FINDINGS

Economic Risks of Soybean Rust in the U.S. Vary by Region

Photos courtesy of M.A. Draper, Parana State, Brazil

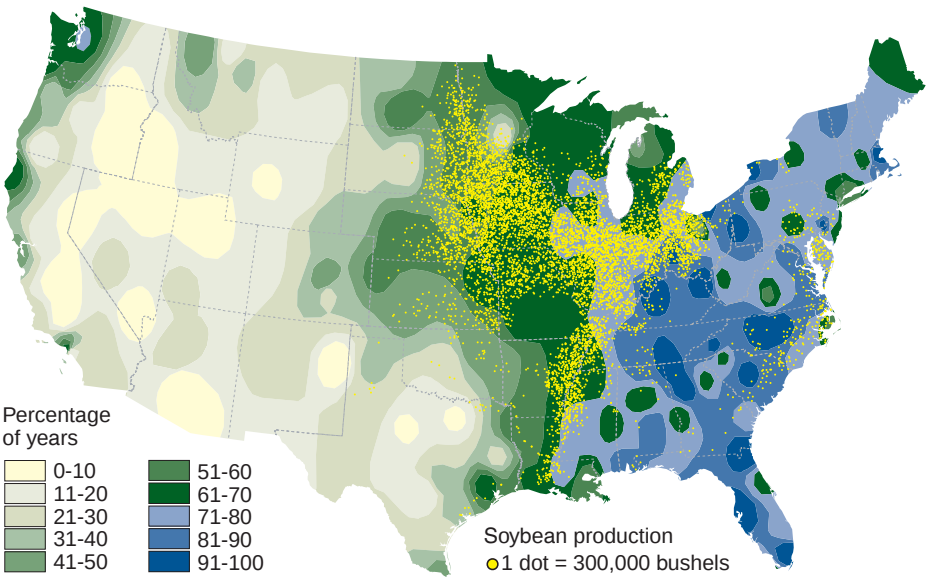
Soybean rust is a plant disease that has reduced yields and raised production costs for soybeans and other legumes in every major production region of the world—except the United States. However, with the recent and rapid spread of the windborne pathogen in South America, most experts agree that the question isn't if, but when, it will enter the U.S. via natural spread. An outbreak could pose economic risks for producers and consumers, and affect agricultural and environmental programs, such as crop insurance, commodity programs, research and extension, and pesticide regulations.

An ERS study shows that the economic effects of the pathogen's entry into the U.S. could vary considerably, depending on the timing, location, spread, and severity of the disease and on the responses of soybean and other crop producers, livestock producers, and consumers. Economic losses to U.S. producers and consumers could range from $640 million to $1.3 billion in the first year of infestation. In the 3-5 years following establishment, losses could average between $240 million and $2.4 billion per year, depending on the geographical extent and severity of annual outbreaks. The wide range in estimates reflects the uncertainty associated with the effects of the disease in the United States. But even the high-end estimates are less than 1 percent of the total economic activity associated with U.S. soybean production and consumption—a finding that confirms the resiliency and adaptability of U.S. agriculture.

Soybean producers would likely bear 60-70 percent of the costs of adjusting to periodic soybean rust outbreaks in the U.S., with consumers and livestock producers bearing the balance. The outbreaks would likely cause agricultural producers, especially soybean growers, to change production practices (for example, to use fungicides and, for some, to alter their crop mix). While producers would have limited management options during the first year of a rust outbreak, these options could increase over time as producers gain new information or as new pest management technologies become available.

The effects of the disease could vary considerably by region. For example, the Eastern U.S. may be more susceptible than other regions to rust infestation because of temperature, relative humidity, and rainfall during the growing season. Fortunately, most U.S. soybean production occurs in the middle part of the country where climate is less supportive of infestation.

Percentage of years out of 30 that climatic conditions are expected to support establishment of soybean rust



Source: USDA's Animal and Plant Health Inspection Service and National Agricultural Statistics Service.

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This finding is drawn from . . .

Potential Economic and Policy Implications of the Wind-Borne Entry of Asian Soybean Rust into the United States, by Michael Livingston, Rob Johansson, Stan Daberkow, Michael Roberts, Mark Ash, and Vince Breneman, OCS-04D-02, USDA/ERS, April 2004, available at: www.ers.usda.gov/publications/ocs/apr04/ocs04d02/

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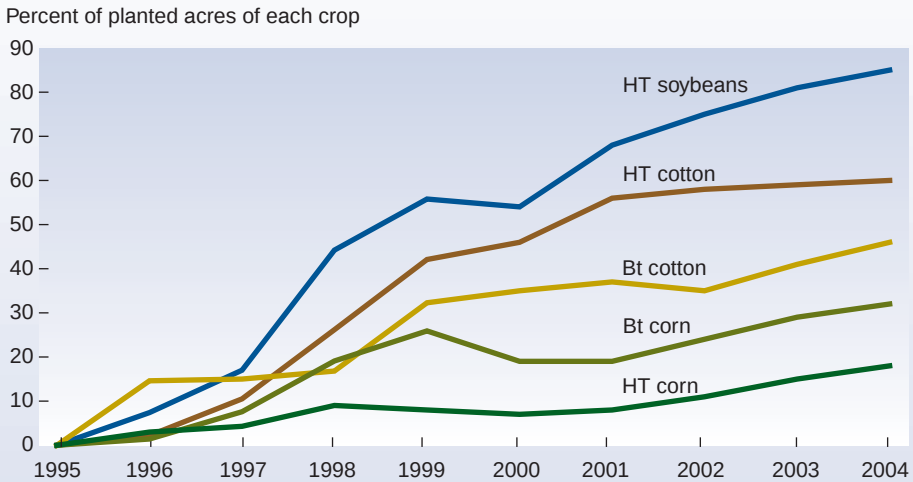
Genetically Engineered Crop Varieties Gain Further Acreage Share in 2004

Genetically engineered varieties of soybeans, corn, and cotton have been available commercially since 1996. Since then, their rate of use by U.S. farmers has climbed most years, including 2004. For the most part, farmers have adopted herbicide-tolerant (HT) varieties, which help control weeds, at a faster pace than insect-resistant varieties, which help control insects.

Weeds are such a pervasive pest for soybeans, corn, and cotton that over 90 percent of planted acreage for each crop was treated with herbicides in recent years. Crop varieties with HT genes can survive certain potent herbicides that previously would have destroyed the crop along with the weeds, giving farmers who adopt HT varieties a powerful new tool to control weeds. Acreage share for HT soybeans, which reached 85 percent of U.S. soybean acreage in 2004, has expanded more rapidly than acreage shares for HT varieties of cotton and corn. Farmers' adoption of HT soybeans has been widespread among major growing States, ranging in 2004 from 75 percent in Michigan to 95 percent in South Dakota. Acreage share for HT cotton has also expanded rapidly, reaching 60 percent in 2004. In contrast, acreage share for HT corn reached only 18 percent in 2004, but this is still an increase from 15 percent in 2003.

Insect-resistant crops contain a gene from a soil bacterium, *Bacillus thuringiensis* (Bt), which produces a protein toxic to specific insects. Acreage shares for Bt cotton and corn are lower than those for HT soybeans and cotton and vary much more across producing States, with adoption more concentrated in areas with high infestations of targeted pests. Farmers planted Bt cotton—which controls tobacco budworm, bollworm, and pink bollworm—on 46 percent of cotton acreage in 2004. Acreage share ranged from 13 percent in California to 86 percent in Louisiana. Bt corn, originally developed to control the European corn borer, was planted on 32 percent of corn acreage in 2004, up from 29 percent in 2003 and 24 percent in 2002. These recent increases in acreage share may be largely due to the commercial introduction in 2003/04 of a new Bt corn variety that is resistant to the corn rootworm, a pest that may be more destructive to corn yield than the European corn borer.

Adoption of GE crop varieties has been highest with HT soybeans and cotton



HT = herbicide-tolerant traits. Bt = insect-resistant traits. Data for each category include varieties with both HT and Bt traits.

Source: USDA annual surveys.

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This finding is drawn from . . .

Adoption of Genetically Engineered Crops in the U.S., available at: www.ers.usda.gov/data/biotechcrops/

Pest Management in U.S. Agriculture, by Jorge Fernandez-Cornejo and Sharon Jans, AH-717, USDA/ERS, October 1999, available at: www.ers.usda.gov/publications/ah717/