

Wheat Stem Rust Hits Eurasian Food Security

by Christine Craig

Ug99, a highly virulent new strain of the wheat stem rust *Puccinia graminis*, has moved into central Iran, where prevailing wind patterns could blow trillions of spores to the wheat-growing regions of Kazakhstan and Russia, as well as into Pakistan and India. With wheat and grain stocks already depleted in recent years, and prices setting records, the movement of the fungus into these wheat-growing regions could lead to widespread famine. Botanists estimate that 90% of all wheat varieties around the world are susceptible to this new strain of disease.

Wheat stem rust last caused large-scale devastation in the United States from 1950-54, decreasing the Spring wheat yield by up to 40%. Part of Norman Borlaug's Green Revolution,

in response to this periodic devastation, involved the breeding of durable rust resistance into wheat crops, a strategy which helped produce decades of freedom from large-scale rust losses. In recent decades of free trade and cartel-serving private research, however, national research funding for, and focus on, wheat rust resistance has fallen precipitously. In fact Borlaug's International Maize and Wheat Improvement Center (CIMMYT) in Mexico has itself been in grave financial difficulties recently.

The Ug99 strain was first identified in 1999 in Uganda. It spread quickly to Kenya, Ethiopia, and elsewhere, where almost no local wheat variety could resist its onslaught. Then a year ago, strong winds blew the fungus across the Red Sea to Yemen, and thence straight north to western Iran this Spring, years earlier than scientists had expected. There is now a mad scramble to develop new varieties of "resistant wheat"—a process that could take up to five years of laborious breeding—while the fungus reproduces prodigiously by spores which are swiftly spread by wind.

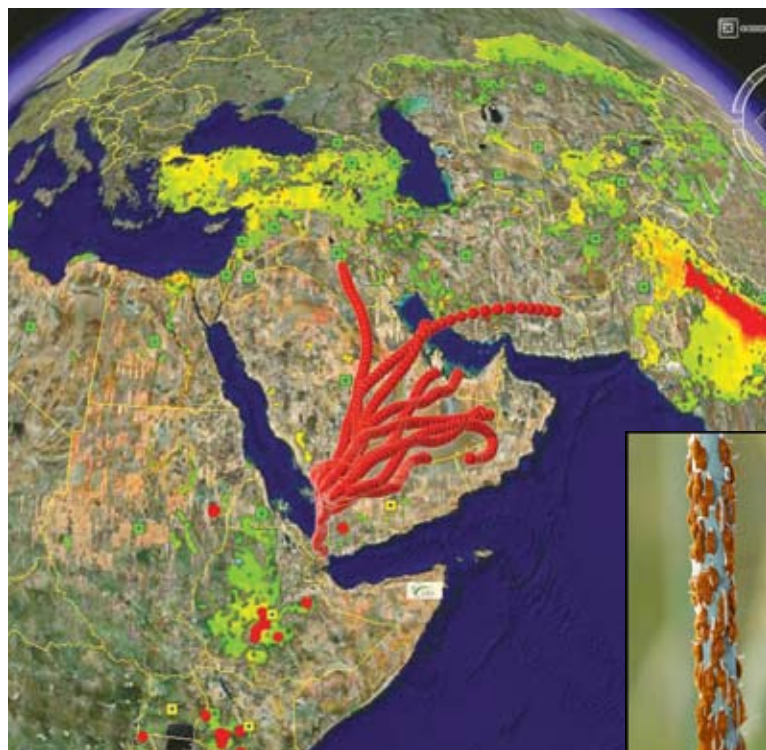
Last Fall, a crash program and early warning system for wheat rust was formed—the Borlaug Global Rust Initiative, mostly under the wing of the Consultative Group on International Agricultural Research (CGIAR)—a research network that grew out of the initiative of President Franklin Roosevelt and plant geneticist Henry Wallace, his Agriculture Secretary and Vice President.

An expanded grouping of CGIAR and other agencies met March 10-11, 2008 in Syria, to ramp up their fight against Ug99, in collaboration with scientists from over a dozen national agriculture research systems, most of which were already affected, or in the path of the marauding fungus. A major question was, how to get funding for the intensive breeding programs required to keep ahead of the fungus.

A prominent participant at the March meeting was Cornell University, which has just been awarded a \$26.8 million grant by the Bill and Melinda Gates

Foundation to head up yet a new global partnership called the Durable Rust Resistance in Wheat Project, to lead the fight to develop a new generation of rust-resistant wheat varieties. In January, Bill Gates gave a similar grant, worth \$19.9 million, to another underfunded CGIAR collaborator, the International Rice Research Institute in the Philippines (likewise an FDR-legacy Green Revolution institution in financial trouble).

FIGURE 1
Spread of Ug99 Wheat Stem Rust into Asia
(December 2006-February 2007)



Courtesy of Dave Hodson, GIS unit, CIMMYT

See the entire interactive graphic at www.cimmyt.org/gis/rustmapper/.

The spread of wheat stem rust could threaten harvests throughout Eurasia.