

Making it count, determining the soil processes contributing to agricultural methane fluxes

Supervisory team:

Rothamsted supervisor: Dr Alison Carswell (Rothamsted Research)

Academic supervisor: Dr Charlotte Lloyd (University of Bristol)

Dr Laura Cardenas (Rothamsted Research), Prof Ian Bull (University of Bristol)

Host institution: Rothamsted Research (North Wyke)

Submit applications to this project to University of Bristol

Project description:

Reducing methane emissions from agriculture is a necessity in the UK and other nations in order to achieve net zero emissions. In 2022, methane contributed 58% of the total greenhouse gas emissions from UK agriculture. The predominant sources of methane from agriculture are enteric fermentation and manure management during livestock housing and manure storage. The Intergovernmental Panel on Climate Change (IPCC) provide guidelines to produce estimates of greenhouse gas emissions from agriculture (IPCC, 2006). Any country can use these guidelines to calculate their national greenhouse gas emissions inventories.

The production of methane has exclusively been considered an anaerobic process, attributed to the microbes methanogens. Yet methane production under aerobic conditions has been observed in fresh- and salt-water environments and soils have also been reported to emit methane. Currently agricultural soils are not considered a methane source under national inventories, although UK soil conditions have the capacity to promote methane production when soils are wet or saturated and there is an available carbon supply.

This project provides an opportunity to enhance our understanding of methane emissions from soils. The successful candidate will work with research groups in Rothamsted Research and the University of Bristol, renowned for their expertise in soil nutrient cycling and atmospheric emissions. Through this project, training in experimental design, advanced laboratory techniques, field and laboratory experiments will be delivered. The student will gain a range of skills and technical expertise in soil science and atmospheric emissions which will equip them with the means to advance their career in a range of academic or non-academic roles.

Our aim as the SWBio DTP is to support students from a range of backgrounds and circumstances. Where needed, we will work with you to take into consideration reasonable project adaptations (for example to support caring responsibilities, disabilities, other significant personal circumstances) as well as flexible working and part-time study requests, to enable greater access to a PhD. All our supervisors support us with this aim, so please feel comfortable in discussing further with the listed PhD project supervisor to see what is feasible.