

## Quantifying the impact of exposure to multiple anthropogenic stressors on bumblebee health

### Supervisory team:

**Main supervisor:** Dr Harry Siviter (University of Bristol)

**Second supervisor:** Dr Christoph Grueter (University of Bristol)

**Non-academic (CASE) supervisor:** Dr Richard Comont (The Bumblebee Conservation Trust)

**Host institution:** University of Bristol

**CASE partner:** The Bumblebee Conservation Trust

### Project description:

Bumblebees are vital pollinators of both crops and wildflowers, however many species are in decline. The drivers of these declines are multifaceted, but bumblebees are exposed to a plethora of anthropogenic stressors. For example, within intensive agriculture, bees are exposed to a cocktail of different pesticides, and habitat loss means that bees are often nutritionally stressed. Domestic honeybees, and commercial bumblebee colonies, can increase the prevalence and intensity of parasites/pathogens within an environment, and climate change means bumblebees are increasingly faced with adverse weather conditions. Importantly, bumblebees are exposed to these stressors simultaneously. Consequently, stressors may interact, and exacerbate one another, leading to synergistic negative interactions. Identifying the interaction effects between these stressors is of vital importance for protecting bumblebees, and their pollination services.

The aims of this PhD project are to:

- i. Determine how exposure to a novel pesticide influences bumblebee (*Bombus terrestris*) colony development in flower rich and poor environments.
- ii. Determine how exposure to a combination of novel pesticides and poor nutrition influence colony founding in multiple bumblebee species.
- iii. Quantify how exposure to multiple pesticides influences bumblebee homing ability.
- iv. Determine how exposure to multiple pesticides influences bumblebee learning and memory.

This project offers an exciting opportunity for PhD candidates interested in bumblebee behaviour, ecology, and conservation. The project will use a combination of laboratory and field based experimental designs to provide an insight into the drivers of bumblebee declines. The project will be led by the candidate (within the above-mentioned framework), allowing the researcher to focus on specific anthropogenic stressors that they are interested in. The candidate will develop skills in experimental design, programming of computer simulations, statistical analysis, and report writing. The project will be conducted in combination with the Bumblebee Conservation Trust and Dr Richard Comont, Science Manager at the Trust, who is a named supervisor on the project. The data collected will therefore be used to directly contribute towards future policy statements. Furthermore, the candidate will participate in a work placement at the Bumblebee Conservation Trust, arranged in negotiation with the student and on a topic that is suitable to their skill set (e.g. data analysis, data collection, policy statement writing or science communication).

**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.**