

# Soybean Rust Pest Alert for the Mississippi Delta States

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## Distribution and Transmission

Asian soybean rust is caused by the fungus *Phakopsora pachyrhizi*. This aggressive fungus is native to Asia and Australia and has spread to soybean growing regions in Africa and South America, causing yield losses from 10 to 80 percent. *Phakopsora pachyrhizi* was reported in Hawaii in 1994 but has not become established there. Soybean rust has never been reported within the continental United States.

The soybean rust fungus produces massive quantities of lightweight spores that are easily windborne, facilitating long-distance spread of the pathogen. Spores also can coat clothing and equipment that have been used in infected areas. The fungus is not seedborne.

Computer models of air currents predict the Appalachian and southeastern regions of the U.S. are the most likely sites for introduction of the fungus. The models predict that the Mississippi Delta region will be most vulnerable during the months of June through September.

## Host Range

*Phakopsora pachyrhizi* infects 95 plant species in 42 genera. Such a wide host range is unusual for a rust fungus and may favor successful overwintering. Hosts include cultivated legumes such as lima or butter beans (*Phaseolus lunatus*), green and kidney beans (*Phaseolus vulgaris*), cowpeas (*Vigna unguiculata*), pigeon peas (*Cajanus Cajun*), and jicama (*Pachyrhizus erosus*), in

addition to cultivated soybean (*Glycine max*) and wild soybean (*Glycine sojae*). Ornamental hosts include hyacinth bean (*Lablab purpureus*), lupine (*Lupinus luteus*), and royal poinciana (*Delonix regia*). Wild hosts include kudzu and sweet clover. Kudzu could function as an overwintering host in areas such as southern Florida where the plant does not go into winter dormancy.

## Symptoms and Identification

Symptoms include tan to dark reddish brown lesions on leaves, stems, petioles, and pods. Leaf spots are typically angular in shape and usually begin on the lower leaves of the plant where humidity is the highest. Newly infected leaves have a mosaic appearance. Tan, cone-shaped pustules (uredinia) are formed within mature lesions, primarily on the underside of the leaf. The uredinia are filled with buff-colored spores (urediniospores). Tan lesions tend to produce more spore pustules than red lesions. Nonsporulating leaf lesions can be easily confused with other common soybean diseases such as bacterial pustule, bacterial blight, brown spot, and frog-eye leaf spot.

## Disease Development

Severity of soybean rust outbreaks depends on environmental conditions. The fungus is considered an aggressive pathogen because it is able to directly penetrate host tissue, reproduce rapidly, and

can produce spores for up to 15 weeks. Spore germination requires 6-12 hours of leaf wetness at temperatures from 15-28 °C (59-82 °F). Uredinia are produced 5-10 days after infection, and spores begin production about 9 days after infection. Spores will continue to be produced for 15 weeks unless environmental conditions become unfavorable. The 15-week sporulation cycle allows the pathogen to persist during dry conditions and reinfect throughout the season when environmental conditions are favorable.

### **Sample Collection Procedures**

Flatten symptomatic leaves or other plant parts between layers of dry paper towels. Place the towel-wrapped sample into a self-locking plastic bag and store in a cooler. Number each sample bag with a permanent marker. Place each sample bag into a second self-locking bag and ship overnight to a diagnostic facility. For each sample record the following information: date collected, host, collector's name and contact information (including phone number), location within the field, county, state, and nearest road intersection.

### **Sample Submission**

Submit samples and information to the diagnostic clinic at your state's land grant university (see addresses below) or your state Department of Agriculture laboratory. Please call the laboratory prior to sending samples.

### **Management Recommendations**

The long-term approach for managing soybean rust involves planting resistant soybean varieties. Currently all commercially available soybean varieties are highly susceptible to soybean rust. Soybean researchers and breeders with the U.S. Department of Agriculture, universities, and the industry are working to identify resistance, and efforts are being made to incorporate resistance and/or tolerance into commercial germplasm.

Effective management will depend on early detection, preferably before the fungus is actively sporulating. Therefore, monitoring fields is strongly recommended. Chemical management will depend on many factors, including disease pressure (wet, humid conditions), maturation date, presence of disease, weather forecasts, price of soybeans, premiums, yield potential, and fungicide application methods.

Three fungicides are currently labeled for use on soybeans in the United States; applications for additional product registration are pending. Contact your local university's Extension personnel for information on fungicides labeled for your area.

### **Laboratory Contact Information**

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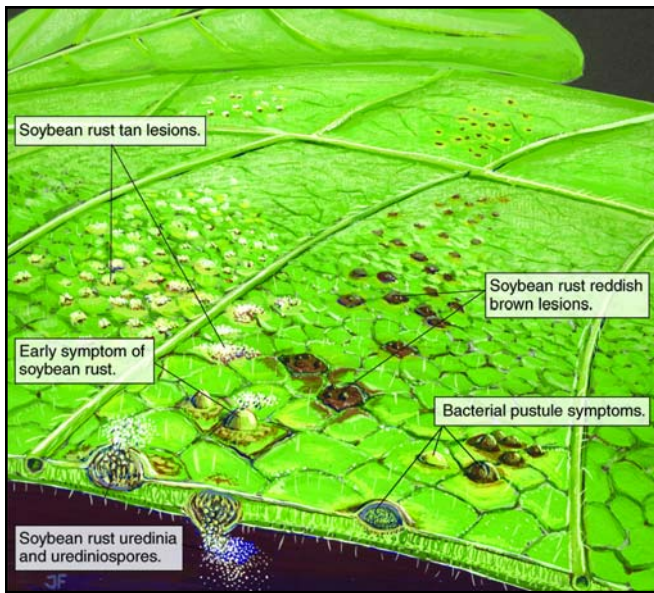
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Characteristics of soybean rust lesions and bacterial pustule.



Early symptoms of soybean rust.



Chemically treated vs. untreated areas of a soybean field infected with *Phakopsora pachyrhizi*.



Sporulating soybean rust lesions.



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