

New races of damaging wheat rust found as old ones continue to spread

According to two new studies produced by scientists in collaboration with FAO, wheat rust, which can cause crop losses of up to 100 percent in untreated susceptible wheat, is spreading further in Europe, Africa, and Asia. Highlighted in the journal *Nature* following their publication by Aarhus University and the International Maize and Wheat Improvement Center (CIMMYT), the reports show the emergence of new races of both yellow and stem rust in various regions of the world in 2016.



Photo by Yue Jin via [Wikimedia Commons](#) - Close up of stem rust

At the same time, well-known existing rust races have spread to new countries, the studies confirm, underlining the need for early detection and action to limit major damage to wheat production, particularly in the Mediterranean basin.

Wheat is a source of food and livelihoods for over one billion people in developing countries. Northern and Eastern Africa, the Near East, and West, Central and South Asia – which are all vulnerable to rust diseases – alone account for some 37 percent of global wheat production.

"These new, aggressive rust races have emerged at the same time that we're working with international partners to help countries combat the existing ones, so we have to be swift and thorough in the way we approach this," said FAO Plant Pathologist Fazil Dusunceli. "It's more important than ever that specialists from international institutions and wheat producing countries work together to stop these diseases in their tracks – that involves continuous surveillance, sharing data and building emergency response plans to protect their farmers and those in neighboring countries."

Wheat rusts spread rapidly over long distances by the wind. If not detected and treated on time, they can turn a healthy looking crop, only weeks away from harvest, into a tangle of yellow leaves, black stems, and shriveled grains. Fungicides can help to limit damage but early detection and rapid action are crucial. So are integrated management strategies in the long run.

Mediterranean most affected by new rusts

On the Italian island of Sicily, a new race of the stem rust pathogen –called TTTTF – hit several thousands of hectares of durum wheat in 2016, causing the largest stem rust outbreak that Europe has seen in decades. Experience with similar races suggests that bread wheat varieties may also be susceptible to the new race. TTTTF is the most recently identified

race of stem rust. Without proper control, researchers caution, it could soon spread over long distances along the Mediterranean basin and the Adriatic coast.

Various countries across Africa, Central Asia and Europe, meanwhile, have been battling new strains of yellow rust never before seen in their fields.

Italy, Morocco and four Scandinavian countries have seen the emergence of an entirely new, yet-to-be-named race of yellow rust. Notably, the new race was most prevalent in Morocco and Sicily, where yellow rust until recently was considered insignificant. Preliminary analysis suggests the new race is related to a family of strains that are aggressive and better adapted to higher temperatures than most others.

Wheat farmers in Ethiopia and Uzbekistan, at the same time, have been fighting outbreaks of yellow rust AF2012, another race which reared its head in both countries in 2016 and struck a major blow to Ethiopian wheat production in particular. AF2012 was previously only found in Afghanistan, before appearing in the Horn of Africa country last year, where it affected tens of thousands of hectares of wheat.

"Preliminary assessments are worrisome, but it is still unclear what the full impact of these new races will be on different wheat varieties in the affected regions," said Dusunceli. "That's what research institutions across these regions will need to further investigate in the coming months."

To offer support, FAO, in collaboration with its partners, is stepping up its efforts in training rust experts from affected countries to boost their ability to detect and manage these emerging wheat rust races.

As new races emerge, old ones continue to spread

The already established Warrior(-) race of yellow rust – which came onto scientists' radars in Northern Europe and Turkey a few years ago – continued its aerial march in 2016 and is now widely present in Europe and West Asia.

The Digalu (TIFTTF) race of stem rust continues to devastate wheats in Ethiopia, while the most well-known race of stem rust - the highly potent Ug99 - is now present in 13 countries. Having spread in a northward trend from East Africa to the Middle East, Ug99 has the potential to affect many wheat varieties grown worldwide as it keeps producing new variants. Most recently, it has been detected in Egypt, one of the Middle East's most important wheat producers.

International collaboration crucial

The findings of the Aarhus study build on training sessions conducted in 2016 in collaboration between the International Center for Agricultural Research in the Dry Areas (ICARDA), Aarhus university, CIMMYT, and FAO. The training, which will be repeated this year, allows rust experts to strengthen their surveillance and management skills, coupled with surveys and collection of rust samples for tests and analysis by Aarhus University. The recently established Regional Cereal Rust Research in Izmir, Turkey, will host the training.

These efforts have been part of FAO's four-year [global wheat rust programme](#), which facilitates regional collaborations and offers support to individual countries eager to boost their surveillance capacity. It also helps countries act swiftly to control outbreaks before they turn into epidemics and cause major damage to food security. But further research, particularly into breeding resistant varieties, and national response plans need to be backed by adequate resources.

FAO, CIMMYT, ICARDA and Aarhus University are working together as members of the [Borlaug Global Rust Initiative](#) (BGRI).

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