

Researchers propose ecological route to plant disease control

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New research involving a scientist at the University of York has revealed a potential natural defence against invasive pathogens which damage food crops across the world.

Dr Ville Friman, of the Department of Biology at York, worked with colleagues in China and the Netherlands in the search for new ways to suppress the pathogen *Ralstonia solanacearum* which causes bacterial wilt of tomato and potato. Global damage estimates of bacterial wilt of potato currently exceed \$950 million per year.

Traditionally, farmers have employed integrated management—potentially involving the use of chemicals—to protect crops against pathogen invasion and increase yields. But some chemicals are banned within the EU because of their detrimental effects on the environment.

The researchers studied if the soil microbial community that interacts with the plant could be harnessed to act as an ecological defence against pathogen invasion. They specifically concentrated on bacterial resource competition networks and studied pathogen invasion success in simplified laboratory experiments and tomato plant roots.

These tests showed that the greater niche overlap between the resident microbial community and the invading pathogen led to intensified resource competition constraining the spread of bacterial wilt. Moreover, pathogen invasion success was further reduced when competition

between the members of resident bacterial community was minimized.

Dr Friman said: "Soil-borne plant pathogens are difficult to control because of their variable populations and their ability to evolve to overcome plant resistance. A significant proportion of global food production is lost to soil-borne plant diseases. Thus, improving rhizosphere community invasion resistance could significantly improve crop yields across different agricultural systems."

The researchers suggest adopting an ecological approach to improve plant health by engineering the resource competition interaction networks of plant-associated bacterial communities.

The research is published in *Nature Communications*.

More information: Trophic network architecture of root-associated bacterial communities determines pathogen invasion and plant health, *Nature Communications*, 2015.

Provided by University of York

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