

SCIENTISTS ISSUE RALLYING CRY FOR WHEAT BLAST RESEARCH

A team of scientists in the UK and Bangladesh are turning to the combined knowledge of the global scientific community to address an emerging threat to Asian agriculture.

The target is the fearsome fungal disease wheat blast. The pathogen was spotted in Bangladesh in February this year – its first report in Asia. Wheat is the second major food source in Bangladesh, after rice. The blast disease has, so far, caused up to 90% yield losses in more than 15,000 hectares. Scientists fear that the pathogen could spread further to other wheat growing areas in South Asia. The UK and Bangladeshi teams are making raw genetic data for the wheat blast pathogen available on a new website – www.wheatblast.net - and inviting others to do the same. Professor Sophien Kamoun, of The Sainsbury Laboratory in Norwich, who is leading the project, said that a wide cultural change is needed for scientists to optimally address new threats to food security.

“I have a beef with the way that research is typically done. We need a fundamentally new approach to sharing genetic data for emerging plant diseases,” he said. “We need to generate and make data public more rapidly and seek input from a larger crowd because, collectively, we are better able to answer questions.”

Professor Kamoun, with colleagues at The Genome Analysis Centre and John Innes Centre in Norwich, and with Professor Tofazzal Islam's Team of Bangabndhu Sheikh Mujibur Rahman Agricultural University (BSMRAU) in Bangladesh, is hoping that the www.wheatblast.net website, together with an accompanying Facebook page, will provide a hub for information, collaboration and comment. They are basing the site on their successful Open Ash Dieback website, which brought scientists together in the fight against ash dieback disease.

The blast fungus normally infects rice and over 50 types of grasses. Occasionally, a blast fungus strain would jump from one host to another resulting in a new disease. Such a “host jump” to wheat has happened in Brazil in the 1980s. The wheat blast pathogen is now rife in South America, where it infects up to 3 million hectares and causes serious crop losses.

Prof Kamoun and colleagues are working with Professor Tofazzal Islam's team, of the Department of Biotechnology of BSMRAU in Gazipur, Bangladesh. They hope that the genetic data will help determine whether the Bangladeshi wheat-infecting strain has evolved independently from local grass-infecting fungi or was somehow introduced into the country.

Professor Tofazzal Islam said “This pathogen causes a destructive disease on rice and it would be disastrous if the same situation arises now in wheat. Genomic and post-genomic research should clarify the origin of the wheat strain

and guide measures for disease management. Prompt responses are needed from the scientific community and the government of Bangladesh for addressing this national crisis to ensure increasing wheat production, which is linked with future food and nutritional security of the nation.”

The group of scientists includes Dr Diane Saunders at The Genome Analysis Centre and John Innes Centre who developed a technique last year, known as Field Pathogenomics. To date, Field Pathogenomics has been applied to track another fungal crop disease – yellow rust. The method generates highly-specific genetic information directly from diseased wheat samples to determine the identity of the pathogen strain that’s associated with an epidemic. Application of this method to wheat blast should unmask the pathogen in Bangladesh and contribute to a response plan.

The recent wheat blast epidemic in Bangladesh has prompted Professor Nick Talbot, University of Exeter, to post on the wheatblast.net website a set of genetic data generated by his group from worldwide populations of the wheat and rice blast fungus. Prof Talbot said “In an emergency like this one, the community must come together to share data and compare notes. Only then, we will determine the true identity of the pathogen and put in place effective measures in a timely fashion.”

Professor Neil Hall, Director of The Genome Analysis Centre said: “It is critical in emerging crises like this that scientific data is rapidly generated and made available as soon as possible. Having an open-access site has already galvanized open exchange of information for the ash dieback disease. The scientific community needs to rally behind open science to respond to recurrent threats to global food security.”

This research has been funded by the Gatsby Charitable Foundation and UK’s Biotechnology and Biological Sciences Research Council (BBSRC).

Notes to editors

1. Professor Sophien Kamoun is available for interview on Friday 15 April and Saturday 16 April. After that he will be travelling but available for telephone interviews. If you would like to interview Professor Kamoun please see contact details below.

2. For further information or to arrange interviews please contact:

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3. Images to accompany the press release can be found at: <http://bit.ly/1p3Fu1L>

4. About The Sainsbury Laboratory

The Sainsbury Laboratory (TSL) is a world-leading research centre focusing on making fundamental discoveries about plants and how they interact with microbes. TSL not only provides fundamental biological insights into plant-pathogen interactions, but is also delivering novel, genomics-based, solutions which will significantly reduce losses from major diseases of food crops, especially in developing countries. TSL is an independent charitable company and receives strategic funding from the Gatsby Charitable Foundation with the balance coming from competitive grants and contracts from a range of public and private bodies, including the European Union (EU), Biotechnology and Biological Sciences Research Council (BBSRC) and commercial and charitable organisations www.tsl.ac.uk.

5. About The Genome Analysis Centre

The Genome Analysis Centre (TGAC) is a world-class research institute focusing on the development of genomics and computational biology. TGAC is based within the Norwich Research Park and receives strategic funding from the Biotechnology and Biological Science Research Council (BBSRC) - £7.4M in 2013/14 - as well as support from other research funders. TGAC is one of eight institutes that receive strategic funding from BBSRC. TGAC operates a National Capability to promote the application of genomics and bioinformatics to advance bioscience research and innovation.

TGAC offers state of the art DNA sequencing facility, unique by its operation of multiple complementary technologies for data generation. The Institute is a UK hub for innovative Bioinformatics through research, analysis and interpretation of multiple, complex data sets. It hosts one of the largest computing hardware facilities dedicated to life science research in Europe. It is also actively involved in developing novel platforms to provide access to computational tools and processing capacity for multiple academic and industrial users and promoting applications of computational Bioscience. Additionally, the Institute offers a Training programme through courses and workshops, and an Outreach programme targeting schools, teachers and the general public through dialogue and science communication activities. www.tgac.ac.uk

6. About the John Innes Centre

Our mission is to generate knowledge of plants and microbes through innovative research, to train scientists for the future, to apply our knowledge of nature's diversity to benefit agriculture, the environment, human health and well-being, and engage with policy makers and the public.

To achieve these goals we establish pioneering long-term research objectives in plant and microbial science, with a focus on genetics. These objectives include promoting the translation of research through partnerships to develop improved crops and to make new products from microbes and plants for human health and other applications. We also create new approaches, technologies and resources that enable research advances and help industry to make new products. The knowledge, resources and trained researchers we generate help global societies address important challenges including providing sufficient and affordable food, making new products for human health and industrial applications, and developing sustainable bio-based manufacturing.

This provides a fertile environment for training the next generation of plant and microbial scientists, many of whom go on to careers in industry and academia, around the world.

The John Innes Centre is strategically funded by the Biotechnology and Biological Sciences Research Council (BBSRC). In 2014-2015 the John Innes Centre received a total of £36.9 million from the BBSRC.

7. About the BBSRC

The Biotechnology and Biological Sciences Research Council (BBSRC) invests in world-class bioscience research and training on behalf of the UK public. Our aim is to further scientific knowledge, to promote economic growth, wealth and job creation and to improve quality of life in the UK and beyond.

Funded by Government, BBSRC invested over £509M in world-class bioscience in 2014-15. We support research and training in universities and strategically funded institutes. BBSRC research and the people we fund are helping society to meet major challenges, including food security, green energy and healthier, longer lives.

Our investments underpin important UK economic sectors, such as farming, food, industrial biotechnology and pharmaceuticals.

For more information about BBSRC, our science and our impact see:

<http://www.bbsrc.ac.uk>

8. About Department of Biotechnology of BSMRAU

Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU) is a public university in Bangladesh, which is known as a "Center of Excellence" in higher education and advanced research. The Department of Biotechnology of BSMRAU delivers high class teaching and conducts cutting-edge research in biotechnology for sustainable solution of current and emerging challenges associated with food and nutritional security of Bangladesh and the globe.

<http://www.btlbsmrau.org>

9. Useful links:

Wheatblast.net (to go live Tuesday morning, 00:01 BST, 19 April 2016)

Wheat blast website at Kansas State University <https://www.k-state.edu/wheatblast/>

Wheat blast website at CIMMYT <http://www.cimmyt.org/en/wheat-blast>

Wheat in Bangladesh <http://aobpla.oxfordjournals.org/content/5/pls042.full>

Wheat blast threatens yield <http://www.thedailystar.net/backpage/wheat-blast-threatens-yield-784372>

Wheat blast affects 15,500 hectares of land in 5 districts

<http://www.thedailystar.net/country/wheat-blast-affects-15500-hectares-land-5-dists-1208944>

Genomics of emerging plant pathogens: too little, too late. Microbiology Today

http://kamounlab.dreamhosters.com/pdfs/MicrobiologyToday_2012.pdf

OpenAshDieBack <http://oadb.tsl.ac.uk>

Ends.