

“THESE DISEASES CANNOT BE IGNORED, AND RATES AND TIMINGS OF FUNGICIDE APPLICATIONS FOR RUST AND OTHER FOLIAR DISEASES MUST BE RESEARCHED.”

GABE SCIUMBATO



*Frogeye leaf spot is one of the soybean diseases already in Mississippi.*

# SOYBEAN RUST... Battle lines form before disease hits

By Bonnie Coblenz

The battle against an inevitable soybean disease has begun in Mississippi, with researchers and specialists ready to attack rust once it appears in the state.

Soybean rust is a fungal disease spread by spores. It can be carried on the wind for hundreds of miles, transported on people or machinery, or spread by infected plant material. Left untreated, it completely defoliates and often kills a plant, reducing yields by as much as 80 percent.

The Mississippi State University Extension Service, the Mississippi Agricultural and Forestry Experiment Station and the Mississippi Soybean Promotion Board have joined forces with the U.S. Department of Agriculture and the Bureau of Plant Industry against this disease, which is present in many other soybean-producing countries.

Billy Moore, Extension plant pathologist emeritus with MSU, is working with the team in the statewide battle against the disease.

“It’s not a matter of if, but when we’re going to get soybean rust,” Moore said.

There are two strains of soybean rust, but only an aggressive Asian strain is a threat to the United States. The Asian strain was discovered in Japan in 1902, and it quickly spread throughout the rest of Asia. It moved to Australia and then to Africa in 1996. A cyclone spread rust to the rest of the continent’s soybean growing areas shortly after it arrived in southern Africa.

In 2001, it was found in South America, and now Brazil, Argentina, Paraguay and Bolivia are fighting the disease. Brazil is a significant producer of soybeans, and Moore said producers there are doing an excellent job fighting the disease. Despite their efforts, when the disease arrived in 2002, Brazil had estimated yield losses of 4 million bushels. In 2003, that loss jumped to 80 million bushels, and by this year, losses had reached 170 million bushels.

Moore had three reasons why the losses continue to increase in Brazil.

“About 95 percent of farmers are spraying for rust. The 5 percent who don’t spray experience almost total losses, some producers aren’t spraying a second time, and even when fungicides are applied correctly, they still only give about 80 percent control,” Moore said.

Fungicides are a preventative and must be applied on time and before the disease arrives.

“You can get a good crop if you spray to prevent the disease,” he said.

Rust may first occur anywhere in the United States, but it is expected to enter into the Southeast from Central America, following a path similar to the one that corn blight took when it entered in 1970. Kudzu is an excellent host for rust, as are crops such as green beans and peas.

“Climatic conditions are very favorable for rust in the southeastern U.S.,” Moore said. “Ideal temperatures are 68 to 86 degrees.”

The best news about the disease may be that U.S. winters should beat it back every year. Moore said researchers expect rust to be able to overwinter in Florida and south Texas, then move north every year into soybean fields.

“We may dodge rust in early plantings because it has to move in from other areas where it overwintered, but then it can build up quickly and cause damage on later plantings,” Moore said.

Mississippi has six sentinel plots from George to Adams counties and one in Stoneville that are monitored weekly for the arrival of rust. All were planted at least one month before producers planted soybeans. Four plots are on private fields, while others are on the South Mississippi Branch Experiment Station in

Poplarville, the Delta Research and Extension Center in Stoneville and one at Alcorn State University near Lorman.

Any suspect sample taken from a sentinel plot or any other field in the state is sent to MSU's plant pathology and nematology lab in the Department of Entomology and Plant Pathology. Clarissa Balbalian, a MSU Extension Service diagnostician, manages that lab.

"We were trained to identify soybean rust and have the proper equipment and permits in place," Balbalian said.

This lab, which is in the southern division of the National Plant Diagnostic Network, currently serves just Mississippi, but it could serve neighboring states as well. When soybean rust is discovered, final identification will be made by USDA personnel in Beltsville, Md. Balbalian said educational efforts have helped those in contact with the soybean crop learn to identify the disease correctly.

"Our growers and agents know the problems we commonly see and what to look for," Balbalian said. "When we get our first positive, we likely will see a flood of samples."

Gabe Sciumbato, MAFES plant pathologist in Stoneville, said seven fungicides have been identified to fight rust, and others are in the process of being added to the list. The day rust is discovered in the United States, Mississippi will join other states poised to receive an immediate Section 18 Emergency label allowing producers to use these fungicides.

"Right now, we're looking at these and other experimental fungicides to determine their effectiveness against major soybean diseases present in Mississippi to see how they fit into a disease management program" Sciumbato said. "Our research has shown that the new, high-yielding, early-planted soybeans can have significant yield and seed quality improvements following the use of late-season foliar fungicides."

Other research at Stoneville involves determining the resistance of entries in the Mississippi Soybean Variety Trials to major soybean diseases in Mississippi. Researchers expose plants to diseases by sticking infected toothpicks into the stems, spraying spores on the plants or mixing fungus with the seed at planting. It has been shown that soybean rust weakens the plant and makes it more susceptible to other soybean diseases.

"These diseases cannot be ignored, and rates and timings of fungicide applications for rust and other foliar diseases must be researched," Sciumbato said.

Sciumbato said long-term rust control will come through a resistance breeding program. U.S. researchers only work with rust in countries where it is present or in special containment facilities.

"There are several races of the rust, and single gene resistance has not lasted for very long. Therefore, breeders must incorporate several genes, each adding some resistance," Sciumbato said. "This will take several years to develop."



*Research associate Ken Stetina checks one of the soybean research plots at the Delta Research and Extension Center.*

*Photos by Bob Ratliff*