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Earthworm Society of Britain
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In the UK and Ireland 27 species of earthworm have been recorded living in natural environments. Earthworms are under-recorded and as a result we know very little about the true distribution of many of our species. In fact, distribution maps have only been published for a handful of species. The Earthworm Society of Britain (ESB) was set up to tackle this issue and now manages the National Earthworm Recording Scheme. The aims of this scheme are to train new earthworm recorders and produce new earthworm records.

On 21st March 2015 ESB earthworm recorders sampled 9 sites across Powis Castle (Powys, Wales) and Preston Montford (Shropshire, England) for earthworms. This report outlines some background information on earthworm ecology and the results of the sampling.

Earthworm Ecology

Earthworms in the UK are divided into four groups, called ecotypes, each of which has a different life style.

Compost earthworms

As their name would suggest, these are most likely to be found in a compost bin, but can also be found in manure heaps, sewage treatments works and other places with large amounts of organic matter. They prefer warm and moist environments with a ready supply of fresh compost material. They can very rapidly consume this material and also reproduce very quickly. Compost earthworms tend to be bright red in colour and stripy. Compost earthworm species include *Eisenia fetida* and *Dendrobaena veneta*

Epigeic earthworms

Epigeic earthworms live on the surface of the soil in leaf litter. These species tend not to make burrows but live in and feed on the leaf litter. Epigeic earthworms are also often bright red or reddy-brown, but they are not stripy. Epigeic earthworm species include *Dendrobaena octaedra*, *Dendrobaena attemsi*, *Dendrodrilus rubidus*, *Eiseniella tetraedra*, *Heliodrilus oculatus*, *Lumbricus rubellus*, *Lumbricus castaneus*, *Lumbricus festivus*, *Lumbricus friendi*, *Satchellius mammalis*

Endogeic earthworms

Endogeic earthworms live in and feed on the soil. They make horizontal burrows through the soil to move around and to feed and they will reuse these burrows to a certain extent. Endogeic earthworms are often pale colours, grey, pale pink, green or blue. Some can burrow very deeply in the soil. Endogeic earthworm species include *Allolobophora chlorotica*, *Apporectodea caliginosa*, *Apporectodea icterica*, *Apporectodea rosea*, *Murchieona muldali*, *Octolasion cyaneum* and *Octolasion lacteum*

Anecic earthworms

Anecic earthworms make permanent vertical burrows in soil. They feed on leaves on the soil surface that they drag into their burrows. They also cast on the surface, and these casts can quite often be seen in grasslands. They also make middens (piles of casts) around the entrance to their burrows. Anecic species are the largest species of earthworms in the UK. They are darkly coloured at the head end (red or brown) and have paler tails. Anecic earthworm species include *Lumbricus terrestris* and *Apporectodea longa*

Study Sites – Powis Castle

Three sites were sampled across Powis Castle. One site was a set of 3 large compost heaps of different ages (PCC) and was sampled in a non-quantitative manner. A grassland site (PC1) and wetland site (PC2) were sampled using the ESB soil pit sampling standard protocol.

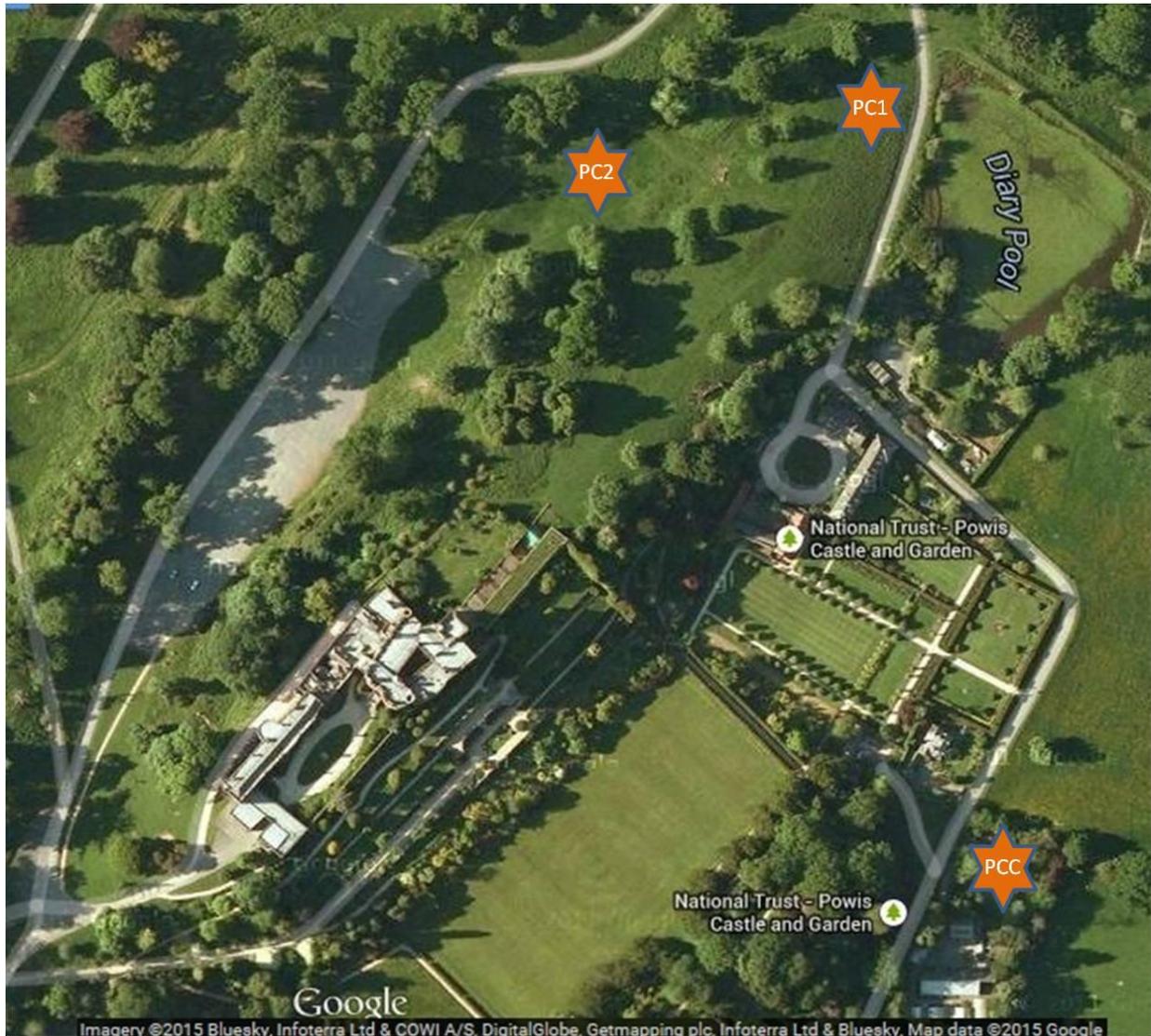


Figure 1 (above): Satellite map of Powis Castle showing the location of sampling sites.

Table 1: Details of sampling locations in Powis Castle

Site Code	Grid Reference	Habitat	Comments
PCC	SJ21810637	Compost heap	Compost heaps of different ages. Sampling non-quantitative.
PC1	SJ21770670	Grassland	Adjacent to <i>Lasius flavus</i> nests. Soil pits, deadwood and leaf litter sampled.
PC2	SJ21700668	Wetland	Wet flush. Soil pits, standing water and deadwood sampled.

Study Sites – Preston Montford

Five sites were sampled across Preston Montford. One site was a set of 3 compost heaps of different contents (PMC) and was sampled in a non-quantitative manner. The other sites (PM1, PM2, PM3, PM4 and PM5) were sampled using the ESB soil pit sampling standard protocol and consisted of a variety of habitats.

Figure 2 (left): Satellite map of Preston Montford showing the location of sampling sites.



Table 2: Details of sampling locations in Richmond Park

Site Code	Grid Reference	Habitat	Comments
PMC	SJ43231439	Compost heap	Food waste compost heap, grass cutting compost heap and leaf litter compost heap.
PM1	SJ43401422	Meadow	Hay meadow consisting of treated and untreated patches. Soil pits, hedgerow and hay pile sampled.
PM2	SJ43421438	Wetland	Wetland at end of natural sewage filtration system. Soil pits and under deadwood sampled.
PM3	SJ432146	Woodland	Small deciduous woodland with very dry litter. Soil pits sampled.
PM4	SJ433145	Grassland	Open field. Soil pits sampled.
PM5	SJ43201463	Wet woodland	Wet woodland on the bank of River Severn. Soil pits and deadwood sampled.

Sampling Methods

ESB soil pit sampling standard protocol: Five soil pits were excavated at each site measuring approximately 25cm X 25cm X 10cm. The contents of each pit were hand sorted and any earthworms were removed and preserved in 80% alcohol on site. In addition to the sampling, a grid reference of the location and habitat details were recorded.

Compost sites/microhabitat searches: To improve the probability of finding epigeic and compost species of earthworm, microhabitats (such as deadwood, hedgerows and leaf litter) were searched at each site and two additional sites of compost heaps were searched (PCC and PMC). Each microhabitat or compost site was searched in a non-quantitative manner and any adult earthworms were removed and preserved in 80% alcohol on site.

Identification

On 22nd March 2015 the ESB ran an identification course at the FSC Preston Montford Field Centre (Shropshire) to provide training for inexperienced earthworm recorders and identify the specimens collected the previous day. Earthworms were identified using binocular microscopes and the FSC *Key to the earthworms of Britain and Ireland* (Sherlock, 2012). All identifications were verified by experienced ESB recorders (Keiron Brown, Kerry Calloway, Rachel Clark and Salma Mostafa).

Results

In total 15 species of earthworm were recorded across the two sites (11 species at Powis Castle and 13 species at Preston Montford) in order to create the following site species lists:

Powis Castle earthworm species

Allolobophora chlorotica
Allolobophoridella eiseni
Aporrectodea caliginosa
Aporrectodea rosea
Dendrodrilus rubidus
Eisenia fetida
Lumbricus castaneus
Lumbricus terrestris
Murchieona muldali
Octolasion cyaneum
Satchellius mammalis

Preston Montford earthworm species

Allolobophora chlorotica
Aporrectodea caliginosa
Aporrectodea longa
Aporrectodea rosea
Dendrodrilus rubidus
Eisenia fetida
Eiseniella tetraedra
Lumbricus castaneus
Lumbricus rubellus
Lumbricus terrestris
Octolasion cyaneum
Octolasion lacteum
Satchellius mammalis

Most of the species recorded are thought to be relatively common species with broad distributions. However, one species recorded at Powis Castle, *M.muldali*, is thought to be relatively rare (though further investigation is required to confirm this).

E. tetraedra is an earthworm commonly found in waterlogged sites and was found in both wetland habitats sampled at Preston Montford.

National Earthworm Recording Scheme

All of the records have been submitted to the National Earthworm Recording Scheme and will be shared responsibly with external organisations, such as Local Biological Records Centres and the National Biodiversity Network. Earthworm records will be made freely available, alongside other wildlife records, to the general public.

The [ESB website](#) contains guidance on sampling, identifying and recording earthworms and includes PDF copies of all of our guidance documents. The ESB is always grateful to receive any new, or old, records. Please note that even single records of a species with no habitat information are still useful as geographic distribution data is still very limited with regards to earthworms. Please feel free to contact us if you are interested in organising any earthworm identification training for your staff.

Further Information

Carpenter D, Sherlock E, Jones DT, Chiminoides J, Writer T, Neilson R, Boag B, Keith AM, Eggleton P (2012) Mapping of earthworm distributions for the British Isles and Eire highlights the under-recording of an ecologically important group. *Biodiversity Conservation* 21:475-485

[Natural England \(2014\) Earthworms in England: distribution, abundance and habitats. PDF available at: http://publications.naturalengland.org.uk/publication/5174957155811328](http://publications.naturalengland.org.uk/publication/5174957155811328)

[Sims RW, Gerrard BM \(1999\) Earthworms. Synopses of the British Fauna \(New Series\). 39. London: Linnean Society of London](#)

[Sherlock E \(2012\) Key to the earthworms of the UK and Ireland. Field Studies Council](#)

Please contact the author of this report, Keiron Derek Brown, at info@earthwormsoc.org.uk if you have any queries regarding this report.

FSC Tomorrow's Biodiversity Project

The Earthworm Society of Britain would like to thank Richard Burkmar and the FSC Tomorrow's Biodiversity Project for funding and facilitating the ESB Preston Montford Field Meeting 2015.



Tomorrow's Biodiversity is an FSC project funded by the Esmée Fairbairn Foundation for five years (2013-2017 inclusive). It is helping us to identify important gaps in identification and monitoring skills, as well as barriers to filling those gaps, and developing/trialling solutions with new training, resources (e.g. new AIDGAP keys or electronic resources) or other interventions.

The first two years (2013-2014) focused on identifying gaps and barriers and framing the delivery phase. The delivery phase (2015-2017 inclusive) is developing 'exemplar' projects which can address some of the gaps and trial new ways of working that can overcome some of the barriers. The project will enable the Field Studies Council to develop new resources and training for taxa and/or habitats that are currently under-resourced but which have the potential to make a valuable contribution to our understanding of how biodiversity fares over the coming decades in the face of rapid environmental change.

We would also like to thank all of the participants (see table 3 below) for all their contribution to the most successful ESB field meeting to date.

Table 3: The volunteers that were involved in the earthworm sampling of Powis Castle/Preston Montford and the identification of specimens.

ESB recorders involved in specimen collection	ESB recorders involved in specimen identification
Charlie Bell	Charlie Bell
Lynne Besenyei	Lynne Besenyei
Keiron Brown	Keiron Brown
Richard Burkmar	Richard Burkmar
Kerry Calloway	Kerry Calloway
Rachel Clark	Rachel Clark
Anthony Cuthbert	Anthony Cuthbert
Iwan Edwards	Iwan Edwards
Richard Gallon	Richard Gallon
Bob Griffiths	Bob Griffiths
Zoe Haysted	Zoe Haysted
Ruaidhri Holmes	Ruaidhri Holmes
Colmb Holmes	Colmb Holmes
Salma Mostafa	Salma Mostafa
Martin Noble	Martin Noble
Phillip Playford	Phillip Playford
Gwen Potter	Gail Quartly-Bishop
Gail Quartly-Bishop	Dawn Thomas
Dawn Thomas	Jan Tomlinson
Jan Tomlinson	

Finally, thank you to the FSC Preston Montford and NT Powis Castle and all the staff that allowed us to sample these sites and provided us with food and accommodation.