

# Plant pathologists study how Asian soybean rust fungus overrides plant immune systems

October 13 2016, by Steve Whitham

---

Iowa State University scientists are piecing together clues about how a global pest hacks the immune systems of soybeans.

Soybean rust fungus poses one of the biggest threats to soybean producers across the globe, though it's rare in Iowa. In a paper published recently in the peer-reviewed scientific journal *PLoS Pathogens*, a group of ISU plant pathologists offers evidence that a protein secreted by the pathogen cripples the soybean's immune system and allows the fungus to flourish.

Further study of how the protein interacts with the soybean [immune response](#) could lead to better protection against soybean rust fungus and similar pathogens in other plants, said Steve Whitham, professor of plant pathology and microbiology and senior author of the study.

Whitham said the soybean rust fungus secretes more than 100 proteins when it comes into contact with a soybean plant. One of those, a small secreted cysteine-rich protein known as PpEC23, interferes with both of the major pathways plants use to trigger immunity to pathogens, Whitham's research team found. The researchers focused on the protein and learned that it interacts with another protein in the soybean plant called SPL121, which regulates immune responses.

Essentially, the rust fungus hacks SPL121 and switches off the soybean plant's immune system, Whitham said.

"Our idea is if we can disrupt that interaction, we take away one of the weapons of the fungus," he said. "The plant might be able to defend itself more effectively."

Soybean plants, and many other organisms, have two major pathways to trigger immune responses. One of them is called a pathogen-associated molecular pattern-triggered immunity, in which conserved molecules associated with a pathogen are recognized by the immune system of an organism. The other major pathway to an immune response is an effector-triggered immunity, in which a protective response begins when an organism's resistance genes detect pathogenic genes on a one-to-one basis.

Whitham said the small secreted cysteine-rich protein featured in his research circumvents both immunity pathways in [soybean plants](#).

So far, Asian soybean rust has posed little threat in Iowa, where cold winters contain the spread of the fungus, he said. However, warmer southeastern states must contend with the disease, and it's among the most devastating diseases soybean producers in South America face, he said.

Additionally, Whitham said many other plants, such as wheat, suffer from similar rust fungi that carry genes resembling PpEC23, and his research may have implications for those species as well.

Provided by Iowa State University

Citation: Plant pathologists study how Asian soybean rust fungus overrides plant immune systems (2016, October 13) retrieved 2 May 2024 from <https://phys.org/news/2016-10-pathologists-asian-soybean-rust-fungus.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.