School of Agriculture, Policy and Development

Investigating the Effects of Silvoarable Agroforestry Systems on Pollinator Communities

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How Might Alley-cropping Benefit Pollinators?

- Continuous sources of nectar and pollen
- Habitat connectivity
- Undisturbed nesting sites
- Shading and reduced wind disturbance

(Hill and Webster, 1995; Sollen-Norrlin et al., 2020)

What Does Previous Research Show?

Compared to monocrop controls, silvoarable systems have shown:

- **Greater abundance** of bumblebees, solitary bees and hoverflies (Varah et al., 2020; Staton et al., 2022)
- **Increased diversity** and functional identity of bees (Staton et al., 2022)

BUT there are still knowledge gaps about how these effects may change as the system matures, and how they might be seen across the wider landscape.

My Research Aims

Expand the *temporal* scale of investigations by exploring the effects of silvoarable systems on the abundance, diversity and functional identity of pollinator communities over time.

Expand the *spatial* scale of investigations by modelling the effects of silvoarable systems on pollinator abundance and pollination service across a wider landscape.

Approach 1: Empirical Data Collection

Methods

- Studied 3 previously-surveyed UK fruit alley-cropping farms
- Once a month between March-August 2023:
  - Pan traps to assess diversity
  - Transects to assess abundance
  - Floral surveys

Next steps

- Finish identifying pan trap specimens
- Append to previous data from the same sites
- **Assess diversity trends over time…**

Approach 2: Modelling

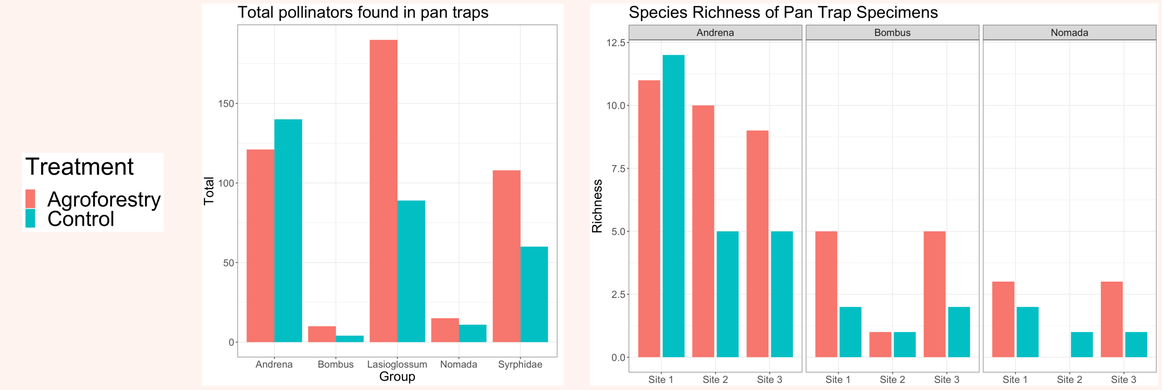
Methods

- Add silvoarable agroforestry as a land cover class in Poll4pop, a model which can predict bee abundance across landscapes (Gardner et al., 2020).
- Test model predictions against field abundance data

Next steps

- Establish **best model parameters** for silvoarable agroforestry using data-driven calibration and expert opinion
- Model the **wider landscape effects** of silvoarable systems on pollinators at both current and target uptake intensities
- Explore the **optimal intensity and arrangement** of silvoarable systems for pollinators in the wider landscape

Preliminary Results



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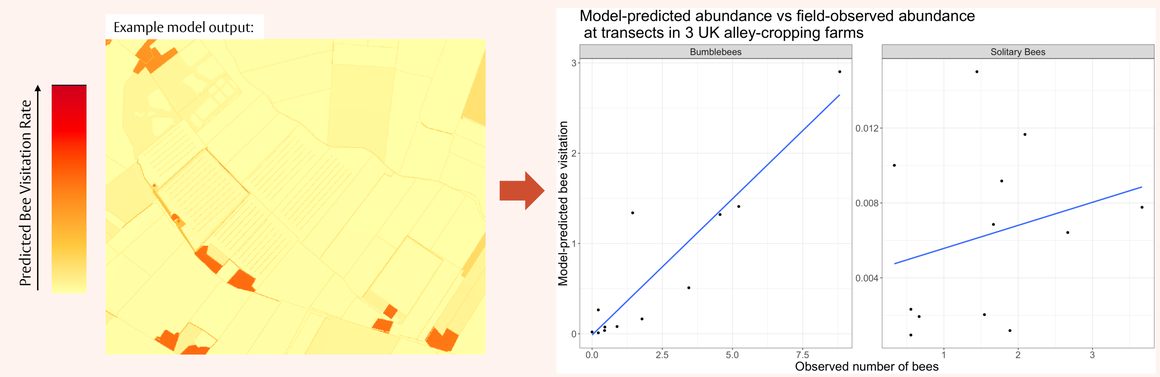

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Wild Pollinators:

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