

Soybean Rust and Organic Soybean Production

The Iowa State University (ISU) Organic Ag Program has been asked to respond to the discovery of soybean rust in the U.S. (as of November 19, 2004, the disease has been reported from 5 states in the South) and how it relates to organic growers. Iowa has approximately 60,000 acres of organic soybeans and all growers are equally concerned about the prospect of rust appearing in Iowa in 2005.

Soybean rust (*Phakopsora pachyrhizi* / *P. meibomia*) is a very important exotic disease threatening commercial soybean production in the US. Environmental conditions in the US are expected to be very favorable for rust development. Experts have said that: "Should the disease be introduced into the US, it would likely spread throughout the main US soybean production area in one season."

The rust pathogen survives and reproduces only on live hosts. Soybean rust is not seed-borne, although spores could travel as contaminants in seed lots from infested areas. Urediniospores are very easily wind disseminated. **Soybean is susceptible at any growth stage but symptoms usually appear at or after flowering and show up on the lower leaves first. The pathogen prefers prolonged wet and cool conditions. Two types of foliar symptoms are produced: a) large tan lesions with abundant spore production and b) smaller red-brown lesions with fewer spores produced (see photos).**

Top of a soybean leaf infected with Asian Soybean Rust



Bottom of a soybean leaf infected with Asian Soybean Rust



Varietal screening done in quarantine by the USDA reveals that virtually all the existing commercially grown soybean cultivars are susceptible. Sources of resistance to the prevalent natural populations of soybean rust have been identified. **A number of different synthetic fungicides are known to be effective in rust management but organic management has not been sufficiently studied due to the absence of the disease in the US.**

Starting in 2005, all available organically-approved materials (copper, sulfur, hydrogen peroxide, and other naturally-based materials) will be tested for efficacy against soybean rust. Tests will be conducted with cooperator states where the disease has already been detected. The

chances of finding a material as effective as the already-identified synthetic fungicides is not good, however. Organic farmers, like conventional soybean farmers, will need to do a risk/benefit assessment and determine if economics favor spraying any materials if the disease is found in Iowa. ISU will determine costs of materials for organic producers and help in developing best methods for dealing with this disease if it is found in Iowa. Longer crop rotations and compost applications can assist with general disease management—the long-term effect of these strategies for soybean rust is not known at this time.

The early arrival in the U.S. from points south (South America and Africa) caught many by surprise. "The number of hurricanes and precipitation events this year increased the possibility of spore dispersal," X.B. Yang, plant pathologist at ISU, said. "Rain is a factor in the survival of spores. This hurricane season was a once-in-40-year event, which may help explain how soybean rust was blown into the United States this year."

Soybean rust may or may not find its way to Iowa organic soybean field next year. "Soybean rust will not overwinter in Iowa. We will have to wait for the spores to travel from the south every season. It's too early to make predictions, but we need to make predictions based on spring rust occurrence in the south and early summer weather systems, such as tropical storms, that may influence its travel," Yang said.

ISU has developed a rapid analysis system if you find a suspicious leaf. The fast track system was developed to speed up reporting of soybean rust. The system is simple: producers submit samples to first detectors at no cost. First detectors send suspect samples to triage personnel, who are Iowa State Extension field staff, for further diagnosis. The triage person then forwards suspect samples to the Iowa State University Plant Disease Clinic.

ISU is reacting to the threat of soybean rust with great speed. As part of the new effort, Iowa State will create two new faculty positions working on methods to combat soybean rust in the colleges of agriculture and liberal arts and sciences, as well as a postdoctoral scientist position. The Iowa Soybean Promotion Board will provide \$500,000 over three years to help fund salaries of the new faculty.

Extensive surveys of soybean and various legume hosts for Asian soybean rust will be carried out in Iowa, beginning in 2005.

Faculty already on board at ISU that you may call with questions:
Greg Tylka, Iowa State plant pathologist, (515) 294-1741, gltylka@iastate.edu.
Tylka coordinated training sessions for over 400 crop professionals during the summer.

Palle Pedersen, Iowa State agronomist, (515) 290-3212, palle@iastate.edu. Pedersen is Iowa State's extension expert on soybean issues.

Alison Robertson, Iowa State plant pathologist, (515) 294-1741, alisonr@iastate.edu. Robertson is an Iowa State extension plant pathologist.

X.B. Yang, Iowa State plant pathologist, is one of the leading experts in the world and is on his way to Louisiana as member of the USDA soybean rust detection assessment team.

The Organic Ag program will continue to provide updates as information is gained through USDA, ISU and other University sources. A soybean rust website has been established at <http://www.soybeanrust.info>. Other web-based information is contained at:

<http://www.ag.iastate.edu/aginfo/news/2004releases/rustreact.html>

<http://www.ag.iastate.edu/aginfo/news/2004releases/rusticanes.html>

<http://www.ag.iastate.edu/aginfo/news/2004releases/rustma.html>

Stay vigilant: learn the symptoms; and report any suspicious leaves as soon as you see them.