

The role of cover crops in tackling wireworm damage to potatoes

Supervisory team:

Rothamsted supervisor: Dr Jozsef Vuts (Rothamsted Research)

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Non-academic (CASE) supervisor: Dr David Nelson (Branston Ltd.)

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Host institution: Rothamsted Research (Harpenden)

CASE partner: Branston Ltd.

Submit applications to this project to UWE

Project description:

The UK market produced 5.37 million tonnes of potatoes in 2020. However, over the last few years, many farmers have given up growing potatoes due to increasing risks from the loss of chemicals for pest and disease control. Wireworms are major potato pests, increasing in importance in recent years, which is driven by the incorporation of minimal tillage and by the ban of effective chemical controls. Potato production in the UK is thus declining, putting the £4.7bn value from the industry at risk. New approaches are urgently needed to reverse this trend and ensure sustainability.

Potatoes are grown in rotations with carrot, wheat, barley and oilseed rape. However, with increase in wireworm damage, the incorporation of crop species that directly or indirectly reduce wireworm damage to potatoes may provide an alternative management option. Despite some exciting innovations in Canada, there is to date little evidence for the efficacy of cover crops in doing so in the UK or Europe. Given the potential for biological control of wireworm, there is now an urgent need to identify suitable cover crop species that can be included in the rotation to reduce damage to potatoes and other vulnerable crops. Other benefits of using cover crops include reduced soil erosion and improved soil nutrition.

This PhD project aims to experimentally test commercially available plants as cover crop candidates and understand how they reduce wireworm feeding damage to potato. After receiving appropriate training, you will set up laboratory and greenhouse feeding trials with wireworms to test the effect of rotation plant succession and cover crops on potato damage and larval behaviour. You will analyse the chemical makeup of soil and plants using, for example, gas chromatography (GC) and GC-mass spectrometry, to understand how chemicals reduce larval damage, as well as wireworm stomach content, growth rate and viability. A 3-month industry placement is also part of your project.

You will have, or soon expect to obtain, an upper second- or first-class undergraduate degree in biology, chemistry or environmental science. The supervisory team at Rothamsted and The University of the West of England consists of experienced chemical and behavioural ecologists and analytical chemists. By joining this team, you will learn skills around hypothesis formulation and testing, critical thinking, experimental design, working in a laboratory environment and dissemination of science to the academic community, and will have a unique chance to influence IPM in regenerative agricultural systems.

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.