Rationale:
Natural England assesses soil biodiversity as part of our monitoring across 40 National Nature Reserves to detect long-term environmental trends. Tullgren extracts of soil mesofauna are proving challenging to identify using trained volunteers. Could metabarcoding be a rapid, cost-effective approach for monitoring soil mesofauna and characterising their communities?

Method:
Two sets of six samples were taken from three chalk grasslands: ancient species-rich, agriculturally improved and naturally reverting grassland.

Identified to species / genus / family
~200 individuals of most common species

Barcoded 18S rRNA & COI

Results:

Morphological identification

18S rRNA Tullgren extraction

18S rRNA Bulk soil extraction

Community composition: 18S rRNA represented broad soil communities (mesofauna, plants, algae, fungi and protists) but gave a poor match to ecologically appropriate species in GenBank. There were more collembola OTUs in agriculturally improved grassland and more acari in the species-rich grassland soil in Tullgren extracts.

Conclusions:
- Metabarcoding shows good potential for rapid characterisation and monitoring of soil mesofauna communities, but better COI primers are needed for some groups and for bulk soil approaches.
- More effort to generate barcodes for more soil species will help identify realistic soil communities.