Queen's University Belfast

Competition Funded International PhD Studentship

From Ecosystem to Molecular Scale: Linking phosphorus to microbial methane cycling in rice paddies

Application Deadline: 28th February 2017
Start Date: October 2017

Over 56% of the world's population live in the Asia-Pacific Region (APR), where rice is the staple food. The APR adds 51 million rice consumers annually and FAO estimates that the annual production of rice should be increased to 700 million tonnes by 2025 to feed the growing population. Whilst there are several constraints in meeting this demand i.e. resource limitations (land, water, nutrients), a well-known by-product of rice cultivation is the emission of methane (CH_4), a potent greenhouse gas (25 times more effective than CO_2). Rice paddies are known to contribute about 10% of global anthropogenic CH_4 emissions. It has been well established that microbes modulate CH_4 flux within rice paddies i.e. anaerobic methanogens produce CH_4 and aerobic methanotrophs consume CH_4. Recently, we showed that long-term soil phosphorus (P) deficiency could trigger functional response (lower emissions) within both the functional guilds. However, a detailed understanding of the eco-physiological mechanisms, specifically in relation to soil C:(N:P) stoichiometry is scarce.

Supervisory team: Dr Deepak Kumaresan, Dr John McGrath and Prof Geoff McMullan at School of Biological Sciences & Institute for Global Food Security, Queen's University Belfast.

The successful PhD student will be trained in molecular ecology tools (multi-'omics) leveraged by stable-isotope probing (SIP) technique and trace gas monitoring at the field. The student will gain from complementary expertise on microbial one-C metabolism and P cycling at QUB and also international research experience. The student will also liaise with **Prof Wenxue Wei at Chinese Academy of Sciences – Institute for SubTropical Agriculture**, Changsha, Hunan Province, China to carry out field experiments.

For further details **please contact Dr Deepak Kumaresan**, School of Biological Sciences
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Applicants should have, or expect to achieve, at least a 2.1 honours degree in microbiology, biochemistry, molecular microbiology or environmental science or a closely related discipline.

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