

Bees, bugs and antibiotics – the interactions of agricultural and veterinary antibiotics with bee health

Supervisory team:

Main supervisor: Dr Lena Wilfert (University of Exeter)

Second supervisor: Dr Will Gaze (University of Exeter)

Prof Ed Feil (University of Bath), Dr TJ McKinley (University of Exeter), Prof Angus Buckling (University of Exeter)

Collaborators: Prof Mark Brown (RHUL), Dr Michelle Fountain (East Malling Research)

Host institution: University of Exeter

Project description:

The pollination services provided by bumblebees and honeybees are crucial for agricultural sustainability. In recent years, it has become clear that the gut microbiome plays a crucial role in bee health. In fact, the resistance against *Critihidia bombi*, a key parasite of bumblebees, and the strong genotype-genotype interactions with its host are predominantly explained by the gut biome rather than by the host itself (Koch et al Ecology Letters 2012, Wilfert et al. Molecular Ecology 2007). Antibiotics can disrupt this interaction and cause fitness loss (Koch et al. PNAS 2011). Environmental exposure to antibiotics is a potentially serious problem in bees: antibiotic sprays are used while crops are in flower and prophylactic antibiotic treatment of honeybees is widespread in North America, which has led to the evolution of AMR. Studying the interactions of pollinators, pathogens and antibiotics is thus crucial for a sustainable future.

In this PhD, you will be able to study fundamental evolutionary ecology, for example testing the effect of stress on community stability, while directly addressing questions around pollinator health. You will be supervised by a team of experts in evolutionary ecology, pollinators, microbial communities and experimental evolution at the University of Exeter (Dr. Lena Wilfert, Dr. Will Gaze, Dr. TJ McKinley, Prof. Angus Buckling) and the University of Bath (Prof. Ed Feil); you will be primarily based at the University of Exeter's Penryn Campus. You will receive training in experimental ecology and microbiology, bioinformatics and mathematical modelling.

Funding for this 4-year project is competitive as part of the SWBio BBSRC DTP. Candidates should be able to demonstrate good mathematical skills, e.g. A-level maths or quantitative skills gained in their studies. Please contact Dr. Lena Wilfert (lena.wilfert@ex.ac.uk) for informal questions about the project/requirements. Information about the online application process can be found at <http://www.bristol.ac.uk/swbio/apply/>.