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Questions on soybean rust

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Abstract
Recently, we have received questions on soybean rust from many Iowa soybean producers and agronomists in private and public sectors. This article summarizes their main questions and provides answers.

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INTEGRATED CROP MANAGEMENT

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Soybean leaf with rust.

Enlarge [1]

What is soybean rust?

Soybean rust is by caused the fungus *Phakopsora pachyrhizi*. Soybean rust is a major soybean disease in Asia and Australia, where the pathogen is native. It causes periodic epidemics in some soybean regions. The fungus is airborne and can quickly spread throughout a field planted with susceptible soybean varieties.

Where is soybean rust found?

Many soybean diseases native to Asia have been disseminated worldwide where soybean is grown, but soybean rust is not found in the United States yet and soybean production in South America was free from this disease until very recently. Soybean rust was found in Paraguay in 2001 and some major soybean production regions in Brazil in 2002, where the disease has become a major production concern.

How much damage does the rust do to soybean?

With favorable weather, epidemics occur on a large scale. In Asia, severe epidemics of soybean rust cause premature defoliation, and yield losses up to 70 percent have been reported. In the 2001–2002 growing season, severe epidemics occurred in some areas of Brazil with yield losses up to 50 percent in fields that were not sprayed with fungicide compared with sprayed controls. In Asia, where the disease is severe, growers use fungicides (sometimes spraying twice in China and three times in Africa during the growing season) to control the disease.

What is the risk of soybean rust to U.S. soybean?

Asian soybean rust is considered a major threat to U.S. production. A USDA risk assessment by computer simulation shows that the environmental conditions in U.S. soybean production are suitable to the occurrence of this disease. The disease could cause yield losses up to 40 percent in southern U.S. production regions or more than 10 percent in other regions if sufficient soybean rust spores can be disseminated from south to north during a growing season. Based on another USDA study by their economists and pathologists, the worst-case scenario of this disease could cause losses of $7.2 billion (1984 figure) to the U.S. soybean industry. Keep in mind, however, these assessments were made under certain assumptions.

How is soybean rust disseminated?

The fungus survives year-round in warm areas, such as southern China. During a growing season, the pathogen is disseminated by northward seasonal wind. For regions where the disease is not present, such as North America, one possible route of introduction is with infested soybean debris or dry soybean plants. Therefore, seed companies have been requested to clear the seed when moving germplasm in breeding activities. However, other unidentified means may be equally important in disseminating the fungi.

What research is underway on soybean rust?

The consensus among plant pathologists is that it is just a matter of time before this disease arrives in North America, like all other soybean pests that are not native to the Western Hemisphere. Because there is no resistance in U.S. germplasm, soybean here is vulnerable to attack by this disease. Currently, the United Soybean Board is funding a research project to manage the risk. In this project, U.S. scientists are collaborating with scientists in South America and Asia to search for resistance genes from U.S. soybean lines and exotic germplasm. No chemicals are labeled for soybean rust in the United States, and research is underway to evaluate fungicides for controlling the disease once the rust is introduced.

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