

Corn gene helps fight Multiple Leaf Diseases

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A specific gene in corn seems to confer resistance to three important leaf diseases—southern corn leaf blight, northern leaf blight, and gray leaf spot—all of which cause lesions on corn leaves worldwide. Credit: Regis Lefebure.

(PhysOrg.com) -- A specific gene in corn seems to confer resistance to three important leaf diseases, according to U.S. Department of Agriculture (USDA) scientists and their university colleagues.

This [discovery](#), published in 2011 in the [Proceedings of the National Academy of Sciences](#), could potentially help plant breeders build [disease-resistance](#) traits into future corn plants.

The research team included Agricultural Research Service (ARS) plant geneticists Peter Balint-Kurti, Jim Holland and Matt Krakowsky in the agency's Plant Science Research Unit in Raleigh, N.C., and scientists with the University of Delaware, Cornell University, and Kansas State University. ARS is the USDA's chief intramural scientific research

agency.

Three diseases-southern corn [leaf](#) blight, northern leaf blight, and gray leaf spot-all cause lesions on corn leaves worldwide. In the U.S. Midwest Corn Belt, northern leaf blight and gray leaf spot are significant problems.

The researchers examined 300 corn varieties from around the world to ensure a genetically diverse representation. No corn variety has complete [resistance](#) to any of these diseases, but varieties differ in the severity of symptoms they exhibit.

The researchers set out to look for maize lines with resistance to the three diseases to determine which genes underlie disease resistance, according to Balint-Kurti. When they tested the lines for resistance, they found that if a [corn](#) variety was resistant to one disease, chances were favorable that it was also resistant to the other two.

The researchers applied a statistical analysis technique called "association mapping" to identify regions of the genome associated with variation in disease resistance. According to Balint-Kurti, the scientists knew there was a strong correlation between resistance of one disease and the other two. They postulated that some resistance genes conferred resistance to two or more different diseases, and they identified a gene that seemed to confer multiple disease resistance.

This gene, a GST (glutathione S-transferase), is part of a family of genes known for their roles in regulating oxidative stress and in detoxification. Both of these functions are consistent with a role in disease resistance.

More information: [Read more](#) about this research in the February 2012 issue of *Agricultural Research* magazine.

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