Understanding the molecular basis of Sitophilus olfaction: towards novel integrated pest management strategies for weevils

Supervisory team:
Lead supervisors: Dr David Withall (Rothamsted Research), Dr Joel Loveridge (Swansea University)
Dr John Caulfield (Rothamsted Research), Prof Tariq Butt (Swansea University)

Host institution: Rothamsted Research (Harpenden), Swansea University
Submit applications for this project to Swansea University

Project description:
This is an exciting interdisciplinary opportunity to study the chemical ecology of important cereal pests, the rice weevil (Sitophilus oryzae) and granary weevil (Sitophilus granarius), with a view to developing novel integrated pest management solutions. Rice and cereals are among the most important crops in the world, and weevils of the genus Sitophilus are responsible for significant post-harvest losses. The use of volatile semiochemicals (behaviour-modifying 'information signals' such as pheromones) to lure pests aways from a crop is a powerful strategy for crop protection; leading to lower pesticide use and so reducing environmental damage as well as contamination of the human food supply chain.

Over the course of this PhD project you will investigate the molecular detail of how Sitophilus weevils detect and interpret chemical signals in their environment. This will involve direct studies of weevil behaviour, insect electrophysiology, synthetic chemistry, analytical chemistry, bioinformatics, computational chemistry and molecular modelling, giving you a broad skill base. Integrated pest management is a vibrant and growing sector with significant employment opportunities in academic, industry, and in regulatory and other government bodies, but the experience and skills you will gain in this project are also directly transferrable to other fields.

The outputs of this work will have the potential for substantial economic and environmental impact, and contribute to United Nations Sustainable Development Goals relating to food security and protecting the environment. You will be supervised by an interdisciplinary team, with opportunity to interact with industry, and your time will be divided between Rothamsted Research and Swansea University, giving you the opportunity to experience different research environments and ways of working.

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.

NOTE: For this project, only full-time is possible due to the nature of the research being carried out.