Ancient wheat plague threatens world crops anew

June 10 2011, by Kerry Sheridan

A wheat field in pictured in Godewaersvelde, northern France. The last major epidemic of the fungal disease broke out in 1953 but was quelled with the introduction of a resistant strain of plants in the 1970s, an initiative spearheaded by the late Norman Borlaug, the Nobel Peace Prize winner widely known as the father of the Green Revolution.

Diseases that ravage wheat fields are as old as time itself. The ancient Romans even had a legend to explain the terrible plagues.

According to the myth, a mischievous young boy tied a flaming wheat straw to a fox's tail, torturing the animal. This single act angered the Roman god Robigus so much that he unleashed a rust-colored plague on the fields that turned all the crops to black.

"Stem rust, when it goes epidemic, destroys a crop," said Ronnie

Coffman, a leading expert on wheat disease and chair of the department of plant breeding and genetics at Cornell University.

"There is nothing left but black stems, zero grain. It is just an absolute devastation."

The last major epidemic of the fungal disease broke out in 1953 but was quelled with the introduction of a resistant strain of plants in the 1970s, an initiative spearheaded by the late Norman Borlaug, the Nobel Peace Prize winner widely known as the father of the Green Revolution.

In 1998, a new wave of the stem rust fungus, Ug99, turned up in Uganda, overcoming crops that were once resistant and wielding the potential to kill as much as 90 percent of the world's wheat.

The disease is now widespread in eastern Africa and threatens to move deep into the Middle East and Asia, where it could wipe out farms, cause rising bread prices and unleash fresh political and economic unrest, experts say.

Already, the strain has shown up in Iran and in Yemen, Osama bin Laden's ancestral homeland that has plunged into political turmoil in the past five months amid deadly fighting over the future of the country.

Hikes in food prices have also helped stoke a series of uprisings across the Arab world, Mexico, Haiti and beyond.

"Yemen is a big problem," said Coffman, who as Borlaug's one-time doctoral student is now carrying on his mentor's lifelong mission to spread strong crops around the world and provide steady food sources to the poor. Borlaug died in 2009.

This file photo shows a Palestinian farmer working in a wheat field in the West Bank city of Jenin. Diseases that ravage wheat fields are as old as time itself. In 1998, a new wave of the fungus known as Ug99 turned up in Uganda, overcoming crops that were once resistant and wielding the potential to kill as much as 90 percent of the world's wheat.

Whipping winds can transport spores as many as 100 miles (160 kilometers) per day, raising concerns among scientists about where the epidemic could turn up next.

"From Yemen, the wind currents are such that it could be carried to almost any part of the world -- winds blow into south Asia, they blow into central Asia, they blow into Europe even," Coffman told AFP.

From South Africa, winds could send the plague to the southern cone of Latin America or to Australia, both areas that grow tremendous amounts of wheat.

Wheat makes up a fifth of the world's food and is second only to rice in the diets of people in developing countries.

Kenya is one country already grappling with a crisis in wheat production, as small farmers face a loss of as much as 70 percent of their yield,

according to Peter Njau, an expert at the Kenya Agriculture Research Institute.

Large-scale farmers who can afford chemicals to kill the fungus still face rising costs of production, as much as 40 percent higher than in normal years, Njau said in an interview.

The price of a bag of wheat has risen by about a third, and spiking fuel costs combined with a recent reduction on import tax for wheat will put a squeeze on local farmers unseen in many years, he said.

"The farmers, when they harvest their crop, they will end up being paid less for their product and that might be a bone of contention between the farmers and the government," said Njau.

This handout photograph, obtained courtesy of the Kenya Agricultural Research Institute in 2005, shows brown spores on wheat, the effects of a deadly fungus that caused the new strain of stem rust dieases decimating wheat plantations in eastern Africa. The disease is now widespread in eastern Africa and threatens to move deep into the Middle East and south Asia.

Kenya is working with experts at Cornell University and in Mexico to deliver new strains that may be able to resist the latest wave of stem rust.

Experts from around the world are heading to Minnesota next week to share their latest research, as part of an annual meeting beginning June 13 by the Borlaug Global Rust Initiative project that was launched in 2005.

Some new approaches include combining multiple resistant genes into a single plant so that it will withstand any mutations that might allow stem rust to take over again, and creating plants that allow a small amount of stem rust to infiltrate so that the fungus doesn't mutate into a new super strain.

"Significant progress" has been made, with some new varieties even boosting yields by up to 15 percent, according to Ravi Singh of the International Maize and Wheat Improvement Center (CIMMYT) in Mexico.

But funding remains a key obstacle, and Singh said world governments must now take steps to replace their wheat crops.

"Scientists can only do so much," Singh said. "We need to see national governments making the investments in seed systems development."