Recovery Plan for Wheat Blast
(caused by *Magnaporthe oryzae*
*Triticum* pathotype)

Contributors:

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Known as ‘Brusone do Trigo’

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Wheat Blast in South America

- In Brazil, Bolivia, Paraguay, and Northern Argentina
- Yield losses from 5 to 100% in individual fields
- Bad Blast outbreak in 2009 led to the 1st International Wheat Blast Workshop in Brazil (May, 2010) and establishment of the International Wheat Blast Consortium
Widespread occurrence of head blast, without leaf blast infection, raises the question of inoculum source
Major resistance genes lacking; fungicide treatments unreliable; impact of climate change not understood
Wheat Blast could easily be mistaken for Fusarium head blight if it appears in the US crop

- Main symptoms are bleached heads with traces of gray from blast sporulation
- With severe infection, seeds are shriveled, poorly developed
- The fungus can be transmitted through seeds

Wheat blast symptoms (arrow). From laboratory inoculations by Gary Peterson (Ft. Detrick, MD).

Blast-infected Christian Cruz and Bill Bockus, KSU.
Two potential routes to emergence of wheat blast in the U.S.

• Introduction from South American
  - The fungus is seed-borne, increasing opportunities for spread

• Host shift mutations in native U.S. Gray Leaf Spot turf grass pathogen strains
  - This second route confirmed by single blasted wheat head in Kentucky
Magnaporthe oryzae Includes Host-adapted Forms

Mark Farman 2002 Phytopathology
First report of wheat blast outside South America. Genome sequencing showed the fungus was a native US ryegrass strain.

LEXINGTON, Ky. University of Kentucky College of Agriculture specialists are encouraging Kentucky wheat producers and crop consultants to scout their fields for a new disease that could have important implications for future crop years.

Lloyd Murdock, Don Hershman, Mark Farman, Gary Peterson
US Wheat Shows a Continuum of Reaction to Wheat Blast

Screening in BSL-3 facilities at Ft. Detrick and KSU
Field Tests in South America

First field tests completed in Bolivia and more are planned

http://en.wikipedia.org/wiki/South_america

Cruz, Bockus, Peterson and Stack
Research Priorities:

• Identify blast resistance in US wheat varieties through field tests in South America

• Molecular markers for broadly effective resistance genes

• PCR-based diagnostics

• Optimize fungicide treatments including seed treatments

• Understand wheat blast epidemiology

• Determine risk from native US ryegrass strains

• Wheat blast forecasting model
Extension Priorities:

• Train farmers and agricultural professionals to identify wheat blast

• Incorporate blast surveillance into ongoing wheat disease monitoring networks, perhaps into the developing ipmPIPE

• Educate growers and agricultural professionals about ryegrass blast and the potential threat to wheat
Education Priorities:

• Develop and host wheat blast workshops and short courses for wheat stakeholders

• Develop and disseminate Extension publications on identification and management of wheat blast

• Dovetail outreach efforts with NCERA-184 and WERA-97 to avoid duplication of effort and promote inter-group cooperation and activities