



## Northern New York Agricultural Development Program

# FACT SHEET

# 2 in a series on Soybeans

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### **Coping with Asian Soybean Rust**

**Timing and technique are critical management decisions. Learn what, when and how to apply fungicides to protect or cure your crop.**

**For more information, see the Northern New York Agricultural Development Program Fact Sheet on Growing Soybeans in NNY found online at [www.nnyagdev.org](http://www.nnyagdev.org).**

## **Growing Soybeans in NNY: Coping with Asian Soybean Rust**

### **Introduction: What is Asian Soybean Rust?**

Asian soybean rust is a fungus, *Phakospora pachyrhizi*, that damages soybeans. The USDA Economic Research Service estimates that, once established, Asian soybean rust could cause \$240 million to \$2 billion in economic losses in the U.S. The wind-borne fungus was first confirmed in the Southern U.S. soybean fields in November 2004. The spores causing that outbreak may have been carried to the U.S. by hurricanes from South America and deposited with rainfall in the U.S. in September. By spring 2005, the disease was known to be in the state of Georgia.

The life cycle of the fungus is such that a new generation of spores may appear on infected plants every 10-15 days and the disease can travel 20-30 miles a day during the growing season. More than 90 legumes, including snap beans and clovers, may act as an overwintering host for the fungus. Cornell University plant pathologist Gary C. Bergstrom says he expects to see damaging epidemics of Asian soybean rust in some years in New York, but not every year.

The conditions that favor development of the fungus include leaf wetness, mild temperatures (64 to 82 degrees F), and 75-80 percent humidity. Symptoms appear five to ten days after the spores germinate and infect plants.

### **Methods for Coping with Rust**

The preferred method for combating Asian soybean rust is prevention. However, since one cannot control the winds that carry the rust spores, fungicide is the only proven method for coping with the fungus. Use of fungicides increases production costs, but can prevent massive losses of yield. Protectant fungicides protect soybeans against rust only if they are applied in advance of infection. Curative fungicides are applied once plants are infected.

Currently three fungicides: azoxystrobin (Quadris), pyraclostrobin (Headline), and chlorothalonil (Bravo, Echo)

**Crop monitoring, early detection and well-timed application of fungicides are keys to successfully managing soybean rust.**

**The fungus can spread from the first sighting of infection to damage in less than a week with nearly 100 percent infection in just three weeks.**

**The symptoms of Asian soybean rust include:**

- **small yellow or tan areas on the leaves that turn brown to reddish brown**
- **tiny bumps develop within the rust lesions, especially on overleaf surfaces.**

**Before sporulation, rust lesions may be confused with Septoria brown spot, bacterial pustule, and other diseases.**

are registered nationally for soybean rust control. These fungicides are protectants and must be applied in advance of the disease infecting plants.

A quarantine exemption (<http://pmep.cce.cornell.edu/profiles/index.html>) has been issued by the US Environmental Protection Agency to New York State for the emergency use of four additional fungicides: myclobutanil (Laredo), propiconazole (Tilt, Propimax and Bumper), tebuconazole (Folicur), and tetraconazole (Domark).

Stratego is a combination premix of trifloxystrobin (preventative) and propiconazole (curative). Another combination product (Quilt) is expected in spring 2005. Other fungicides may also be approved for use in New York - watch the website at <http://www.ppath.cornell.edu/soybeanrustny/default.htm> for more information.

Use of a single fungicide spray by ground rig is expected to add at least \$15 per acre to soybean production costs.

Always carefully read fungicide labels for specific instructions for handling and applying the fungicide.

### **Early Detection**

Crop monitoring and early detection are the keys to successfully managing soybean rust. Plant sentinel plots two to three weeks earlier than the main crop. Monitor the crop weekly, watching for the symptoms of Asian soybean rust: small yellow or tan areas on the leaves that turn brown to reddish brown. Tiny bumps develop within the rust lesions, especially on underleaf surfaces.

Before sporulation, rust lesions may be confused with Septoria brown spot, bacterial pustule, and other diseases. Asian soybean rust differs from bacterial pustule in that the infection begins in the lower, rather than the upper canopy, and Asian soybean rust pustules open as a pore with no yellow halo rather than as pustules that are fissures with a yellow halo. Septoria begins in the lower canopy but has no raised pustules. Ask your Cornell Cooperative Extension office for a soybean rust identification card showing symptoms.

### **Spraying**

Fungicides can be applied by ground or by air. A preventative treatment must be applied before plants are infected. Curative spraying may work if less than 10 percent of the lower canopy is infected. If infection has reached the mid-upper canopy, spraying may not provide any economic return. See Table 1. for 2005 Soybean Rust Fungicide Use Guidelines for New York.

**Table 1. 2005 Soybean Rust Fungicide Use Guidelines for New York**  
 (<http://www.ppath.cornell.edu/soybeanrustny/default.htm>)

Fungicide strategy for 1st application	Crop and disease status		Fungicide application <sup>3</sup>	
	Crop stage <sup>1</sup>	Disease level <sup>2</sup>	1st application	2nd application
Preventative (pre-infection)	Vegetative	None	Spraying Not Recommended	
	R1 to R6	None: risk low	Spraying Not Recommended	
		None, but Risk high	Chlorothalonil <sup>4</sup>	Triazole <sup>6</sup> or
			OR	Premix/Tank Mix <sup>7</sup>
			Sirobilurinx <sup>5</sup>	Triazole <sup>6</sup> or
			OR	Premix/Tank Mix <sup>7</sup>
Triazole <sup>6</sup>	Premix/Tank Mix <sup>7</sup>			
		OR	Premix/Tank Mix <sup>7</sup>	
		Premix/Tank Mix <sup>7</sup>	Triazole <sup>6</sup> or Premix/Tank Mix <sup>7</sup>	
	R7 or later	Irrelevant	No Benefit to Spraying	
Curative <sup>1,6</sup>	Early vegetative	Increasing	Benefit to Spraying Uncertain	
Early post-infection	Late-vegetative	10% or < inc.	Triazole <sup>6</sup>	Premix/Tank Mix <sup>7</sup>
	to R6	in lower canopy	Premix/Tank Mix <sup>7</sup>	Premix/Tank Mix <sup>7</sup>
	R7 or later	Irrelevant	No Benefit to Spraying	

<sup>1</sup> Vegetative = collective stages before flowering; R1 = beginning flowering, R6 = full seed, R7 = beginning maturity. The vast majority of reports from Africa and Brazil indicate that soybean rust does not need to be controlled when detected in the vegetative crop stages as long as a curative spray program is initiated as soon as crop flowering begins. Spraying before crop flowering, however, may be prudent if disease is increasing and crop is approaching R1. This is especially true for late-planted crops and/or very late-maturing varieties that may develop a large canopy before flowering.

<sup>2</sup> Incidence is number of leaves out of 100. Risk is determined according to national, regional and local reports of rust activity and disease forecasts.

<sup>3</sup> One, two or three applications may be needed, depending upon when the disease comes in and at what crop stage the first application is made. Spray coverage and penetration into the canopy are essential to success. Before making applications late in the season, be sure to consult the product label for days to harvest restrictions. Labels also indicate specific intervals between sprays for different disease situations. These spray intervals must be followed or rust control may be lost. *Consecutive, solo applications of Strobilurin or a Triazole should never be made due to resistance concerns.*

<sup>4</sup> Chlorothalonil is a protective fungicide that should only be used in a totally preventative program.

<sup>5</sup> Strobilurins (e.g., Quadris, Headline) are protective products and have NO curative activity; do not make solo applications of a strobilurin if any rust is present.

<sup>6</sup> Triazoles (e.g., Bumper, Folicur, Laredo, PropiMax, Tilt) have *limited curative ability* and may not perform well if more than 10% disease exists in the lower plant canopy; yield loss is very likely once rust can be found in the mid-crop canopy. Numerous factors play into the decision as to the latest one should apply a fungicide. Factors such as crop stage and yield potential, crop insurance, and many other factors should be considered. Fungicide labels specify upper limits of their products and manufacturers may not support products when applied later than is indicated on the product label. Check with your chemical salesman for more details.

<sup>7</sup> A Premix (e.g., Quilt, Stratego) is a manufactured combination product of a Strobilurin + Triazole. Use label-approved tank mixes of a Strobilurin + Triazole the same as you would a premix.

*Adapted by G.C. Bergstrom for use in New York (Original developed by D. Hershman, A. Dorrance, and M. Draper, January 28, 2005.*

## Acknowledgements:

The information in this fact sheet was compiled from a variety of sources (see For More Information below). Cornell University Professor of Plant Pathology Gary C. Bergstrom also provided information and assistance.

## For more information on Soybean Rust:

- **New York State Soybean Rust Information website:**  
[www.ppath.cornell.edu/soybeanrustny/default.htm](http://www.ppath.cornell.edu/soybeanrustny/default.htm)
- **USDA Soybean Rust website:**  
[www.usda.gov/soybeanrust](http://www.usda.gov/soybeanrust)
- **USDA Soybean Rust Alert:**  
[www.aphis.usda.gov/ppq/ep/soybean\\_rust](http://www.aphis.usda.gov/ppq/ep/soybean_rust)
- **United Soybean Board Rust Guide:**  
[www.unitedsoybean.org/f\\_producers.htm](http://www.unitedsoybean.org/f_producers.htm)
- **Using Foliar Fungicides to Manage Soybean Rust Manual:** [www.oardc.ohio-state.edu/SoyRust/index.htm](http://www.oardc.ohio-state.edu/SoyRust/index.htm)
- **Cornell Cooperative Extension in NNY:**
  - Cornell Cooperative Extension of Clinton County  
6064 Route 22, Ste 5, Plattsburgh, NY 12901-9601  
518-561-7450
  - Cornell Cooperative Extension of Essex County  
3 Sisco St, Ste 1, PO Box 388, Westport, NY 12993-0388  
518-962-4810
  - Cornell Cooperative Extension of Franklin County  
63 West Main St - Court House, Malone, NY 12953  
518-483-7403
  - Cornell Cooperative Extension of Jefferson County  
203 North Hamilton St, Watertown, NY 13601  
315-788-8450
  - Cornell Cooperative Extension of Lewis County  
Outer Stowe St, PO Box 72, Lowville, NY 13367-0072  
315-376-5270
  - Cornell Cooperative Extension of St. Lawrence County  
1894 State Highway 68, Canton, NY 13617  
315-376-9192

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**The Northern New York Agricultural Development Program** selects and prioritizes research the results of which can be practically applied to farms in the six-county region of northern NY: Jefferson, Lewis, St. Lawrence, Franklin, Clinton and Essex Counties.

**To learn more about the Northern New York Agricultural Development Program**, contact Co-Chairs Jon Greenwood, 315-386-3231, or Joe Giroux, 518-563-7523; or R. David Smith, Cornell University, 607-255-7286; or visit [www.nnyagdev.org](http://www.nnyagdev.org). ♦



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