



Scenario
DOCTORAL TRAINING PARTNERSHIP

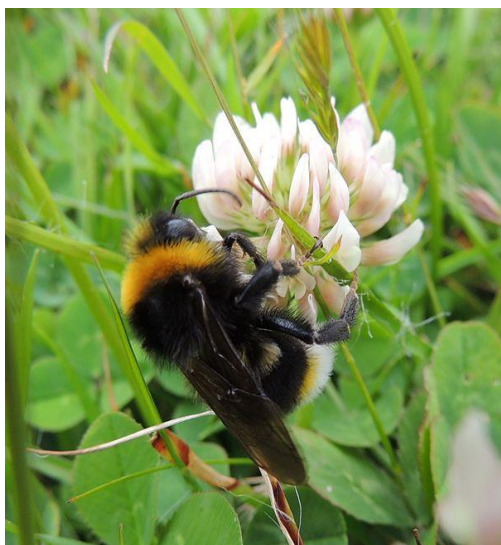
NERC

SCIENCE OF THE
ENVIRONMENT

From soils to plants to pollinators: mechanisms and impacts of metal transmission through an ecological system

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Bumblebee on clover by Orangeaurochs / CC-

Environmental contamination with metals continues to occur, despite significant decreases over the last 40 years, because the primary driver for reductions has been to reduce human exposure. Metal pollution is implicated as contributing to declines in the diversity and abundance of wild pollinators, which perform an essential ecosystem service, but knowledge of its impacts on behavioural ecology and fitness are limited.

This multi-disciplinary project will be the first to develop an understanding of the precise processes by which metals (e.g. lead, zinc, cadmium) move and accumulate through an ecosystem, all the way from the source of pollution through soils and plants, and into pollinators.

The studentship will investigate the processes by which metals enter clover plants, the mechanisms with which the metals are transferred through these plants, their differential accumulation in pollen and nectar, and the impacts this can have on the behavioural ecology and fitness of bumblebees.

Therefore, the project will 1) Investigate plant molecular mechanisms affecting the flow of metals through the soil-plant-insect continuum, 2) Quantify environmentally relevant concentrations of metals in plant pollen and nectar from atmospheric and soil sources, and 3) Study the impact of metal exposure, at environmentally relevant concentrations, on bumblebee behavioural ecology and fitness.

Training opportunities:

The supervisory team combines expertise from a range of scientific disciplines; therefore this studentship offers unique training opportunities in a wide array of laboratory and field skills. The student will receive individual training on a variety of experimental procedures (e.g. molecular biology [quantitative PCR, transcriptomics], metal analysis [e.g. ICP-MS, SEM-EDX] and invertebrate behavioural ecology).

Student profile:

The project is suitable for an enthusiastic student with a 2i or 1st at BSc and/or MSc in Biological Sciences (preferable with knowledge of plant, soil or insect science) who can demonstrate an understanding of chemistry. The student should be keen to conduct laboratory and field based studies and therefore a driving license is desired. A prior knowledge of the biological and chemical analysis techniques used (e.g. quantitative PCR, ICP-MS, SEM) is not essential because training will be provided, although any experience would be an advantage.

<http://www.reading.ac.uk/nercdtp>