

Project title and location:

Can organic substrates from insect bioconversion systems provide sustainable crop nutrition and protection? Fera Science Ltd, Sand Hutton, York

IAFRI background:

The Institute for Agri-Food Research and Innovation (IAFRI) is a joint venture between Newcastle University and Fera Science Ltd and a unique model for how universities can work with private sector research organisations. It operates under a private-public ownership to deliver both public good research and services as well as innovation and wealth creation in strategically important industrial sectors in the UK. Students will have a unique opportunity to benefit from supervision and facilities at both the Newcastle and Sand Hutton campuses to deliver research with real-world impact.

Lead Supervisors (and contact):

For more information and details on how to apply please contact Dr Maureen Wakefield (Maureen.Wakefield@fera.co.uk) or Dr John Walshaw, Newcastle University – Dr Elisa Lopez-Capel, Dr David George

Key research gaps and questions:

The concept of using insects to reduce organic waste and to derive high value products from the insects has been researched for the past few decades and has recently been taken up by a number of companies globally for the production of protein for inclusion in animal feed. The insect species that has been the focus of this research is the black soldier fly, *Hermetia illucens*. This species can develop on a wide range of organic substrates ranging from vegetable waste to animal manures. In addition to the products derived from the insects (protein, fats and chitin) the residual rearing material remaining after the insects have completed development can be used as an organic fertiliser and it is possible that this will act as a biofertiliser due to the presence of a diverse range of microorganisms. Limited studies have also shown that leachate produced in the insect bioconversion process can have an effect on plant diseases. The purpose of this project is to examine the chemical and physical properties and microbial communities in the residue remaining after insect bioconversion to ascertain the function and the potential role as biofertilisers or growth media in different horticultural/agricultural scenarios.

Project Description:

The research aims of the project are:

1. Production and characterisation (chemical, physical and biological) of the rearing substrate residues from a range of organic materials.
2. Glasshouse and field trials to determine effect on plant growth
3. Glasshouse and field trials to determine potential effects on a range on plant diseases
4. Glasshouse and field trials to determine soil improvement qualities
5. Assessment of agri-food sectors which most benefit from use

A representative field crop (potato) and a glasshouse crop (tomato) will be used in the trials. These crops are prone to soil borne diseases (e.g. *Rhizoctonia solani* and *Verticillium albo-atrum* in potato; *Verticillium dahliae* and *Fusarium oxysporum* in tomato), which will be studied in the trials.

Desired skills:

Interest in plant biology and soil health.