MSU patented the resistance technology.

The germplasm already is the subject of growing interest among seed companies, which will cross it with their own varieties. The grower board will earn royalties from sale of seed company varieties containing the trait. A portion of those will come back to MSU, which will in turn

distribute royalties to Wang, the College of Agriculture and Natural Resources and to the MSU Foundation.

“With one exception, all the major soybean genetics companies have licensed his germplasm because the level of resistance to soybean [aphids](#) is very high,” Department of Crop and Soil Sciences Chairperson James Kells said. “We’re very excited about this technology, and we see great potential for commercialization and impact on soybean growers in Michigan and the U.S.”

In addition to funding by growers, Wang's research is supported by the Michigan Agricultural Experiment Station.

Provided by Michigan State University

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