

# New wheat disease could spread faster than expected

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Both plant and human diseases that can travel with the wind have the potential to spread far more rapidly than has been understood, according to a new study, in findings that pose serious concerns not only for some human diseases but also a new fungus that threatens global wheat production.

The research, done by scientists at Oregon State University and other institutions, concluded that invading diseases do not always progress in an orderly, constant rate. These historical studies of both plant and animal diseases show that some pathogens that can be carried through the air can actually accelerate as they move, and can become widespread problems much faster than had been thought possible.

"It's now becoming clear that some types of diseases can spread more rapidly and widely than we anticipated," said Chris Mundt, a professor of plant pathology at OSU. "This makes it especially important, in some cases, to stop a spreading disease quickly if you hope to stop it at all."

The studies explain, in part, how [West Nile Virus](#) spread so rapidly across the United States when experts had been expecting a more plodding, methodical progression of the disease. They help analyze the progression of some historic disease problems, such as the catastrophic potato late blight that led to the Irish potato famine of the mid-1840s. And they suggest that a new fungal pathogen of [wheat](#) that emerged a few years ago in Uganda may pose a much more urgent threat to wheat production around the world than first thought.

The research, in fact, used [stripe rust](#) of wheat, which has spores that can spread on the wind, as a model to help explain how this and other pathogens can move. Mundt, an international expert on pathogens of several important [food crops](#), has studied stripe rust for years.

"If we didn't have crops that could resist [wheat stem rust](#), we pretty much wouldn't have a [wheat industry](#)," Mundt said. "From this pathogen we've learned a lot about plant disease resistance in general, and also how pathogens can move and spread. And this new study confirms that it is crucial to get prepared for the rapid spread of a new variety of wheat stem rust that appeared in Uganda in 1999."

That new type of wheat stem rust, Mundt said, has the potential to attack 75 percent of the world's known wheat varieties, and in a bad year might cause up to 50 percent crop losses in some parts of the world.

"We don't want to suggest that the sky is falling, but major losses could occur if the right set of conditions converges," Mundt said. "This is something that we shouldn't take a chance on. It's already spread to Iran, and the new research shows that its global spread may be about to pick up speed."

People are aware of this problem, already working on it, and hopefully they will be able to develop wheat varieties that are more resistant to it, Mundt said.

"But our new understanding of the speed with which pathogens such as this can spread suggest that we don't have a lot of time to waste," he said. "If anything we should be increasing and accelerating our work on a way to deal with this pathogen."

"This wheat disease problem could be global within a few years," Mundt said. "We would be foolish to ignore it."

Most plant and animal diseases that are spread by contact or close proximity tend to move in a fairly predictable and constant rate of speed, researchers say. However, a significant number of pathogens can be borne by wind-carried spores or migrating birds. In those cases, even though only small amounts of an invading pathogen may show up at any one remote spot, it has the potential to get a foothold and spread rapidly at this distant location - giving the invading pathogen the ability to literally accelerate as the epidemic spreads.

In just two years from 2004-06, the avian bird flu spread across parts of three continents in Africa, Europe and Asia, carried by migrating birds. From an initial source of infection in New York City in 1999, the West Nile Virus spread across most of North America within three years, and soon thereafter to the entire Western Hemisphere.

The spread of these diseases seems to follow very definable mathematical formulas, researchers found.

"It was surprising to see how closely the spread of very different plant, animal and human diseases followed the same mathematical relationship," Mundt said. "This is giving us a better ability to predict how various types of diseases may move, and hopefully prepare for them."

Though rapid transportation systems have become increasingly important in establishing new pathogens around the globe, Mundt said, most disease spread is still done by natural mechanisms once a disease is established, not people getting off a jet aircraft.

More information: The study was just published in the *American Naturalist*.

Source: Oregon State University ([news](#) : [web](#))

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