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FACT SHEET

WHEAT BLAST

WHEAT BLAST IS A RELATIVELY NEW DISEASE OF WHEAT CAUSED BY THE FUNGUS *MAGNAPORTHE ORYZAE* Triticum pathotype (MoT). It was first reported in Brazil in 1985 and has become locally important in Brazil, Bolivia, and Paraguay since its emergence. In 2009, the dual wheat blast and Fusarium head scab epidemics in Brazil were estimated to have lowered the national wheat output by 30%. The South American (SA) strains of MoT are genetically diverse as evident in variable disease phenotypes on SA wheat genotypes. In 2012, wheat blast was reported on a single wheat plant in a research plot in Kentucky. Comparative genomic analysis of the Kentucky strain with an SA strain indicated that they emerged from different *M. oryzae* populations. The Kentucky strain most likely emerged in Kentucky from the gray leaf spot pathogen of annual ryegrass and was not introduced from SA. The SA strain appears to have emerged from wild grass populations of *M. oryzae* in SA.

SIGNIFICANCE

Considering the importance of wheat to global food security, its projected importance to feeding two billion additional humans by 2043, and the economic value of global trade in food and feed wheat grains, wheat blast has the potential to disrupt food distribution systems and the economic well-being of several nations.

IMPACTS

MoT infects all above ground plant parts causing leaf lesions and head blight. Seed in infected heads are smaller and of low quality. In severely diseased wheat heads, seed may be absent. Locally severe epidemics with up to 90-100% loss in affected fields, lowered productivity and poor seed quality are common in epidemic years. To date, minimal trade impacts have been reported. However, this could change as the profile of wheat blast increases and if the pathogen spreads to more countries within SA or if it is reported outside of SA.

PROGNOSIS

Based on a quantitative pathway analysis (Cruz Ph.D. Thesis 2013), the probability exists for the spread of the wheat blast pathogen to additional countries as a consequence of trade of wheat grain or by exchange of wheat breeding germplasm. As a result of an export promotion program in Brazil, it is possible that the pathogen has already been distributed to other countries following the 2009 epidemic.

The potential for the emergence of *M. oryzae* strains highly virulent and aggressive to wheat from Lolium populations of *M. oryzae* indigenous in the United States is unknown and needs investigation.

IMPORTANT FACTS

1. Wheat blast has been increasing in importance and area impacted since 1985 with recent epidemics in 2009 and 2012 in Brazil and 2014 in Bolivia. The threat to U.S. wheat production is currently under evaluation.

2. We have many knowledge gaps about wheat blast disease ecology, epidemiology, and the biology of the MoT pathogen. Ongoing NIFA-funded AFRI research and extension is addressing some of the questions, but additional research will be required to gain an understanding of this emerging disease sufficient to effectively manage it.

Blasted Wheat Heads – Brazil 2012

Wheat Blast Epidemic – Brazil 2012

continued >>

3. While a similar disease on rice (*M. oryzae* patho-systems - i.e., MoT-wheat, *Moo*-rice, *MoL*-ryegrass) occurs in the U.S., similarities in pathogen biology, epidemiology, and disease management are uncertain. We cannot assume that because we know one thing about the rice disease, that it has any relationship tot eh wheat disease.

4. The MoT pathogen varies substantially in how it expresses disease in commercial wheat varieties in South America. Consequently, concerted wheat breeding efforts are necessary should the disease reach the U.S.

5. Leaf infection may or may not be important in the infection of wheat heads. We do not fully understand the most important sources of the pathogen for head infection.

Early detection of the disease is imperative.

The National Plant Diagnostic Network (NPDN) is a critical component of the biosecurity infrastructure of the United States. The detection network provided by NPDN helps rapidly recognize and identify wheat blast and minimize economic and yield loses. NPDN trains agricultural professionals, engaging them as citizen scientists to increase the opportunities to detect outbreaks of this and other important pests and diseases, leveraging the capacity and expertise of the land grant university system to enhance our biosecurity network.

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