Mesofauna communities in soil: Key drivers at the national scale

P. B. L. George[1, 2], A. M. Keith[3], S. Creer[1], D. A. Robinson[2], D. L. Jones[1] & The GMEP Team

[1] Bangor University [2] Centre for Ecology and Hydrology, Bangor [3] Centre for Ecology and Hydrology, Lancaster

Contact
afp67e@bangor.ac.uk

Introduction

- Welsh Government has implemented Glastir as part of its commitments to CAP
- The Glastir Monitoring & Evaluation Programme (GMEP) has been designed to report ongoing results from Glastir
- Mesofauna are important, but often overlooked, components of the soil ecosystem
- Their response to Glastir interventions could be crucial to understanding the delivery of ecosystem services from soil biota

Methods

- Samples collected from sites across Wales in 2013 and 2014
- Mesofauna were extracted at CEH Lancaster using the Tullgren funnel method and identified to Order and/or Family level at Bangor University and CEH Lancaster
- Broad habitats assessed by linear mixed effects models with post-hoc testing
- Community composition assessed by NMDS with ANOSIM analysis
- Correlations with physical/chemical variables explored through RDA

Results

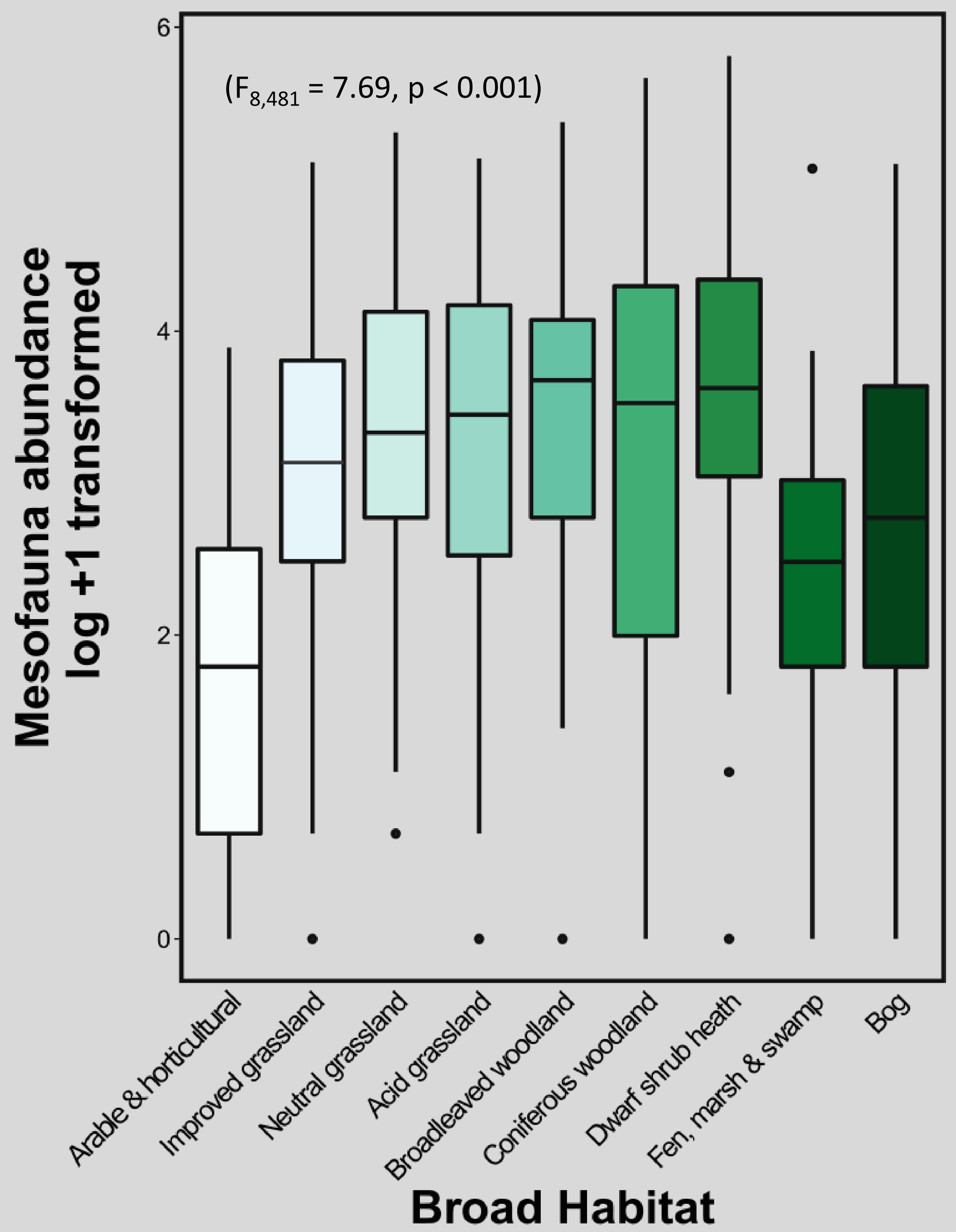

Fig 1. Boxplot of total mesofauna abundance. Fens, marshes, and swamps plus arable and horticultural land had significantly lower mesofauna abundances than all other habitats

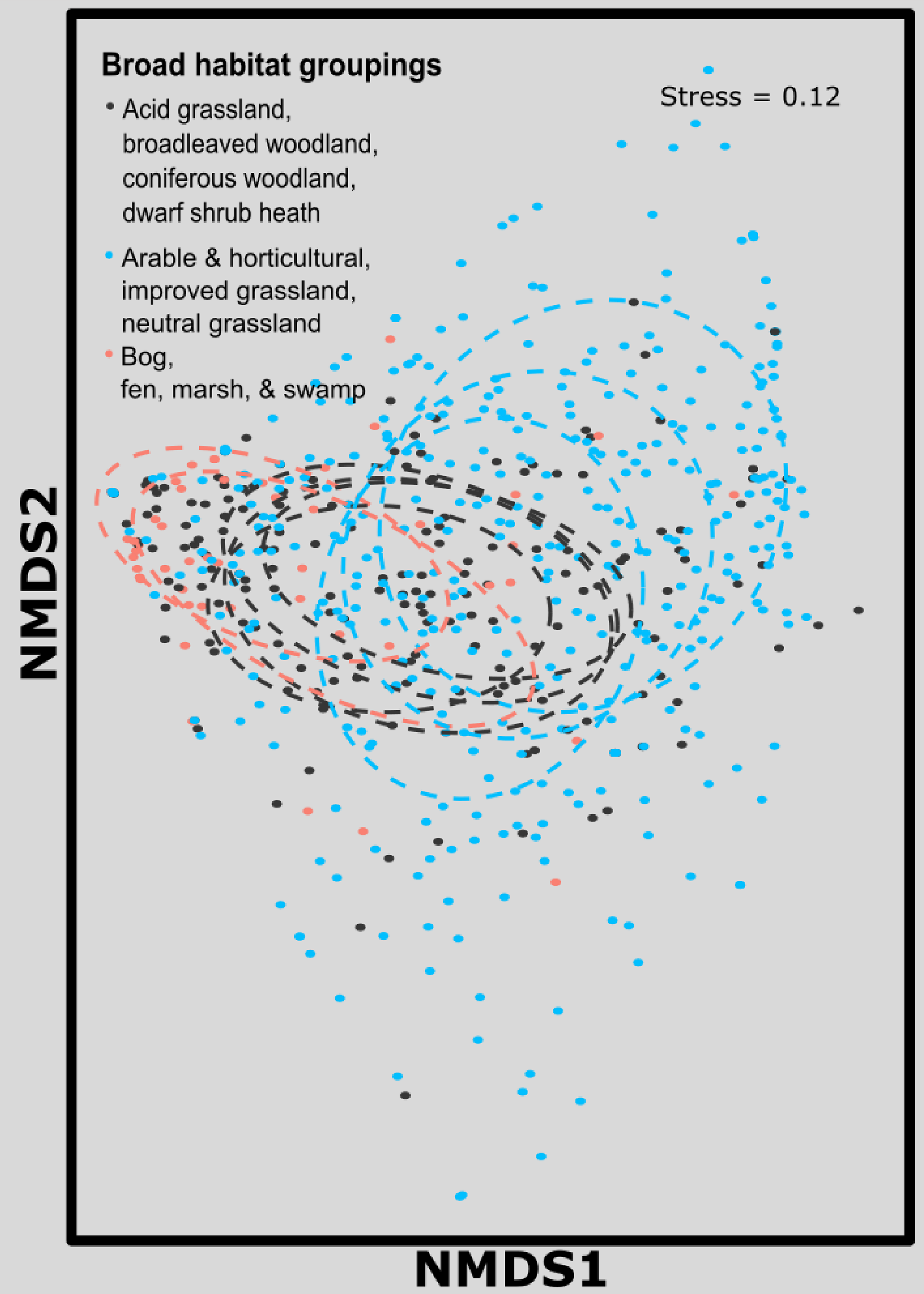

Fig 2. NMDS plot of mesofauna communities in each broad habitat. ANOSIM shows significant convergence between habitats (R = 0.09, p = 0.001), which are colour-coded to show three general groupings.

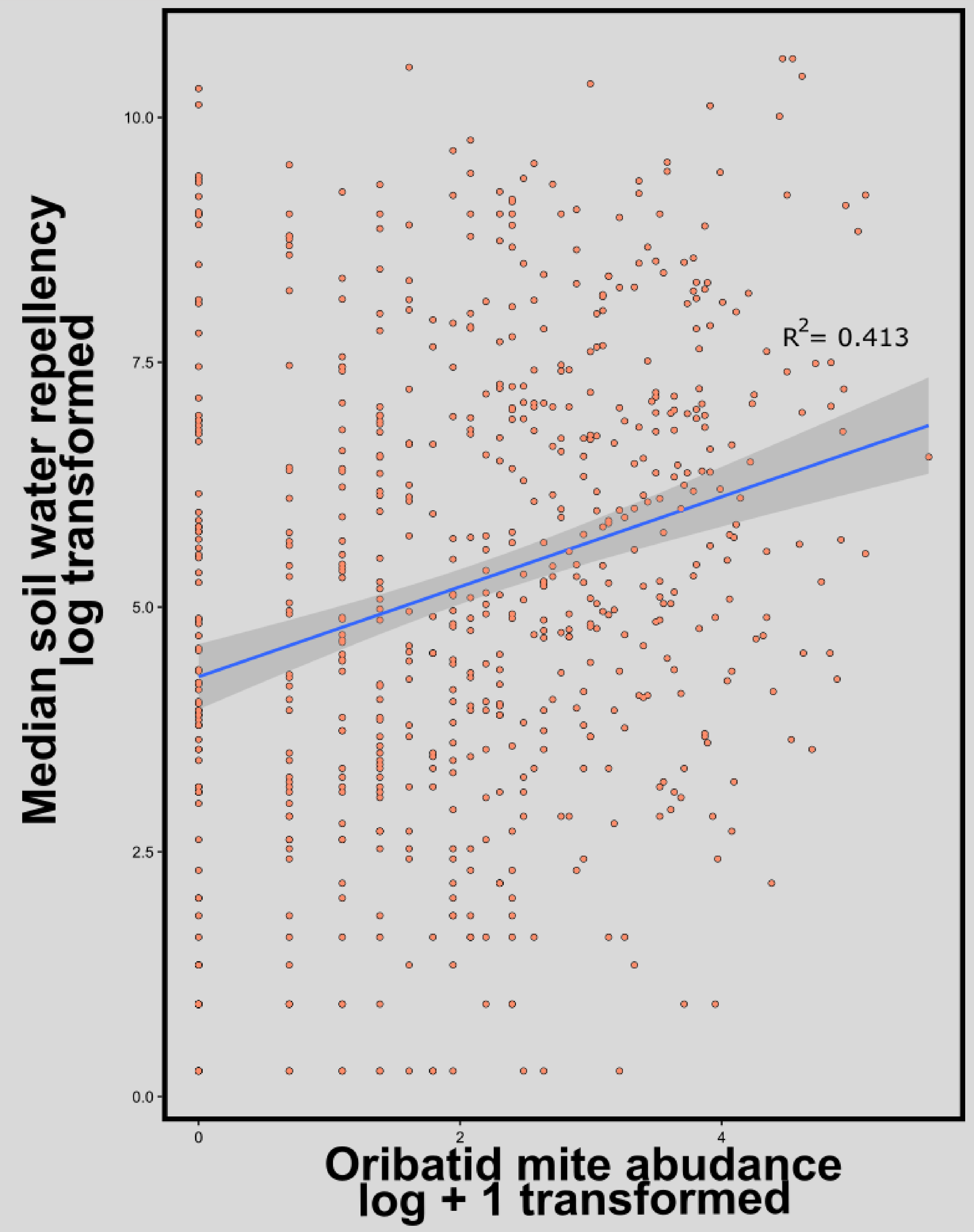

Fig 3. Regression of Oribatid mites against median soil water repellency. This correlation may be caused by abundance of fungi, which increase water repellency[1] and are eaten by the mites[2].

Summary of Findings

- Preliminary results show trends in broad habitat consistent with the literature of the British Isles; mesofauna abundances are lowest in intensively harvested land and naturally inclement habitats[3,4]
- Community structures are similar in habitats with similar physical/chemical properties
- We posit the positive correlation between Oribatid mite abundance and soil water repellency stems from fungal abundance[1]; we plan to test this using ITS data

Acknowledgements & Literature Cited

Prifysgol Bangor University
Centre for Ecology & Hydrology — Natural Environment Research Council
STARS — Soils Training And Research Studentships
Glastir Monitoring and Evaluation Programme

1. Rillig *et al.*, 2010. *Soil Biol. Biochem.* 42: 1189-1191
2. Nielsen *et al.*, 2010. *J. Biogeogr.* 37: 1317-1328
3. Black *et al.*, 2003. *J. Environ. Manage.* 67: 255-266
4. Arroyo *et al.*, 2013. *Ir. Nat. J.* 19-27.