

# Soil Fungi Capture Nutrients for Plants



**Maria Harrison**

Professor, William H. Crocker Professor Adjunct Professor, Department of Plant Pathology and Plant-Microbe Biology

## CURRENT RESEARCH

### Exploring plant-fungal symbioses for sustainable agriculture

Phosphorous (P) is a major mineral nutrient essential for plant growth and development and consequently for successful crop yield. In many of the world's agricultural soils, the levels of phosphate available to the plant are low and limit crop production. Currently, this problem is addressed with the application of phosphate fertilizers, but heavy fertilizer input also has environmental costs and limitations as plants' failure to capture all the phosphate that is applied can contribute to aquatic pollution. Dr. Maria Harrison, William H. Crocker Professor at Boyce Thompson Institute for Plant Research (located at Cornell University), seeks to increase the efficiency of phosphate fertilizer use by involving natural partnerships with soil microbes such as the arbuscular mycorrhizal (AM) fungi, as one part of the solution for economically and environmentally- sustainable agriculture.

All of the major food crops essential for human nutrition are able to form symbioses with AM fungi. These beneficial associations can have a profound effect on plant growth and development as the fungal symbiont captures phosphate from the soil very efficiently and delivers it to the plant. In order to effectively deploy AM symbiosis in agriculture, Dr. Harrison studies how plants and AM fungi develop a stable symbiosis, the mechanisms underlying its development, function and regulation. Dr. Harrison's robust team of 18 researchers including undergraduate and high school students has made several important discoveries, contributed to the training of many scientists who now have their own labs, and advanced an understanding of what is arguably the world's most widespread plant-microbe symbiosis. Ultimately, this basic...

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## AFFILIATION



Boyce Thompson Institute for Plant Research (Cornell University)

## EDUCATION

- Ph.D. in Biochemistry and Applied Molecular Biology 1987, University of Manchester Institute of Science and Technology, UK
- B.Sc. in Microbiology 1984, University of Newcastle Upon Tyne, UK

## AWARDS

- Faculty Excellence in Undergraduate Research Mentoring Award, 2015
- Recipient of the Dennis Robert Hoagland Award, 2015
- Fellow of the American Academy for Microbiology, 2013
- Fellow of the American Association for the Advancement of Science, 2012

## RESEARCH AREAS

Environment, Ecology

## FUNDING REQUEST

Your contributions will support Dr. Maria Harrison at Boyce Thompson Institute for Plant Research as she continues to study plant symbiosis to effectively deliver phosphorus to plants, using genomics, genetics, cell and molecular biology techniques. Donations will help support research; \$30K/year required for supplies, plant growth room, and technology charges and between \$50K-\$130K annually per researcher. Partner with Dr. Harrison's lab as they find new ways to enrich our plants!