RRES Press Release 21/12/22 Chinese farm practice and oilseed rape

**Chinese farm practice may offer clue to improved oilseed rape disease control**

***Rotating OSR with rice cultivation may impede sexual reproduction of blackleg fungus***

A comparative study of a fungal pathogen of oilseed rape (OSR) in Europe and China using new genetic markers suggests that the flooding associated with rice cultivation in China may be limiting its ability to sexually reproduce. These results have important implications for OSR integrated pest management strategies and could contribute to improved security of oilseed supplies.

Blackleg (Phoma) disease is a globally important disease of OSR. Whilst there are at least two fungal species that cause the disease, the study focussed on just one, Plenodomus biglobosus, that causes serious outbreaks of the disease, particularly in China.  The fungus can reproduce both asexually and sexually, but it is heterothallic – in other words, two different mating types must be present for sexual reproduction to occur.

Using new [PCR](https://www.bbc.co.uk/bitesize/guides/zrwhrj6/revision/3)-based diagnostics, the research team screened 59 European and 157 Chinese isolates. Overall, in both Europe and China, P. biglobosus mating types did not deviate from a 1:1 ratio, which would be normal for sexually reproducing pathogen populations. Both mating types were balanced in all the individual European countries tested (Austria, France, Poland, UK). However, in China, mating types were only balanced in the eastern region, whereas in the northern and southwestern regions there were skewed ratios, more typical of predominantly asexual reproduction.

“In parts of China, in which rice and OSR are often grown in rotation; OSR stubble is often submerged under water for long periods. Flooding of infected debris for even relatively short periods of time may inhibit sexually derived spore production and release,” said Dr Kevin King, the lead investigator on the study.

Further research is now required to explore the extent to which sexually produced spores drive blackleg outbreaks in China.

“Future work should focus on quantifying the amounts of airborne spores of P. biglobosus at different locations in China through air spore trapping in conjunction with species-specific real-time PCR,” said Dr King.

P. biglobosus is becoming an increasingly important OSR pathogen in the UK, and it is the only species currently causing blackleg disease in China, the world's second largest OSR producer. Regular sexual reproduction, which could lead to increased genetic variation, enabling the pathogen to better respond to environmental change, may be occurring more often in European as opposed to Chinese pathogen populations.

“Understanding the extent to which sexual reproduction might be occurring in the field for Chinese P. biglobosus population, could provide novel insights, for instance into spore dispersal, that could be used to inform blackleg disease management strategies,” added Dr King.

This research is published in the journal Pathogens and is a collaborative study between scientists at Rothamsted Research in the UK and Huazong Agricultural University in China.

Publication

Indirect Evidence Based on Mating-Type Ratios for the Role of Sexual Reproduction in European and Chinese Populations of *Plenodomus biglobosus* (Blackleg of Oilseed Rape)

[Kevin M. King](https://sciprofiles.com/profile/2029984), [Gail Canning](https://sciprofiles.com/profile/author/QnkwbldBZDV4aEZVbllraGFKVFlhS2pJNEpoMDJKWDIwQnE5cjJDTzBjcz0%3D), [Kang Zhou](https://sciprofiles.com/profile/author/VWtIMml5clVvYUxqVmw0SFpqdXVKQ0w2cXdCcjQ4blYvN2w1SjdLajl4MD0%3D), [Zekuan Liu](https://sciprofiles.com/profile/author/RmFNMVR2bzNlTDFvM0swR2Q4SnBzeFRkM09ueVg0WU5lMWFDUG5UaVZiYz0%3D), [Mingde Wu](https://sciprofiles.com/profile/415785), [Jonathan S. West](https://sciprofiles.com/profile/1842774)

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