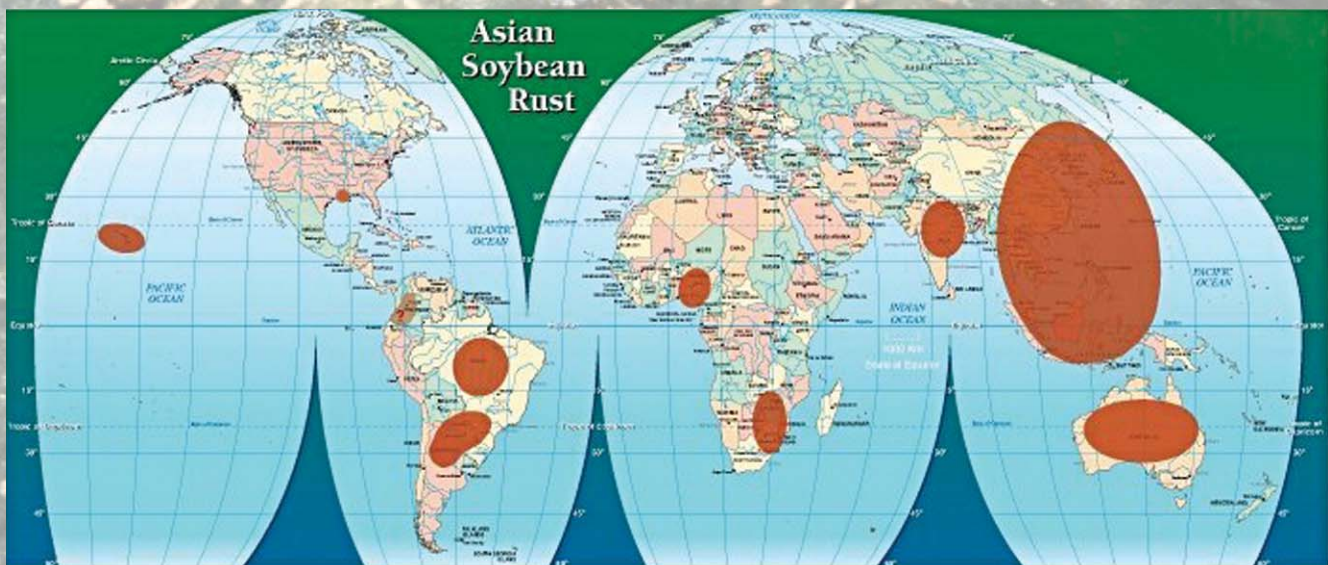


Soybean Rust Management for Michigan Growers in 2005

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ASIAN SOYBEAN RUST INFECTED AREAS

SOYBEAN RUST - Identified in United States

Prior to the November 10, 2004 announcement of a positive identification of the Asian soybean rust spores in two different fields in Louisiana by the Animal and Plant Health Inspection Service (APHIS) of the United States Department of Agriculture (USDA), North America was the only soybean producing continent unaffected by the disease. Since this initial find, not surprisingly, additional fields of soybeans in the south as well as another host plant are reported to have been infected.

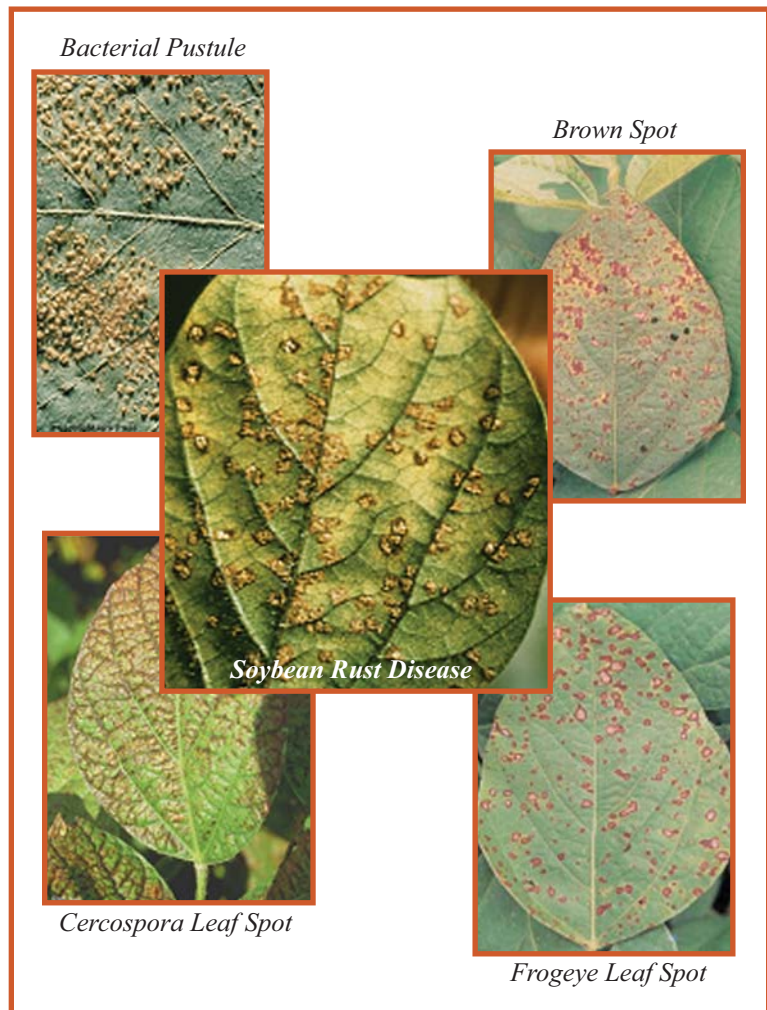
Asian soybean rust, *Phakopsora pachyrhizi*, originated in tropical and subtropical regions of Asia and Australia and most likely spread to several African countries via wind currents. In 2001, the disease was first identified in South America and subsequently has moved to regions further north in that continent.

It is believed this year's active hurricane season, most likely hurricane Ivan, brought the windborne spores into the U.S. Rust causes early leaf defoliation of soybean plants resulting in fewer pods and seeds; therefore, less yield.

The primary symptom when looking for rust is brown-colored spots on the soybean leaf. Early rust detection can be difficult because the lesions can resemble other foliar disease like brown spot, bacterial pustule or bacterial blight; however, if observed closely with magnification, you will see tiny bumps within the lesion. An indication the diseased leaf may be soybean rust would be when the pustule opens it most likely will have a circular pore rather than a linear crack at the top of the lesion more common with bacterial pustule. The lesions are generally found on the underneath side of the lower leaves then progress up the plant as the lower leaves die.

Michigan soybean producers **should be aware** of the recent soybean rust identification in Louisiana, but **NOT become alarmed**. The U.S. soybean industry will survive! There is no need to panic. We have the knowledge to manage the disease. The timing of the recent infestation is a best-case

scenario because we have several months before the 2005 growing season to make management plans. Never before has there been such a unified effort of industry, government, and academia to prepare for such a disease.



SOYBEAN RUST – Winter Survival

Because of Michigan's freezing winter conditions and no known host species surviving the winter, soybean rust spores are not likely to over-winter in Michigan. With alternate host plants being abundant and surviving winter in the southern U.S., this is most likely where spores will survive.

Since the spores are dependent on southerly winds to be transported to Michigan during the summer and need proper moisture and temperature conditions once they arrive, rust infection will most likely vary from year to year.

SOYBEAN RUST – Fast Facts

- Since the rust spores do not infect the soybean seed, there should be no effect on seed supplies for the 2005 planting season.
- Early detection is a must along with an aggressive fungicide control program.
- When soybean rust has been confirmed, the proper fungicide application will be most effective within a couple of days after rust confirmation.
- Be knowledgeable because some fungicides are **preventative** while some are **curative**.
- With the approval of at least six additional active fungicides under EPA's section 18 permit, fungicide shortages are not expected.
- When properly applied, fungicide applications by either ground or aerial methods are believed to be equally effective.
- Research suggests row widths **do not** affect soybean rust incidence/severity.
- Soybean rust resistant varieties **are not** yet available commercially.
- Cell infection is quick, easily in 9-10 days and cycles of spores can continue for up to 15 weeks under ideal conditions although not likely to occur in Michigan.
- Six hours of moisture is needed with a temperature range of 59-82° F for spore germination.
- Soybean rust spores can penetrate the leaf cells directly, not needing "assistance" from leaf damage, insects, etc.
- Early season soybean rust will be found on lower leaves and "move" upwards as lower leaves die.
- If infection occurs, the "best-case scenario" in Michigan would involve late season infection necessitating a single fungicide application.
- Most experts estimate fungicide and associated costs for Michigan growers to be at \$20-\$25/acre.
- Yield reduction caused by soybean rust is reported to be anywhere from 10% - 80% with Michigan losses at the lower percentage.
- Soybean rust spores are reported to have been transported by the wind currents up to 100 miles per day.
- In the southern U.S., there are at least twenty reported species of alternative hosts for the overwintering of rust spores.

SOYBEAN RUST – Export Concerns

Based on the history of soybean rust in other soybean exporting countries, experts predict the recent soybean rust identification in the U.S. will not affect soybeans and soybean product exports. Many importing countries have been purchasing soybeans from South America with very few import concerns because of soybean rust presence.

SOYBEAN RUST – Human/Animal Concerns

Soybean rust spores pose no health concerns to either humans or animals. The rust spores attack the foliage of the soybean plant causing early defoliation and affect the seed yield but do not directly attack the seed to cause food/feed concerns.



Fungicide Options for Asian Soybean Rust (*Phakopsora pachyrhizi*)



Trade Name	Manufacturer	Active ingredient (ai)	Resistance management
Quadris®	Syngenta Crop Protection Inc	azoxystrobin	See guidelines for strobilurin fungicides
Bravo®	Syngenta Crop Protection Inc	chlorothalonil	See guidelines for chlorothalonil fungicides
Echo 720®	Sipcam Agro Inc	chlorothalonil	See chlorothalonil
Headline® 2.09EC	BASF Corporation	pyraclostrobin	See guidelines for strobilurin fungicides
Pristine® 38%WDG	BASF Corporation	pyraclostrobin + boscalid	See guidelines for strobilurin + carboxamide combination fungicides
These fungicides have received Section 18 approval in most states including Michigan			
Tilt® 3.6EC	Syngenta Crop Protection Inc	propiconazole	See triazole fungicides
PropiMax™ 3.6EC	Dow AgroSciences	propiconazole	See triazole fungicides
Bumper® 41.8EC	Makhteshim-Agan	propiconazole	See triazole fungicides
Folicur® 3.6F	Bayer CropScience	tebuconazole	See triazole fungicides
Laredo™ 25EC	Dow AgroSciences	myclobutanil	See triazole fungicides
Laredo™ 25EW	Dow AgroSciences	myclobutanil	See triazole fungicides
Stratego® 2.08F	Bayer CropScience	propiconazole + trifloxystrobin	See guidelines for strobilurin and for triazole fungicides
These fungicides have not yet received Section 18 approval			
Domark™ 125SL	Sipcam Agro USA, Inc.	tetraconazole	See triazole fungicides

Graph taken from www.planthealth.info/rust/rustfungicide.htm as of January 6, 2005.



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SOYBEAN RUST – Grower Education

- Growers should avail themselves throughout the winter of any grower meetings addressing soybean rust.
- Pay particular attention to management information which you can use in making 2005 planting decisions. Symptoms, detection, history, etc. are interesting but do you need that for planting decisions?
- Review and understand the fungicides and how they control the rust. Are they **preventative** or **curative**?
- Understand fungicide use for efficacy, application timing, methods, rates, nozzle type, spray pressure, adjuvant use, gallonage and, of course, economics of control.
- Understand and plan for the importance of **immediate** reaction needs both for "first detection" confirmation of rust and for proper fungicide application.
- Know who to contact in different situations before you need their help. **DEVELOP A PLAN OF ACTION.**
- With immediate response needed, who is the **CORRECT** contact to show your suspected diseased leaf to?
- Investigate the availability of any web-based in-season soybean rust mapping service to help you calculate the risk and potential spore arrival date for your area.

SOYBEAN RUST – Checkoff Efforts

For many months prior to the November 10th rust identification in Louisiana, the soybean checkoff program has been involved in soybean rust efforts on behalf of Michigan growers. These many efforts include: rust information coordination of the private and public sector, literature development and distribution, training for the detection and verification of soybean rust, and an intense effort to identify unique Chinese soybean germplasm for genetic resistance to rust.

Most experts agree the ultimate goal is to identify unique soybean germplasm with genetic resistance to the multiple races of soybean rust. By virtue of "developed networks" between Dr. Dechun Wang, Michigan State University Soybean Geneticist and his comrades at the Nanjing Academy of Agriculture Sciences in the Chinese province of Jiangsu, we are in the third year of germplasm selection for



Dr. Dechun Wang

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rust resistance in maturities adaptable to Michigan environments. Much of this germplasm screening involves material unique to Chinese production.

Since the rust is present in China, we are free to artificially inoculate, evaluate, and experiment with the soybean rust. The provinces of Fujian in southern China and Jiangsu in central China are ideal for rust evaluation because of "good" rust growing conditions as well as having a fine cooperator in the Academy.

Even though some Michigan adaptable germplasm has been identified as having some "resistance level", much evaluation is still needed. Optimistic estimates of germplasm resistance are 8-10 years away – but there is hope! Through your support of the soybean checkoff, we have a good start on resistance germplasm screening.

Be sure to check out the various web sites listed below. Most are being updated regularly.

SOYBEAN RUST – Reference Information

For additional information on soybean rust, visit any of these web sites:

- www.planthealth.info
- www.unitedsoybean.org/producers_rustguide.pdf
- www.cornandsoybeandigest.com
- www.soybeanrustinfo.com
- www.aphis.usda.gov/ppq/ep/soybean_rust
- www.aphis.usda.gov/lpa/issues/sbr/sbr.html



- www.ipmcenters.org/newsalerts/soybeanrust
- www.ncpmc.org/soybeanrust
- www.tifton.uga.edu/sumner/tifton/spray/soybeansprayernozzles.htm

In addition, most likely a USDA-based web site will be available for the 2005 season that will predict soybean rust occurrence based on climatic conditions and reported rust identification.