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STEP

Pollinator Flow Across Agroecosystems

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Managed and Semi-natural Habitats

Pollinators provide a vital ecosystem service for both agricultural systems and the wider countryside[1]. However recent trends have shown pollinator declines as a result of agricultural expansion and habitat loss[2]. To effectively manage agroecosystems and protect pollination service, pollinator availability and habitat use over time need investigating[3].

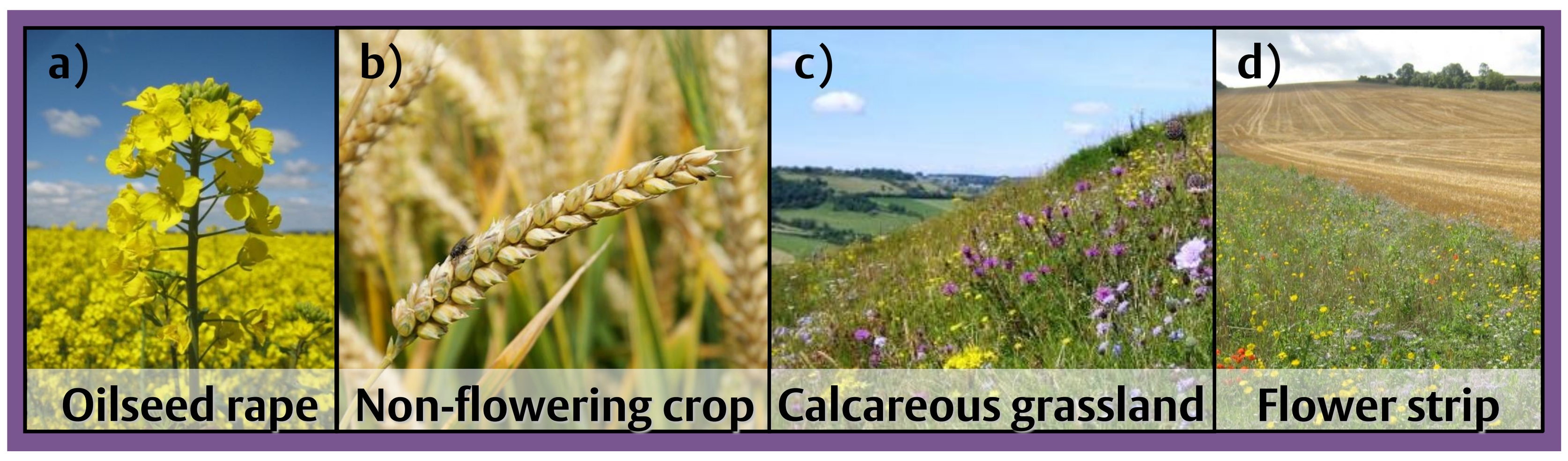
Aim

To assess how habitat gradients, temporal and spatial change in agricultural landscapes effect the abundance and diversity of pollinators and pollination service.

The Main Pollinator Groups

The Study Sites

A network of sixteen study areas were used and encompassed gradients of three local habitat types: **a)** oilseed rape field **b)** non-flowering crop field boundary or **c)** calcareous grassland. In addition half the areas contained an introduced **d)** flower strip (while the other half remained as controls).



Two landscape gradients were considered for each site:

- **Oilseed rape** (*Brassica napus*) % within 1km landscape
- **Lowland calcareous grassland** % within 1km landscape

Data Collection

Survey rounds were completed **during** oilseed rape flowering and **after** flowering at each study site.

Pollinators were sampled along a standardised transect (300m^2) at each study site for 30 minutes between 9am and 6pm on good weather days. Pollinators were identified in the field or captured with a hand net, preserved and later identified in the laboratory.

Initial Results

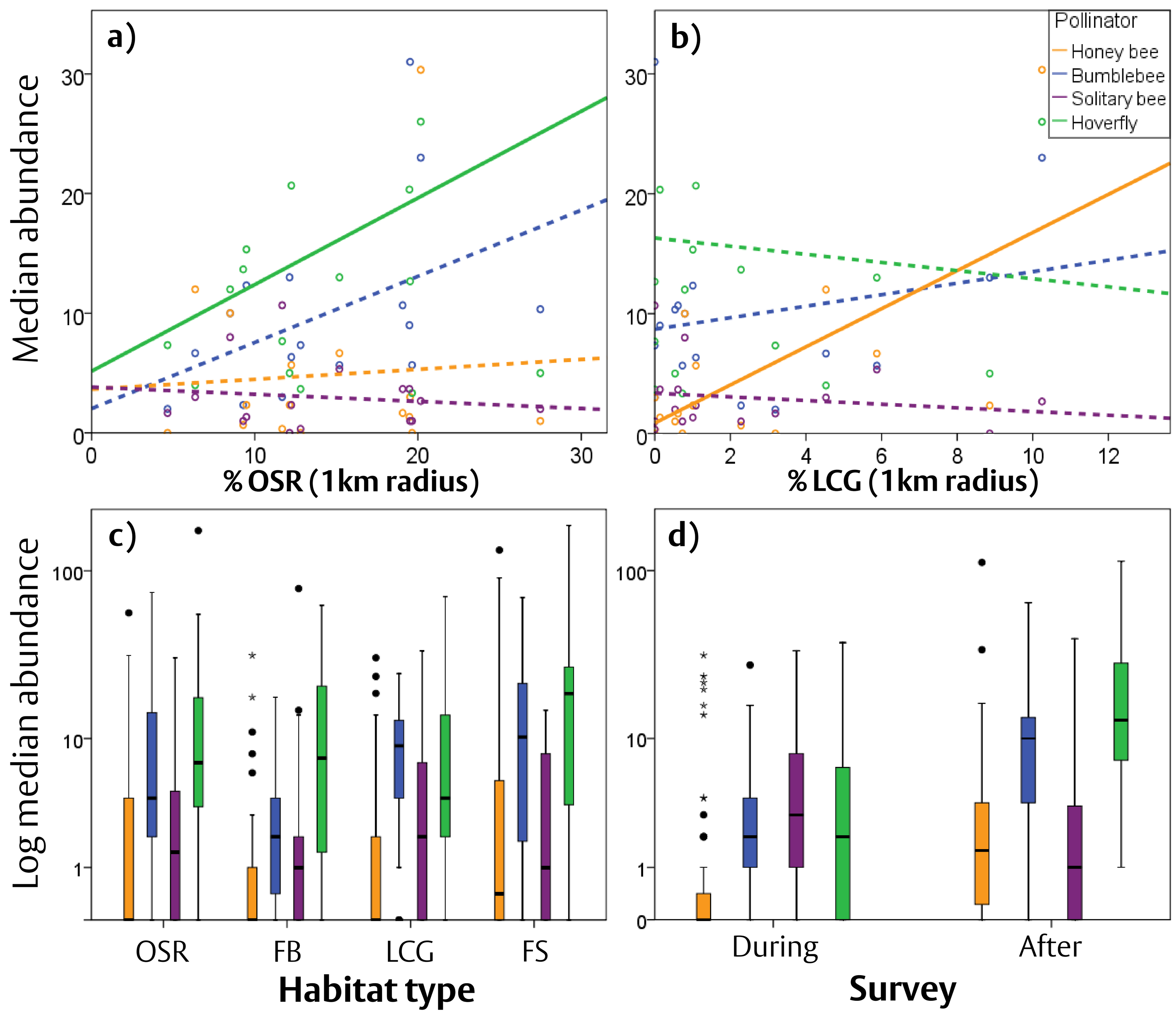


Figure 1. Pollinator responses to the landscape gradient (**a, b** show results from the oilseed study sites), habitat type (**c**) (OSR = oilseed rape, FB = field boundary, LCG = lowland calcareous grassland and FS = flower strip) and survey (**d**) across 300m^2 in 30min (n=660). Solid lines represent significance and dotted lines non-significance from a GLMER.

Discussion

Increasing landscape **OSR** significantly benefited hoverflies; positive trends were indicated for bumblebees and honey bees whilst there was no trend for solitary bees.

Increasing landscape **LCG** significantly increased honey bee abundance; bumblebees showed a weak positive trend with negative trends for hoverflies and solitary bees.

The **FS** was successful in supporting the greatest abundance across all pollinators by providing a high quality habitat. Hoverflies were the only group to be found in high abundance at the **FB**, likely due to their predatory larvae phase.

These responses highlight the differences in pollinator life history and spatiotemporal flower resource availability[3,4]. Clearly the landscape is perceived very differently between the pollinators.

Conclusion

Pollinators respond differently to the broad conservation strategies such as the use of mass flowering crops, protected habitats and targeted habitat creation. Further research will explore species composition, floral availability and the influence of landscape structure on pollination service.

References: Images are personal photography or privately sourced **[1]** Breeze *et al.* (2011) *Agriculture Ecosystems & Environment*, 142:137-143 **[2]** Potts *et al.* (2010) *Trends in Ecology & Evolution*, 25:345-353 **[3]** Diekotter *et al.* (2010) *Journal of Applied Ecology*, 47:209-214 **[4]** Jauker *et al.* (2009) *Landscape Ecology*, 24:547-555. For further information contact: **j.b.wickens@pgr.reading.ac.uk**