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Modelling the response of soil and litter biodiversity to anthropogenic pressures

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INTRODUCTION

- Human activities, particularly land use change, are a significant driver of biodiversity loss worldwide (Tittensor et. al. 2014).
- Soil fauna are significant mediators of the ecosystem services provided by soil (Fig. 1) (Lavelle et. al. 2006) but are rarely included in biodiversity models.
- Local diversity richness is substantially lower in most land-use types compared to primary vegetation (Hudson & Newbold et al. 2015) .
- Does below-ground biodiversity show the same response?

Figure 1 The activity of earthworms reduces flood risk by increasing water infiltration

METHODS

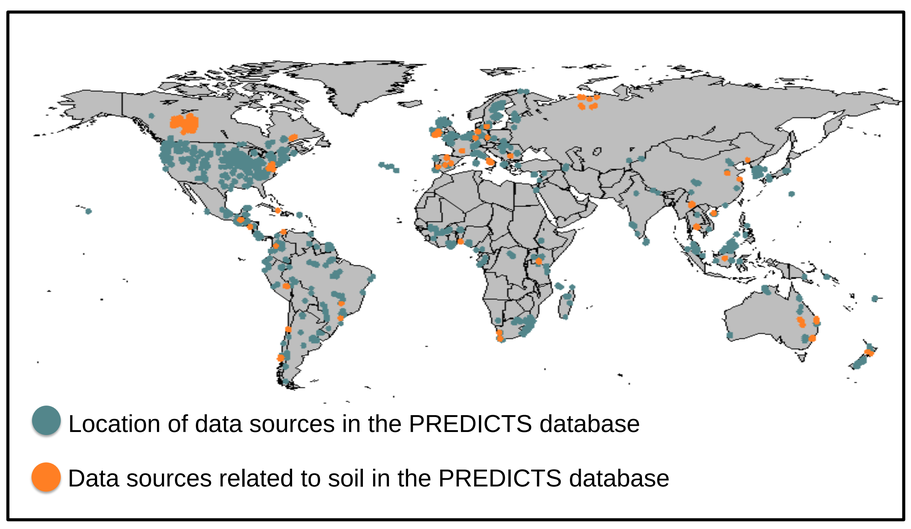
- Using data collated as part of the projecting responses of ecological diversity in changing terrestrial systems (PREDICTS) project (**www.predicts.org.uk**) (Hudson & Newbold e.t al. 2015).

- A subset of the database with sources related to soil was extracted, comprising 31 sources, 53 studies and 1640 sites (table 1 & figure 3).

Table 1 sites by land use type and intensity

	Minimal use	**Light use**	**Intense use**
Primary	531	138	74
Secondary	125	64	88
Pasture	209	100	50
Cropland	121	97	43

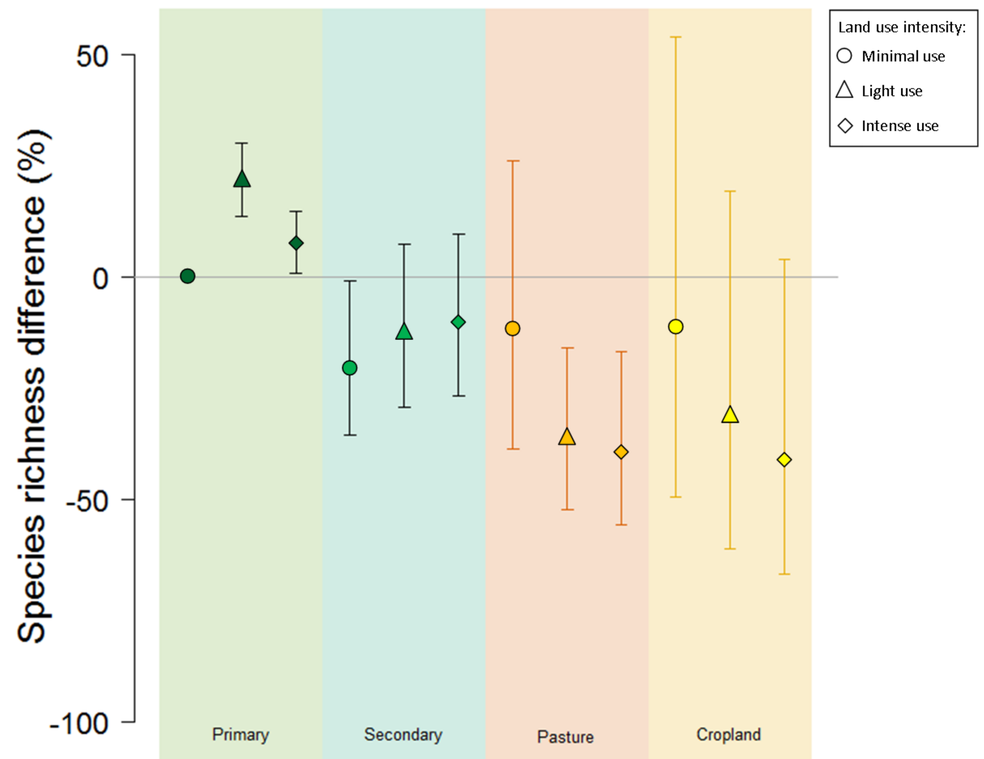
Figure 3 location of data in the PREDICTS database



- Two-tier modelling: 1. Compare random-effects structure, best selected using Akaike Information Criterion values 2. Back-ward stepwise model simplification to select the best fixed-effects structure.

RESULTS

Figure 4 responses of soil biodiversity to different land use types and intensities
Error bars show 95% confidence intervals



DISCUSSION

- Error bars are large, but responses of soil biodiversity to human pressures are broadly similar to overall biodiversity (Hudson & Newbold et al. 2015).
- Pasture and cropland are unexpectedly similar, may be result of overlap when scoring.
- Disturbance appears to increase richness in primary habitats but this effect is not seen in secondary vegetation.

FURTHER WORK

- More data!
- Project models onto scenarios of future changes
- Develop biome- and clade-specific models

Want to contribute?

If you have suitable data we would love to hear from you!
All contributors of data we use will be included as co-authors on an open-access paper updating the database and acknowledged appropriately in all publications.

Please pick up a flyer or email v.burton@nhm.ac.uk

ACKNOWLEDGEMENTS

We thank members of the PREDICTS team and all the many researchers who have made their data available to us.

REFERENCES

Hudson & Newbold et al. (2015) *Nature* 520, 45–50

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