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Soybean rust: A year in review

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Soybean rust: A year in review

Abstract

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Soybean rust update

Soybean rust: A year in review

by Daren Mueller, Department of Plant Pathology

During the 2005 and 2006 growing seasons, soybean rust was not a threat for Iowa soybean growers. This year was a different story, as soybean rust was established fairly early in the season in Texas and Louisiana creating the potential for soybean rust to get to Iowa during the growing season. Thankfully, soybean rust was not found while soybean plants were in a vulnerable stage; however, soybean rust was found in a field in Dallas County, Iowa, on Tuesday, September 25, 2007. Since the initial find, soybean rust was confirmed in 13 additional counties in Iowa (Figure 1).

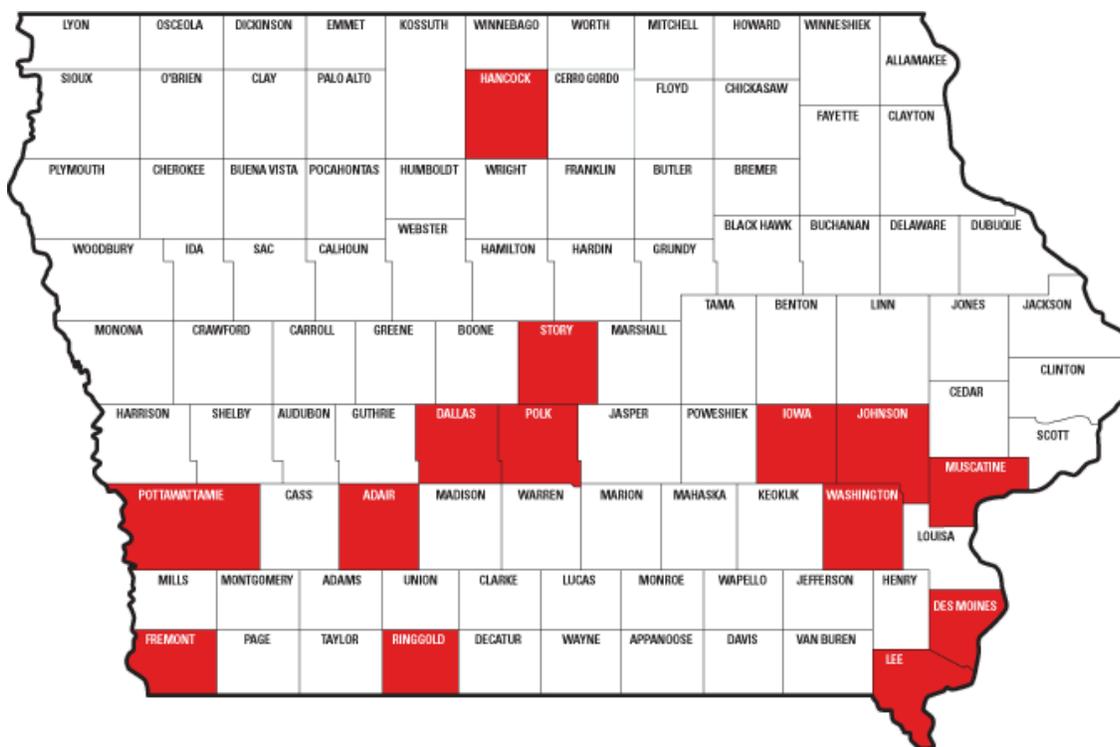


Figure 1. Distribution of soybean rust in Iowa in 2007.

How did soybean rust get to Iowa?

As outlined in the past few years, there are several factors needed for soybean rust to get to Iowa. Three factors that need to happen for soybean rust to get to Iowa are overwintering of the pathogen, movement of rust spores, and favorable environmental conditions in Iowa.

Overwintering

In 2005 and 2006, soybean rust was limited to the far Southeast until late in the season for various reasons, including limited overwintering sites and drought conditions preventing the movement of rust. This season started out similarly as soybean rust was found in five counties in Florida after a record-breaking frost knocked back kudzu growth in early April. However, on May 8, soybean rust was detected in a kudzu patch west of New Orleans in New Iberia, Louisiana. This was 53 days ahead of the 2006 first find of soybean rust in Louisiana. In early June, soybean rust was first reported in Texas.

So where did the inoculum come from that infected plants in Louisiana and Texas? Predictive models suggest that inoculum probably did not come from Florida but instead from somewhere in Central America. Jicama or yam bean was found infected with soybean rust in central Mexico. We don't know if this was the source of inoculum, but this does prove that soybean rust is

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May 21, 2007

in Mexico, giving *Phakopsora pachyrhizi* another overwintering source. Scientists in Mexico since have set up sentinel plots for soybean rust, and this past week, they detected soybean rust on soybean and jicama.

Movement of rust

During 2006, very dry conditions persisted throughout much of the growing season in most of the Southeast. This slowed the spread of rust considerably. In 2007, dry conditions once again plagued many parts of the Southeast (Figure 2). However, Louisiana, Texas, and Oklahoma had adequate rainfall; in fact, they were wetter than normal in many parts. Once soybean rust was established early in the season in Louisiana and Texas, the chances of soybean rust getting to Iowa increased dramatically.

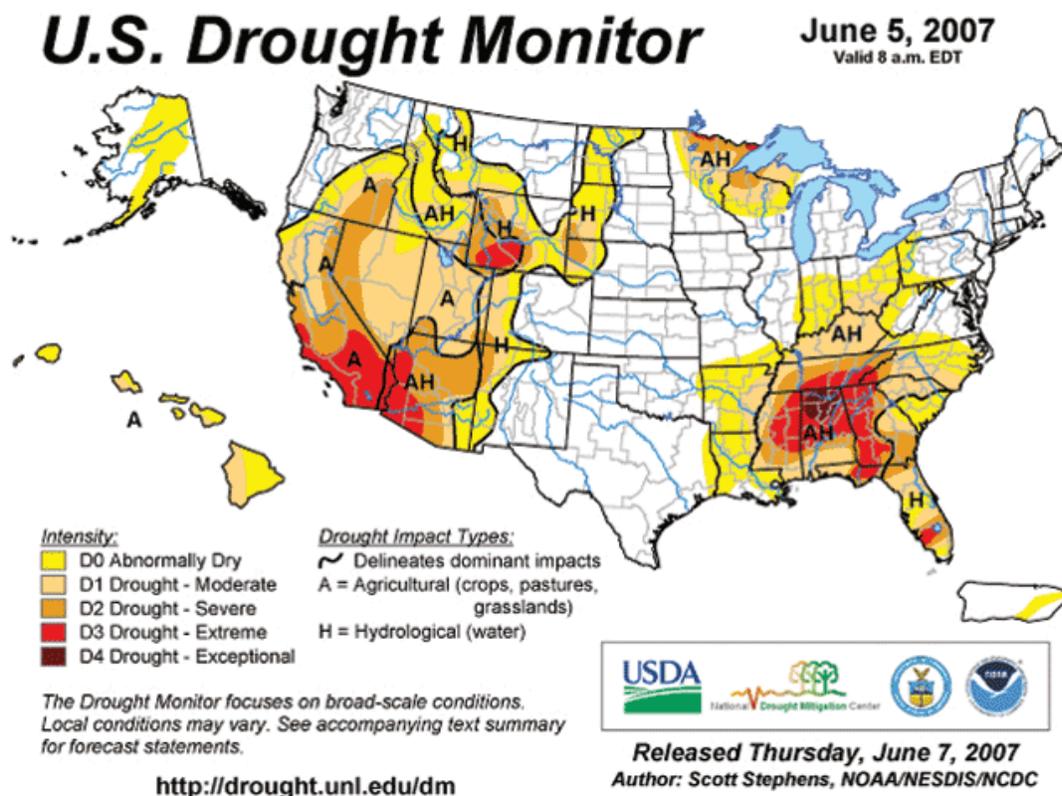


Figure 2. Online drought monitor maps showed where rainfall was limited during the 2007 growing season. To view similar, current maps, visit <http://drought.unl.edu/dm/archive.html>

Environmental conditions in Iowa

In August, temperatures soared throughout the Midwest, including in Oklahoma (northernmost rust find), Kansas and Missouri (two states between rust and Iowa), and Iowa. Like 2006, much of Iowa received frequent (and sometimes heavy) rains. Soybean rust needs moisture, so the rainfall in August was what rust would have wanted. However, the hot temperatures may have slowed the movement of rust northward by limiting the spore production in the source areas as well as killing many of the spores during transport.

By the middle of September, soybean rust still had not been detected in Kansas or Missouri. Like 2006, when the temperatures started cooling and the day length shortened, soybean rust made a push northward. Soybean rust season totals to date are 290 counties in 19 states on soybean or kudzu (Figure 3). In addition, soybean rust was detected in one province in Canada (Ontario in October) and two municipalities in Mexico (in November). By comparison, soybean rust was detected in 274 counties in 15 states in 2006.



Figure 3. Distribution of soybean rust in the United States at the end of November 2007.

Lessons Learned in 2007

Finding the first infected leaf in Iowa was significant. Because of the potential impact on soybean production, soybean rust has garnered far more attention than other soybean pests. Thankfully, the first find in Iowa was well after any management was needed.

Soybean rust is very difficult to identify when at very low levels and other diseases are present. Our ability to identify very low levels (<1%) improved as we worked through the late-season samples. For me, this gives the sentinel plot system even more value, as we have experienced scientists feeding information into the sentinel plot system and that makes decision making for states like Iowa all the more accurate.

What was different about this season compared to the 2005 or 2006 season?

The biggest change was the early in the season establishment of soybean rust in Louisiana and Texas. One area that needs closer monitoring is in Central America. If *P. pachyrhizi* overwinters in Mexico, this could lead to early-season infections in Texas and Louisiana, weather permitting, in subsequent years.

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