

# New hope for fighting major fungal disease in durum wheat

January 18 2015

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Credit: Wikipedia.

A variety of wheat that is resistant to a destructive fungal disease has been found to have specialized and protective cell walls, according to research published in *BMC Plant Biology*. These insights could help to produce stronger, disease-resistant varieties of durum wheat for improved pasta production.

Fusarium Head Blight (FHB) is a fungal disease that affects worldwide wheat production due to dramatic yield loss, and reduced grain quality from toxins that make harvests unsuitable for consumption. While there have been several studies looking at FHB disease resistance in common wheat, little is known about durum wheat - one of the cereals most susceptible to infection and the key ingredient in pasta and couscous.

Italy is one of the world's major producers of durum wheat, and FHB has been permanently present there since 1995.

Lead author Daniela Bellincampi from Sapienza Università di Roma, Italy, said: "Breeding disease-resistant varieties of durum wheat is probably the best economic and ecological strategy for fighting this invasive and destructive disease. Unfortunately, this is particularly challenging due to a lack of highly disease-resistant varieties that are available to use in breeding programs."

Joint author Agata Gadaleta from Università di Bari Aldo Moro, Italy, said: "Now that we've identified the [cell wall](#) characteristics that make a common wheat variety resistant to FHB, work can begin on transferring these traits to vulnerable durum wheat varieties. These could be cultivated in Italy and other countries to help produce safer food with reduced fungal contamination and reduced amounts of dangerous toxins in food stocks."

The researchers compared a disease-resistant variety of common wheat and a susceptible variety of durum wheat. To do this, they infected both with the fungus, and then compared the detailed characteristics of their cell walls.

The cell walls of the FHB-resistant variety had a particular composition of lignin - a structural component which plays a crucial role in cell wall reinforcement - and showed unique compositions of other structural components including pectin and hemicellulose.

The researchers identified a new gene, WheatPME1, that can play a role in changing the chemical structure of pectin - the adhesive component of the plant cell wall. They found that, during infection, the gene had different levels of activity in the FHB-resistant and susceptible varieties.

The researchers hope that the identification of these unique cell wall traits in FHB-resistant common wheat could help in breeding [durum wheat](#) varieties that are able to defend themselves against infection, and reduce fungal toxin contamination in food.

First author Vincenzo Lionetti from Sapienza Università di Roma, Italy, said: "Understanding the dynamics of plant cell wall composition and structure during infection is important to reveal strategies that plant and pathogen exploit to prevail during their interaction."

**More information:** Vincenzo Lionetti, Angelica Giancaspro, Eleonora Fabri, Stefania L. Giove, Nathan Reem, Olga A. Zobotina, Antonio Blanco, Agata Gadaleta and Daniela Bellincampi , Cell wall traits as potential resources to improve resistance of durum wheat against *Fusarium graminearum* , *BMC Plant Biology* 2015 , [DOI: 10.1186/s12870-014-0369-1](#)

Provided by BioMed Central

Citation: New hope for fighting major fungal disease in durum wheat (2015, January 18)  
retrieved 8 May 2024 from  
<https://phys.org/news/2015-01-major-fungal-disease-durum-wheat.html>

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