

Plastics in the Environment: Enhancing carbon sequestration and crop production

Supervisory team:

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Host institution: University of Bristol

Project description:

Plastics in the environment are high on environmental and political agendas around the world generally in a negative context, but their use in agriculture in the form of plastic mulch films continues to grow and are now integral in the production of many crops worldwide. One of the main problems associated with the use of plastics is their disposal after use. This can be addressed by designing them so that they naturally biodegrade. Biodegradable plastic mulch film is used to accelerate and protect emergent high value and long season crops in-field to improve product yield and quality. However, scarce consideration is currently given to the chemical properties of the plastic beyond its broad biodegradability properties and the benefits it might be able to give to the agricultural environment. For example, given the correct formulation, it could actually benefit soils by providing beneficial carbon which can be sequestered by soil microbes, deliver herbicides and pesticides in slow release fashion, making them more efficient and environmentally friendly, or as a mechanism for delivering nutrients to soils.

This project will explore a unique opportunity to exploit the potential to deliver additional benefits to the crop and environment through the manipulation of the chemical formulation of biodegradable plastic films for the enhancement of soil quality and crop nutrition, which are two of the greatest challenges facing modern day agriculture. Through working with a combination of research expertise at University of Bristol and Rothamsted Research, training in advanced laboratory techniques, controlled environment studies and field trials will be provided, meaning the student will acquire a wide range of skills and technical expertise in soil science, but also within other areas of scientific research or non-academic career paths.

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.