

Diverse wheat tapped for antifungal genes

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Asian wheat may offer novel genes for shoring up the defenses of U.S. varieties against *Fusarium graminearum* fungi that cause *Fusarium* head blight (FHB) disease.

According to Agricultural Research Service (ARS) plant molecular biologist Guihua Bai, the FHB resistance found in today's U.S. [wheat](#) varieties is primarily based on the Chinese wheat variety Sumai 3 and a few other sources. But there's concern that FHB-causing species of *F. graminearum* will overcome these resistant sources.

In susceptible varieties, the fungus infects the wheat heads, causing kernels to shrivel up and turn chalky white. The fungus can also produce mycotoxins that reduce the kernels' value and quality, according to Bai, who works at the ARS Hard [Winter Wheat](#) Genetics Research Unit in Manhattan, Kan.

In collaboration with Kansas State University scientists, Bai has sought new sources of FHB resistance from exotic wheat lines collected from China, Korea and Japan. These lines include "landrace" populations—domesticated plants that have changed very little since the advent of modern plant breeding.

Of 87 total Asian landrace accessions tested in greenhouse trials, 26 showed high levels of FHB resistance, Bai reports. Grain evaluations also revealed that 15 of them had exceptionally low levels of the mycotoxin deoxynivalenol, which is produced during disease development and can diminish the value of affected kernels as food or feed.

Six of the accessions possessed genes for different forms of FHB resistance known as types I, II and III. Significantly, some of the [genes](#) appear unrelated to Sumai 3, suggesting the Asian landraces could broaden the genetic pool of resistance now available for use in breeding U.S. [wheat varieties](#). This, in turn, could help avoid repeat disasters such as the FHB epidemic that swept through the Great Plains from 1998 to 2000, costing America's wheat industry \$2.7 billion in losses.

Provided by United States Department of Agriculture

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