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plant disease

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[Home](#) > [Plant Disease](#) > [Table of Contents](#) > [Full Text HTML](#)
[Previous Article](#) | [Next Article](#)

November 2016, Volume 100, Number 11
Page 2330
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DISEASE NOTES

First Report of Wheat Blast Caused by *Magnaporthe oryzae* Pathotype *triticum* in Bangladesh

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Wheat blast or 'brusone,' caused by the ascomycetous fungus *Magnaporthe oryzae* B.C. Couch (syn. *Pyricularia oryzae* Cavara), was first identified in 1985 in Brazil. *M. oryzae* is composed of a range of morphologically identical but genetically different host-specific pathotypes that are specialized for infecting rice (*Oryza* pathotype), wheat (*Triticum* pathotype - *MoT*), perennial and annual ryegrass (*Lolium* pathotype), foxtail millet (*Setaria* pathotype), and many other graminaceous hosts. Isolates from different hosts are genetically distinct, although cross infection occurs to some extent. Wheat blast has become a serious biotic constraint to wheat (*Triticum aestivum* L.) production in parts of the warmer wheat growing areas of the Southern Cone region of South America, causing yield losses of 10 to 100% in recent years (Duveiller et al. 2016). Wheat blast was observed for the first time outside of South America during the 2015-16 cropping season in the districts of Kushtia, Meherpur, Chuadanga, Jhenaidah, Jessore, Barisal, Bhola, and several other districts in the south of Bangladesh. Infected plants showed the

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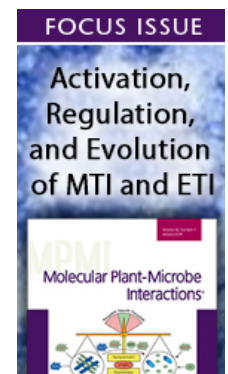
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typical wheat blast symptoms with the spike becoming partially or completely bleached with the blackening of the rachis in a short span of time. Examination of diseased plants showed the presence of elliptical, grayish to tan necrotic lesions with dark borders on the leaf often mixed with spot blotch disease lesions. Additionally, in some fields, blackening of lower nodes was observed. Grains from blast-infected heads were small, shriveled, deformed, and had low test-weight leading to serious yield losses. Diseased plants were collected and brought to the Wheat Research Centre, Bangladesh Agricultural Research Institute, Dinajpur, for further investigation. Grayish mycelium of the fungus taken from the infection point on the rachis of several independent spikes was observed. Incubation of several infected spikes/leaves in a 3-layered moist blotter at room temperature less than 12 h light/darkness cycle for 5 days led to the production of pyriform conidia. Morphobiometrical characteristics of the typical pyriform (pear-shaped) and 2-septate hyaline conidia were in agreement with the identification of the fungus as *M. oryzae* (Subramanian 1968). The air-dried spike samples have been kept in cold storage and several infected spikes were sent to the USDA-ARS, FDWSRU laboratory in the United States for characterization of the pathogen. There, the presence of *M. oryzae* in the infected samples was confirmed based on morphobiometrical analysis, and strains were preserved in the FDWSRU permanent wheat blast strain collection. Molecular analysis with *MoT*-specific markers and comparative genome analysis of isolates (BdBar16-1, GenBank accession no. LXON01000000; BdJes16-1, LXOO01000000; BdMeh16-1, LXOP01000000) confirmed that the wheat blast observed in Bangladesh is caused by *MoT* pathotype and has strong genetic identity to a strain from South America (B71, LXOQ01000000). This first incidence of wheat blast was significantly widespread accounting for approximately 15% of Bangladesh's total wheat area. This large scale incidence of wheat blast has underscored a concern about the potential spread of wheat blast to other wheat producing areas in Bangladesh, South Asia, and beyond.

References:

Section:

Duveiller, E., et al. 2016. Page 1107 in: World Wheat Book, Volume 3. A History of Wheat. **A. Bonjean** and **M. van Ginkel**, eds. Lavoisier, Paris, France.

[Open URL](#) [\[Google Scholar\]](#)

Subramanian, C. V. 1968. *Pyricularia oryzae*. CMI Descriptions of Pathogenic Fungi and Bacteria No. 169. CMI, Kew, Surrey, U.K. [Open URL](#) [\[Google Scholar\]](#)

This project was supported by Agriculture and Food Research Initiative Competitive Grant no. 2013-68004-20378 from the USDA National Institute of Food and Agriculture and the CGIAR Research Program on Wheat.

Cited by

Alternative use of wheat land to implement a potential wheat holiday as wheat blast control: In search of feasible crops in Bangladesh

[Khondoker Abdul Mottaleb](#), [Pawan Kumar Singh](#), [Xinyao He](#), [Akbar Hossain](#), [Gideon Kruseman](#), and [Olaf Erenstein](#)

Land Use Policy Mar 2019, Volume 82, 1-12

[Crossref](#)

Variable resistance of bread wheat (*Triticum aestivum*) lines carrying 2NS/2AS translocation to wheat blast

[Lourdes Cardozo Téllez](#), [Alice Chavez](#), [Nathalia Bobadilla](#), [Pastor Pérez-Estigarribia](#), [Mohan Kohli](#), and [Hermann Buerstmayr](#)

Plant Breeding Feb 2019, Volume 138, Number 1, 62-68

[Crossref](#)

Specific Detection of the Wheat Blast Pathogen (*Magnaporthe oryzae* Triticum)

by Loop-Mediated Isothermal Amplification

[Jarred Yasuhara-Bell](#), [Kerry F. Pedley](#), [Mark Farman](#), [Barbara Valent](#), and [James P. Stack](#)

Plant Disease Dec 2018, Volume 102, Number 12, 2550-2559

[Abstract](#) | [Full Text HTML](#) | [PDF Print](#) | [PDF with Links](#) |

A New Resistance Gene in Combination with *Rmg8* Confers Strong Resistance Against *Triticum* Isolates of *Pyricularia oryzae* in a Common Wheat Landrace

[Shizhen Wang](#), [Soichiro Asume](#), [Trinh Thi Phuong Vy](#), [Yoshihiro Inoue](#), [Izumi Chuma](#), [Joe Win](#), [Kenji Kato](#), and [Yukio Tosa](#)

Phytopathology Nov 2018, Volume 108, Number 11, 1299-1306

[Abstract](#) | [Full Text HTML](#) | [PDF Print](#) | [PDF with Links](#) |

A Putative Zn2Cys6 Transcription Factor Is Associated With Isoprothiolane Resistance in *Magnaporthe oryzae*

[Zuo-Qian Wang](#), [Fan-Zhu Meng](#), [Ming-Ming Zhang](#), [Liang-Fen Yin](#), [Wei-Xiao Yin](#), [Yang Lin](#), [Tom Hsiang](#), [You-Liang Peng](#), [Zong-Hua Wang](#), and [Chao-Xi Luo](#)

Frontiers in Microbiology Oct 2018, Volume 9

[Crossref](#)

Wheat blast: from its origins in South America to its emergence as a global threat

[Paulo Cezar Ceresini](#), [Vanina Lilián Castroagudín](#), [Fabrício Ávila Rodrigues](#), [Jonas Alberto Rios](#), [Carlos Eduardo Aucique-Pérez](#), [Silvino Intra Moreira](#), [Daniel Croll](#), [Eduardo Alves](#), [Giselle de Carvalho](#), [João Leodato Nunes Maciel](#), and [Bruce Alan McDonald](#)

Molecular Plant Pathology Oct 2018, Volume 98

[Crossref](#)

Multi-environment assessment of fungicide performance for managing wheat head blast (WHB) in Brazil and Bolivia

[Christian D. Cruz](#), [Flávio M. Santana](#), [Timothy C. Todd](#), [João L. N. Maciel](#), [Javier Kiyuna](#), [Diego F. Baldeomar](#), [Andrés P. Cruz](#), [Douglas Lau](#), [Claudine S. Seixas](#), [Augusto C. P. Goulart](#), [Angelo A. Sussel](#), [Carlos A. Schipanski](#), [Débora F. Chagas](#), [Maurício Coelho](#), [Tatiane Dalla Nora Montecelli](#), [Carlos Utiamada](#), [Adriano P. Custódio](#), [Marcia G. Rivadeneira](#), [William W. Bockus](#), and [Barbara Valent](#)

Tropical Plant Pathology Oct 2018, Volume 113

[Crossref](#)

Wheat Blast: Past, Present, and Future

[Paulo Cezar Ceresini](#), [Vanina Lilián Castroagudín](#), [Fabrício Ávila Rodrigues](#), [Jonas Alberto Rios](#), [Carlos Eduardo Aucique-Pérez](#), [Silvino Intra Moreira](#), [Eduardo Alves](#), [Daniel Croll](#), and [João Leodato Nunes Maciel](#)

Annual Review of Phytopathology Aug 2018, Volume 56, Number 1, 427-456

[Crossref](#)

A nuclear contortionist: the mitotic migration of *Magnaporthe oryzae* nuclei during plant infection

[Mariel A. Pfeifer](#) and [Chang Hyun Khang](#)

Mycology Jul 2018, Volume 9, Number 3, 202-210

[Crossref](#)

Wheat blast disease management: cues from the advancements in molecular biology of rice-*Magnaporthe* pathosystem

[B. N. Devanna](#) and [T. R. Sharma](#)

Journal of Plant Biochemistry and Biotechnology Jul 2018, Volume 27, Number 3, 249-259

[Crossref](#)

Rise of a Cereal Killer: The Biology of *Magnaporthe oryzae* Biotrophic Growth

[Jessie Fernandez](#) and [Kim Orth](#)

Trends in Microbiology Jul 2018, Volume 26, Number 7, 582-597

[Crossref](#)

Threat of wheat blast to South Asia's food security: An ex-ante analysis

[Khondoker Abdul Mottaleb](#), [Pawan Kumar Singh](#), [Kai Sonder](#), [Gideon Kruseman](#), [Thakur Prasad Tiwari](#), [Naresh C. D. Barma](#), [Paritosh Kumar Malaker](#), [Hans-Joachim Braun](#), [Olaf Erenstein](#), and [Wujun Ma](#)

PLOS ONE May 2018, Volume 13, Number 5, e0197555

[Crossref](#)

Threats of Tar Spot Complex disease of maize in the United States of America and its global consequences

[Khondoker Abdul Mottaleb](#), [Alexander Loladze](#), [Kai Sonder](#), [Gideon Kruseman](#), and [Felix San Vicente](#)

Mitigation and Adaptation Strategies for Global Change May 2018, Volume 21

[Crossref](#)

Rmg8 and Rmg7, wheat genes for resistance to the wheat blast fungus, recognize the same avirulence gene AVR-Rmg8

[Vu Lan Anh](#), [Yoshihiro Inoue](#), [Soichiro Asuke](#), [Trinh Thi Phuong Vy](#), [Nguyen Tuan Anh](#), [Shizhen Wang](#), [Izumi Chuma](#), and [Yukio Tosa](#)

Molecular Plant Pathology May 2018, Volume 19, Number 5, 1252-1256

[Crossref](#)

Wheat Production and Consumption Dynamics in an Asian Rice Economy: The Bangladesh Case

[Khondoker A. Mottaleb](#), [Dil Bahadur Rahut](#), [Gideon Kruseman](#), and [Olaf Erenstein](#)
The European Journal of Development Research Apr 2018, Volume 30, Number 2, 252-275

[Crossref](#)

Gene Flow between Divergent Cereal- and Grass-Specific Lineages of the Rice Blast Fungus *Magnaporthe oryzae*

[Pierre Gladieux](#), [Bradford Condon](#), [Sebastien Ravel](#), [Darren Soanes](#), [Joao Leodato Nunes Maciel](#), [Antonio Nhani](#), [Li Chen](#), [Ryohei Terauchi](#), [Marc-Henri Lebrun](#), [Didier Tharreau](#), [Thomas Mitchell](#), [Kerry F. Pedley](#), [Barbara Valent](#), [Nicholas J. Talbot](#), [Mark Farman](#), [Elisabeth Fournier](#), and [John W. Taylor](#)

mBio Mar 2018, Volume 9, Number 1

[Crossref](#)

Evolving food consumption patterns of rural and urban households in developing countries

[Khondoker Abdul Mottaleb](#), [Dil Bahadur Rahut](#), [Gideon Kruseman](#), and [Olaf Erenstein](#)

British Food Journal Feb 2018, Volume 120, Number 2, 392-408

[Crossref](#)

The fungal pathogen *Magnaporthe oryzae* suppresses innate immunity by modulating a host potassium channel

[Xuetao Shi](#), [Yu Long](#), [Feng He](#), [Chongyang Zhang](#), [Ruyi Wang](#), [Ting Zhang](#), [Wei Wu](#), [Zeyun Hao](#), [Yi Wang](#), [Guo-Liang Wang](#), [Yuese Ning](#), and [Yuanchao Wang](#)

PLOS Pathogens Jan 2018, Volume 14, Number 1, e1006878

[Crossref](#)

The arms race between *Magnaporthe oryzae* and rice: Diversity and interaction of Avr and R genes

[Bao-hua WANG](#), [Daniel J. Ebbole](#), and [Zong-hua WANG](#)

Journal of Integrative Agriculture Dec 2017, Volume 16, Number 12, 2746-2760

[Crossref](#)

Photosynthesis impairments and excitation energy dissipation on wheat plants supplied with silicon and infected with *Pyricularia oryzae*

[Carlos Eduardo Aucique-Pérez](#), [Paulo Eduardo de Menezes Silva](#), [Wiler Ribas Moreira](#), [Fábio Murilo DaMatta](#), and [Fabrício Ávila Rodrigues](#)

Plant Physiology and Biochemistry Dec 2017, Volume 121, 196-205

[Crossref](#)

NOXious gases and the unpredictability of emerging plant pathogens under climate change

[Helen N. Fones](#) and [Sarah J. Gurr](#)

BMC Biology Dec 2017, Volume 15, Number 1

[Crossref](#)

Chapter 5: Wheat Blast Caused By Magnaporthe Oryzae Pathotype Triticum: Present Status, Variability, and Strategies for Management

[Devendra Pal Singh](#)

Management of Wheat and Barley Diseases Oct 2017, 635-644

[Crossref](#)

Transfer and engineering of immune receptors to improve recognition capacities in crops

[Luis Rodriguez-Moreno](#), [Yin Song](#), and [Bart PHJ Thomma](#)

Current Opinion in Plant Biology Aug 2017, Volume 38, 42-49

[Crossref](#)

Caught in the jump

[Takaki Maekawa](#) and [Paul Schulze-Lefert](#)

Science Jul 2017, Volume 357, Number 6346, 31-32

[Crossref](#)

Evolution of the wheat blast fungus through functional losses in a host specificity determinant

[Yoshihiro Inoue](#), [Trinh T. P. Vy](#), [Kentaro Yoshida](#), [Hokuto Asano](#), [Chikako Mitsuoka](#), [Soichiro Asume](#), [Vu L. Anh](#), [Christian J. R. Cumagun](#), [Izumi Chuma](#), [Ryohei Terauchi](#), [Kenji Kato](#), [Thomas Mitchell](#), [Barbara Valent](#), [Mark Farman](#), and [Yukio Tosa](#)

Science Jul 2017, Volume 357, Number 6346, 80-83

[Crossref](#)

Wheat blast disease: danger on the move

[Christian D. Cruz](#) and [Barbara Valent](#)

Tropical Plant Pathology Jun 2017, Volume 42, Number 3, 210-222

[Crossref](#)

A special issue on Fusarium head blight and wheat blast

[Emerson M. Del Ponte](#), [Barbara Valent](#), and [Gary C. Bergstrom](#)

Tropical Plant Pathology Jun 2017, Volume 42, Number 3, 143-145

[Crossref](#)

The Lolium Pathotype of Magnaporthe oryzae Recovered from a Single Blasted Wheat Plant in the United States

[Mark Farman](#), [Gary Peterson](#), [Li Chen](#), [John Starnes](#), [Barbara Valent](#), [Paul Bachi](#), [Lloyd Murdock](#), [Don Hershman](#), [Kerry Pedley](#), [J. Mauricio Fernandes](#), and [Jorge Bavaresco](#)

Plant Disease May 2017, Volume 101, Number 5, 684-692

[Abstract](#) | [Full Text HTML](#) | [PDF Print](#) | [PDF with Links](#) |

Durable resistance to rice blast

[Guo-Liang Wang](#) and [Barbara Valent](#)

Science Mar 2017, Volume 355, Number 6328, 906-907

[Crossref](#)

Genomics-Based Marker Discovery and Diagnostic Assay Development for Wheat Blast

[Michael L. Pieck](#), [Amy Ruck](#), [Mark L. Farman](#), [Gary L. Peterson](#), [James P. Stack](#), [Barbara Valent](#), and [Kerry F. Pedley](#)

Plant Disease Jan 2017, Volume 101, Number 1, 103-109

[Abstract](#) | [Full Text HTML](#) | [PDF Print](#) | [PDF with Links](#) |

**Sustainable crop intensification through surface water irrigation in Bangladesh?
A geospatial assessment of landscape-scale production potential**

[Timothy J. Krupnik](#), [Urs Schulthess](#), [Zia Uddin Ahmed](#), and [Andrew J. McDonald](#)
Land Use Policy Jan 2017, Volume 60, 206-222

[Crossref](#)

**A comparative analysis of nonhost resistance across the two Triticeae crop
species wheat and barley**

[Rhoda Delventhal](#), [Jeyaraman Rajaraman](#), [Francesca L. Stefanato](#), [Sajid Rehman](#),
[Reza Aghnoum](#), [Graham R. D. McGrann](#), [Marie Bolger](#), [Björn Usadel](#), [Pete E.](#)
[Hedley](#), [Lesley Boyd](#), [Rients E. Niks](#), [Patrick Schweizer](#), and [Ulrich Schaffrath](#)
BMC Plant Biology, Volume 17, Number 1

[Crossref](#)

**Emergence of wheat blast in Bangladesh was caused by a South American
lineage of *Magnaporthe oryzae***

[M. Tofazzal Islam](#), [Daniel Croll](#), [Pierre Gladieux](#), [Darren M. Soanes](#), [Antoine](#)
[Persoons](#), [Pallab Bhattacharjee](#), [Md. Shaid Hossain](#), [Dipali Rani Gupta](#), [Md.](#)
[Mahbubur Rahman](#), [M. Golam Mahboob](#), [Nicola Cook](#), [Moin U. Salam](#), [Musrat](#)
[Zahan Surovy](#), [Vanessa Bueno Sancho](#), [João Leodato Nunes Maciel](#), [Antonio](#)
[NhaniJúnior](#), [Vanina Lilián Castroagudín](#), [Juliana T. de Assis Reges](#), [Paulo Cezar](#)
[Ceresini](#), [Sebastien Ravel](#), [Ronny Kellner](#), [Elisabeth Fournier](#), [Didier Tharreau](#),
[Marc-Henri Lebrun](#), [Bruce A. McDonald](#), [Timothy Stitt](#), [Daniel Swan](#), [Nicholas J.](#)
[Talbot](#), [Diane G. O. Saunders](#), [Joe Win](#), and [Sophien Kamoun](#)
BMC Biology Dec 2016, Volume 14, Number 1

[Crossref](#)

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