PROJECT TITLE: Quantifying the cascading impact of pesticide use on biodiversity

Project Science Theme: Evolution and Biodiversity
Project keywords: Biodiversity, Ecology, Conservation, Agriculture, Pesticides

Lead Institution: University Bristol
Lead Supervisor: Dr Harry Siviter, Bristol, School of Biological Sciences
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Project description:

Pesticides are widely used in agriculture, yet their effects on biodiversity are typically assessed using a limited number of model species, rarely accounting for impacts that extend through ecological networks. This project asks: (i) how do pesticides affect organisms across multiple trophic levels, including pollinators, predatory insects, and soil invertebrates; (ii) how do direct and sub-lethal effects alter ecological interactions; and (iii) how does biodiversity recover following pesticide exposure? Addressing these questions is essential for developing ecologically realistic assessments of pesticide risk and informing sustainable agriculture.

The candidate will combine manipulative mesocosm experiments and ecological modelling to quantify pesticide impacts on invertebrate communities and the interactions that underpin ecosystem functioning. Experimental data will be used to assess changes in abundance, behaviour, and community structure across trophic levels. These datasets will be integrated into mathematical models to predict cascading effects on wider biodiversity, including plants and vertebrates. The project is intentionally flexible, enabling the candidate to shape research direction through the selection of focal taxa, ecological interactions and modelling approaches, supported by regular supervisory guidance and opportunities to develop independent research questions.

The project will provide extensive hands-on training in field ecology, experimental design, biodiversity monitoring, invertebrate identification, data management, statistical analysis, ecological network analysis and mathematical modelling. Supervisors and project partners will provide training throughout the PhD, supporting the candidate to develop increasing independence in study design, data analysis, and research leadership.

The project will benefit from close collaboration between the University of Bristol and UKCEH, bringing together complementary expertise in ecology, entomology, soil biodiversity, environmental monitoring and ecological modelling. The candidate will gain access to specialist facilities, long-term datasets, field sites, and interdisciplinary expertise spanning academic and

applied research environments. This partnership will enhance both the scientific scope of the research and the training experience provided.

Useful recruitment links:

For information relating to the research project please contact the lead Supervisor via: harry.siviter@bristol.ac.uk

Bristol NERC GW4+ DTP Prospectus:
https://www.bristol.ac.uk/study/postgraduate/research/great-western-four-doctoral-training-partnership-nerc/

How to apply to the University of Bristol:
http://www.bristol.ac.uk/study/postgraduate/apply/

The application deadline is Thursday 7 January 2027 at 2359 GMT