

Developing a push-pull bio-insecticidal strategy to control establishment pests in oilseed rape based on attractant and repellent semiochemicals

Supervisory team:

Lead supervisors: Dr Samantha Cook (Rothamsted Research), Prof Tariq Butt (Swansea University)

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Host institution: Rothamsted Research, Swansea University

Submit applications for this project to Swansea University

Project description:

This is an exciting opportunity to work on novel integrated pest management solutions for oilseed rape (OSR). OSR is the second largest UK crop after cereals, but is under significant threat due to the withdrawal of the major conventional pesticides previously used to control pests such as cabbage stem flea beetle and slugs. The use of volatile semiochemicals (behaviour-modifying 'information signals' such as pheromones) to lure pests away from a crop is a powerful strategy for crop protection; it can allow effective pest control without causing environmental harm or generating unwanted residues on the crop itself.

Over the course of this PhD project you will develop "push-pull" strategies for OSR protection, whereby repellent semiochemicals placed within or near the crop are used in combination with attractant semiochemicals placed as lures or within trap crops at a more remote location. This will involve laboratory studies with the pests themselves, determination of the most effective blends and formulations of semiochemical compounds and field trials to determine their effectiveness for OSR protection – and any negative effects on non-target/beneficial organisms – under real-world conditions. You will develop skills and experience in invertebrate rearing, handling and taxonomy, plant growth studies, behavioural bioassays, invertebrate electrophysiology, analytical chemistry, semiochemical formulation and conducting field trials (design and assessment methods).

The outputs of this work will have the potential for substantial economic and environmental impact, and contribute to the United Nations Sustainable Development Goals of food security and protecting the environment. Integrated pest management is a vibrant and growing sector with significant employment opportunities in academic, industry, and in regulatory and other government bodies. A number of industrial partners are already interested in this work and a PIP placement with them may be possible. You will be supervised by an interdisciplinary team; your work will be divided between Rothamsted Research and Swansea University, giving you the opportunity to experience different research environments and ways of working. Swansea University offers state-of-the-art labs for analytical chemistry and invertebrate (especially slug) behaviour studies, and extensive collaborations with industry on formulation science. Rothamsted Research offers world-class chemical ecology facilities, an invertebrate behaviour laboratory, insectary (with expertise in rearing cabbage stem flea beetle) and on-site experimental farm.

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.