NERC-funded Research Experience Placement (REPs) Summer 2025

Project title

The role of sustainable agriculture in UK invertebrate conservation

Lead supervisor

Lynn Dicks

Project description

Farm practices to enhance soil health in arable systems include reduced tillage, grass leys, cover crops, soil amendments, and returning crop residues to the soil – together referred to as 'regenerative agriculture'. Evidence from farmer surveys shows promising uptake among English arable farmers [1, 2], and clear potential for them to become conventional farming practice within the next 10 years. While there is ample evidence of benefits to soils, and in some cases, crop yields [3, 4], little is known about how these benefits interact with other environmental outcomes, especially when they are combined as a whole system transition. For example, what are the effects of reduced soil disturbance and enhanced soil biodiversity on insect species using arable fields, and the ecosystem services they provide? How does herbicide use in low tillage systems impact soil-dwelling invertebrates? This placement will join one of two large interdisciplinary projects working with farmers in East Anglia to measure multiple outcomes from the shift towards regenerative agriculture in intensive arable systems [e.g., 5].

The project will focus on one or more invertebrate groups with a strong ecological link to soil (e.g. as a habitat or feeding resource for part of the life cycle). This could include, for example, ground-nesting bees, flies, beetles, spiders, molluscs or earthworms, comparing responses to management at field or landscape-scale. A number of specific projects are possible, according to a student's interest. They could include landscape-scale modelling to predict bee populations and pollination services, laboratory identification of specimens already collected over several years, direct measurement of biodiversity or ecosystem services delivered by invertebrates, such as pollination and pest regulation in field studies and experiments, exploration of ecological community structure or functional responses through ecological network analysis, analysis of economic outcomes or relationships between insect communities and pressures such as pesticide use, or climate.

There is also an opportunity within our group to join a project working on habitat restoration for conservation of the shrill carder bee (Bombus sylvarum), for a student with a strong interest in pollinator conservation.

1. Dicks, L.V., et al., What agricultural practices are most likely to deliver 'sustainable intensification' in the UK? Food and Energy Security, 2018: p. e00148.
2. Jaworski, C.C., et al., Sustainable soil management in the United Kingdom: A survey of current practices and how they relate to the principles of regenerative agriculture. Soil Use and Management, 2023. 40(1).

3. Shackelford, G.E., et al., Evidence Synthesis as the Basis for Decision Analysis: A Method of Selecting the Best Agricultural Practices for Multiple Ecosystem Services. Frontiers in Sustainable Food Systems, 2019. 3(83).
4. Haddaway, N.R., et al., How does tillage intensity affect soil organic carbon? A systematic review. Environmental Evidence, 2017. 6(1): p. 30.
5. Berthon, K., et al., Measuring the transition to regenerative agriculture in the UK with a co-designed experiment: design, methods and expected outcomes. Environmental Research: Food Systems, 2024. 1(2): p. 025007.

Project restrictions

No restrictions

Working arrangements

Modelling or analytical approaches can be carried out remotely. It might also be possible for a student to work on specimen identifications from a remote location.