

Research shows how plant welfare is improved by fungi in soil

May 13 2014, by David Garner

A University of York biologist is part of an international team of scientists that has discovered how plants use fungi to help them to gather vital nutrients from the soil.

The team of Dr Michael Schultze, of the Department of Biology at York, working with colleagues in China, France and USA as well as the John Innes Centre at Norwich, studied the symbiosis between fungus and the roots of *Medicago truncatula*.

The research may point the way to the development of higher yield crops using plants' own organic tools rather than fertilizers.

The researchers found that a protein, known as a proton pump, at the interface of fungus and root cells energises cell membranes creating a pathway into the [plant cell](#) for nutrients such as phosphorus.

Most plant species are able to exploit an intimate relationship with beneficial fungi in the soil to form mycorrhizas (fungal roots). Since fine fungal filaments called hyphae can grow beyond the root system, they help the plant to acquire [mineral nutrients](#), such as phosphorus, more efficiently.

Using rice and *Medicago truncatula*, the research, which is published in the journal *Plant Cell*, shows that the proton pump is essential for [plants](#) using fungus in improving nutrient uptake.

Dr Schultze said: "We envisage that the mycorrhiza-specific [proton pump](#) could be an interesting target for plant breeders in an effort to increase crop yield with minimal input of fertilizers."

More information: Ertao Wang, Nan Yu, S. Asma Bano, Chengwu Liu, Anthony J. Miller, Donna Cousins, Xiaowei Zhang, Pascal Ratet, Million Tadege, Kirankumar S. Mysore, J. Allan Downie, Jeremy D. Murray, Giles E.D. Oldroyd, and Michael Schultze. "A H⁺-ATPase That Energizes Nutrient Uptake during Mycorrhizal Symbioses in Rice and *Medicago truncatula*." *Plant Cell* 2014 tpc.113.120527; First Published on April 29, 2014; [DOI: 10.1105/tpc.113.120527](https://doi.org/10.1105/tpc.113.120527)

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