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**When you support
Extension, wheat
producers and
governmental
bodies have access
to research-based
information to
make informed
decisions.**

COOPERATIVE EXTENSION EXTENDING KNOWLEDGE *Changing Lives*



David Van Sanford and Lloyd Murdock scout the research plots at the UK Research and Education Center in Princeton.

Extension Plant Pathology and Diagnostic Services Averted Unnecessary and Costly Destruction of Kentucky Wheat Crop

Wheat blast is an emerging threat to wheat production world-wide. When discovered in Kentucky, Extension researchers responded quickly to identify the source and avoided destruction of \$217 million of Kentucky wheat.



In 2015, over 32 million bushels of wheat was produced in Kentucky. The five-year average value of wheat in Kentucky is \$217 million each year.

United States Department of Agriculture, National Agricultural Statistics Service

Wheat blast is caused by a fungus (*Magnaporthe oryzae/Pyricularia grisea*) and was first detected in Brazil in 1985 when it caused farm crop losses of 40% to 100%. In 2016, entire wheat crops were burned in Bangladesh to avert spread of the fungus. There are no commercially available resistant varieties of wheat, and fungicidal programs targeting wheat blast have generally been ineffective due to the emergence of genetic resistance in the fungus.

In 2011, an Extension specialist working at the University of Kentucky Research and Education Center in Princeton found wheat blast on a single wheat head in a research plot. UK plant pathologists quickly determined that the wheat blast pathogen found in Kentucky was genetically similar to a pathogen strain previously found on annual ryegrass, a common forage crop in the south but recognized as a weed in Kentucky wheat fields. From this, it was concluded that the fungus found on wheat in 2011 in Kentucky had likely been around for decades attacking annual and perennial ryegrasses. Perennial ryegrass is a common turfgrass in Kentucky but infrequently used for forage. This was the first time it was documented that the pathogen had apparently jumped hosts from annual ryegrass to wheat. By determining that the 2011 detection came from annual ryegrass growing locally and not from South American wheat, potentially serious regulatory actions, such as quarantines and crop destruction, were averted. It is suspected that low level wheat blast infections had previously occurred in Kentucky but had escaped notice because the disease symptoms are similar to those of Fusarium head blight, a very common disease.

Extension specialists and UK-affiliated researchers helped avert unnecessary regulatory

action in Kentucky and possibly in other states, as well. Dr. Mark Farman (Professor, Plant Pathology; Associate Director, UK Healthcare Genomics Center) is co-PI on a large, National Institute of Food and Agriculture (NIFA)-funded project to develop novel strategies for controlling blast diseases in wheat and rice. His group has:

- generated a diagnostic tool for identifying foreign wheat blast strains;
- identified genes that lead to resistance in wheat to the blast fungus;
- determined that the South American wheat blast fungus has now escaped from its continent creating a global concern for a devastating disease.

The USDA Animal and Plant Health Inspection Service (APHIS) followed the research developments very closely. UK also provided them with protocols that they started using in-house. In addition, Extension specialists are working internationally to develop disease-resistant varieties of wheat and to develop methods of global monitoring of the movement and distribution of blast-causing fungal strains.



Wheat blast identified at UK Research and Education Center in Princeton. Wheat blast is a disease of major concern for wheat breeders worldwide.