

Project Title: *Developing effective non-thermal interventions to Address Very complex diseases in Bumblebees that promotes Bee health and wellbeing with positive impact on sustainable management of Ireland's ecosystem and biodiversity services (acronym - SAVE-Bee)*

SAVE-B will develop novel approaches to promote health and well-being in animal pollinators, specifically bumblebees (*Bombus terrestris*), which are essential for vital food security and ecosystem service management. Currently, there is a major decline in our pollinators with very few effective strategies to address this problem. Although there are many drivers of this decline, a significant contributor is the occurrence and spread (through cross-contamination by native and managed bees) of various pathogens and parasites that affect bee health.

This EPA co-funded PhD project will investigate novel parasite control methods and interventions and will focus on the pollen that is supplied to farmed colonies of bumblebees. Wild sourced pollen is generally contaminated with multiple pathogens and parasites including the prevalent parasite *Crithidia bombi* and to date the sterilisation of pollen is achieved using gamma irradiation. Led by Professor Neil Rowan (Athlone Institute of Technology), this transdisciplinary study will test and develop novel sterilisation technologies, alternative to gamma irradiation, and establish reliable and repeatable operational conditions that can be applied to the commercial bee industry. The ability to provide sterile pollen is recognised as a major Hazard Analysis Critical Control Point (HACCP) within the product pipeline of commercial colony production. Studies on the fortification of pollen with novel bioactives will be conducted to assess their potential to improve bee health.

This potential impact (negative and positive) of treated pollen on bee health will be assessed at the molecular, immunological, behavioural and colony levels. These aspects of the project will be co-supervised by Dr Jim Carolan at Maynooth University (MU) and will involve a range of approaches including quantitative proteomics, enzymatic assays, confocal microscopy, molecular based parasite-identification and immunoassays. The assessment of colony health in terms of reproductive output, immunotolerance and colony development will also be conducted at MU. Dr Michael Goblirsch (University of Minnesota, USA) will collaborate on development of potential *in vitro* bioassays. This research is strongly aligned with All Ireland pollinator plan 2015-2020 and the strategic research missions of AIT, Maynooth University and the Environmental Protection Agency.

Duration of Project: 48 month project

Proposed Start date: TBC

Funding Agency: EPA / AIT Co Fund

Type of Degree Offered: Doctor of Philosophy (Ph.D)

Scholarship Details Monthly Stipend, Fees, Travel & Consumables: €87,000 over 4 years

Minimum Qualifications/Experience Necessary/Any Other Requirements:

2.1 honours degree in any Biological Science related discipline (including microbiology, immunology), toxicology or environmental science discipline. Given that the project will require working with live bees, experience with insect maintenance is desirable but not essential. A

Applications to be received by close of business **Friday 14th September 2018**. **Research Application Form and project details are available on <https://www.ait.ie/research-and-innovation/postgraduate-research-opportunities>**

Research Supervisors: Professor Neil Rowan and Dr Jim Carolan

For further information regarding the project please contact: nrowan@ait.ie or James.Carolan@mu.ie