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Earthworm Society of Britain

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 18<sup>th</sup> and 19<sup>th</sup> October 2014 Kerry Calloway and Rachel Julie Clark led a team of earthworm recorders to undertake earthworm sampling in Capstone Farm Country Park (Kent). 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 *Eisenia 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*

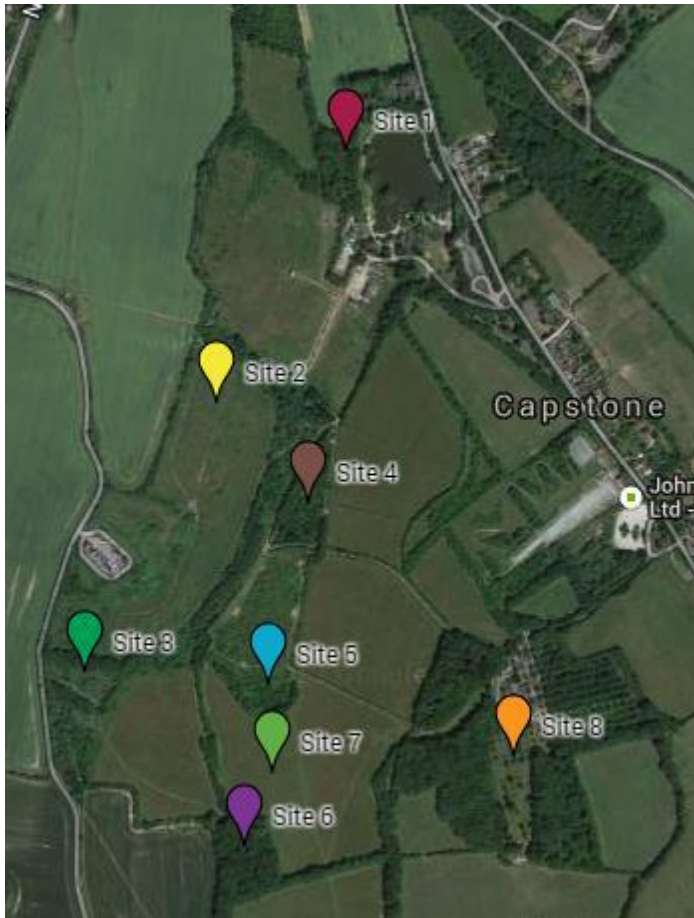
### *Endogeic earthworms*

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



Eight sites (see figure 1 and table 1) were chosen across Capstone Farm Country Park that represented a range of habitats, including grassland, woodland and Orchard.

Figure 1 (above): Ordnance Survey Map of Capstone Farm Country Park showing the location of sampling sites (googlemaps.com, 2014).

**Table 1: Details of sampling locations in Capstone Farm Country Park**

Site No.	Site Name	Grid Reference	Habitat	Comments
1	Tangle Wood	TQ776654	Deciduous Semi-Natural Woodland	Small fragment of woodland, 0.5 hectares in size. Hazel planted 10 years ago, but woodland is older. Hornbeam present.
2	The Landfill Site	TQ776654	Neutral Grassland	Previously Shawstead landfill site, which closed in 1984.
3	Rough Grassland	TQ776654	Grassland	Very rough grassland with scattered shrubs, rosehips and thistles.

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Site No.	Site Name	Grid Reference	Habitat	Comments
4	Millennium Wood	TQ776654	Deciduous Planted Woodland	Small fragment of woodland, 0.6 hectares in size. Planted in 2 phases: 1997 and 2000. Species include: birch, beech, oak, blackthorn and sycamore.
5	Seasonal Pond	TQ776654	Grassland	Seasonal pond that floods most years. Last flooding 2 years ago.
6	Orchid Wood	TQ776654	Deciduous Semi-Natural Woodland	Unmanaged ancient woodland. Limited ground vegetation and lots of dead wood. Sycamore present.
7	The Valley Field	TQ782645	Neutral Grassland	Large open grassland, surrounded by woodland and shrub fragments, small stream running through middle of grassland. Grass cut early September 2014.
8	Orchard	TQ782645	Scattered orchard within park	Loamy soil, neutral grass. Grass mowed in September 2014.

## Sampling Methods

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 six figure grid reference of the location and habitat details were recorded.

Microhabitats, such as dead wood, leaf litter, grass edges, wood chip and a ditch were also sampled.

## Identification

On 19th October 2014 the ESB ran an identification course at the Kingsley House, Gillingham (Kent) to provide training for inexperienced earthworm recorders and identify the specimens collected in Capstone Farm Country Park the previous day. Earthworms were identified using binocular microscopes and the Field Studies Council Key to the earthworms of Britain and Ireland (Sherlock, 2012).

A second day of identification was done by Rachel Clark at the Natural History Museum. All identifications were verified by experienced ESB recorders (Keiron Brown, Kerry Calloway, Rachel Clark and Emma Sherlock).

## Results

In total 10 species of earthworm were recorded through the soil pit sampling of 4 sites (see table 2).

*Allolobophora chlorotica*  
*Apporectodea caliginosa*  
*Apporectodea longa*  
*Apporectodea rosea*  
*Dendrodrilus rubidus*  
*Lumbricus festivus*  
*Lumbricus rubellus*  
*Lumbricus terrestris*  
*Octolasion cyanaeum*  
*Octolasion lacteum*

In total 2 species of earthworm were recorded through the investigation of deadwood at 1 sites (see table 3).

*Allolobophora chlorotica*  
*Lumbricus castaneus*

In total 2 species of earthworm were recorded through the investigation of leaf litter at 2 site (see table 4).

*Allolobophora chlorotica*  
*Lumbricus rubellus*

In total 1 species of earthworm were recorded through the investigation of a ditch/stream at 1 site (see table 5).

*Allolobophora chlorotica*

In total 3 species of earthworm were recorded through the investigation of woodchip at 1 microhabitat site (see table 6).

*Allolobophora chlorotica*  
*Apporectodea caliginosa*  
*Apporectodea longa*

## Recording in Capstone Farm Country Park

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 our Earthworm Recording Instructions, Soil Pit Sampling Instructions, Earthworm Recording Form and Earthworm Recording Sheet. 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.

## **Acknowledgement**

The ESB are very grateful to Capstone Farm Country Park and Medway Council for kindly granting permission to sample in the park. Particular thanks to Dan Gooch for his navigation and valuable information about the various sites we sampled and for helping us with the sampling throughout the day.

## **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

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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

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**Table 2: Records collected through soil pit sampling of all sites across Capstone Farm Country Park by Kerry Calloway and Rachel Julie Clark on 18<sup>th</sup> October 2014.**

Species	Grid Reference	Number	Habitat	Comments
<i>Allolobophora chlorotica</i>	TQ776654	12	Deciduous Woodland	Small fragment of woodland, 0.5 hectares in size. Hazel planted 10 years ago, but woodland is older. Hornbeam present.
<i>Apporectodea longa</i>	TQ776654	4	Deciduous Woodland	Small fragment of woodland, 0.5 hectares in size. Hazel planted 10 years ago, but woodland is older. Hornbeam present.
<i>Apporectodea rosea</i>	TQ776654	2	Deciduous Woodland	Small fragment of woodland, 0.5 hectares in size. Hazel planted 10 years ago, but woodland is older. Hornbeam present.
<i>Allolobophora chlorotica</i>	TQ776654	4	Neutral Grassland	Previously Shawstead landfill site, which closed in 1984.
<i>Apporectodea caliginosa</i>	TQ776654	1	Neutral Grassland	Previously Shawstead landfill site, which closed in 1984.
<i>Apporectodea longa</i>	TQ776654	2	Neutral Grassland	Previously Shawstead landfill site, which closed in 1984.
<i>Lumbricus festivus</i>	TQ776654	2	Neutral Grassland	Previously Shawstead landfill site, which closed in 1984.
<i>Allolobophora chlorotica</i>	TQ776654	2	Neutral Grassland	Previously Shawstead landfill site, which closed in 1984.
<i>Apporectodea rosea</i>	TQ776654	2	Grassland	Very rough grassland with scattered shrubs, rosehips and thistles.
<i>Lumbricus rubellus</i>	TQ776654	2	Grassland	Very rough grassland with scattered shrubs, rosehips and thistles.
<i>Allolobophora chlorotica</i>	TQ776654	13	Deciduous Woodland	Small fragment of woodland, 0.6 hectares in size. Planted in 2 phases: 1997 and 2000. Species include: birch, beech, oak, blackthorn and sycamore.
<i>Apporectodea caliginosa</i>	TQ776654	1	Deciduous Woodland	Small fragment of woodland, 0.6 hectares in size. Planted in 2 phases: 1997 and 2000. Species include: birch, beech, oak, blackthorn and sycamore.
<i>Apporectodea rosea</i>	TQ776654	1	Deciduous Woodland	Small fragment of woodland, 0.6 hectares in size. Planted in 2 phases: 1997 and 2000. Species include: birch, beech, oak, blackthorn and sycamore.
<i>Apporectodea caliginosa</i>	TQ776654	2	Grassland	Seasonal pond that floods most years. Last flooding 2 years ago.
<i>Apporectodea longa</i>	TQ776654	1	Grassland	Seasonal pond that floods most years. Last flooding 2 years ago.
<i>Apporectodea rosea</i>	TQ776654	4	Grassland	Seasonal pond that floods most years. Last flooding 2 years ago.
<i>Octolasion lacteum</i>	TQ776654	1	Grassland	Seasonal pond that floods most years. Last flooding 2 years ago.

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Species	Grid Reference	Number	Habitat	Comments
<i>Apporectodea caliginosa</i>	TQ776645	3	Deciduous Woodland	Unmanaged ancient woodland. Limited ground vegetation and lots of dead wood. Sycamore present.
<i>Apporectodea caliginosa</i>	TQ782645	5	Neutral Grassland	Large open grassland, surrounded by woodland and shrub fragments, small stream running through middle of grassland. Grass cut early September 2014.
<i>Apporectodea rosea</i>	TQ782645	1	Neutral Grassland	Large open grassland, surrounded by woodland and shrub fragments, small stream running through middle of grassland. Grass cut early September 2014.
<i>Dendrodrilus rubidus</i>	TQ782645	2	Neutral Grassland	Large open grassland, surrounded by woodland and shrub fragments, small stream running through middle of grassland. Grass cut early September 2014.
<i>Octolasion cyaneum</i>	TQ782645	1	Neutral Grassland	Large open grassland, surrounded by woodland and shrub fragments, small stream running through middle of grassland. Grass cut early September 2014.
<i>Apporectodea caliginosa</i>	TQ782645	4	Orchard	Scattered orchard within park. Loamy soil, neutral grass. Grass mowed in September 2014.
<i>Apporectodea longa</i>	TQ782645	1	Orchard	Scattered orchard within park. Loamy soil, neutral grass. Grass mowed in September 2014.
<i>Apporectodea rosea</i>	TQ782645	2	Orchard	Scattered orchard within park. Loamy soil, neutral grass. Grass mowed in September 2014.
<i>Dendrodrilus rubidus</i>	TQ782645	3	Orchard	Scattered orchard within park. Loamy soil, neutral grass. Grass mowed in September 2014.
<i>Lumbricus terrestris</i>	TQ782645	1	Orchard	Scattered orchard within park. Loamy soil, neutral grass. Grass mowed in September 2014.

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**Table 3: Records collected through dead wood sampling across Capstone Farm Country Park by Kerry Calloway and Rachel Clark on 18<sup>th</sup> October 2014.**

Species	Grid Reference	Number	Habitat	Comments
<i>Allolobophora chlorotica</i>	TQ776654	3	Deciduous Woodland	Small fragment of woodland, 0.5 hectares. Hazel planted 10 years ago, but woodland is older. Hornbeam present.
<i>Lumbricus castaneus</i>	TQ776654	1	Deciduous Woodland	Small fragment of woodland, 0.5 hectares. Hazel planted 10 years ago, but woodland is older. Hornbeam present.

**Table 4: Records collected through leaf litter sampling across Capstone Farm Country Park by Kerry Calloway and Rachel Julie Clark on 18<sup>th</sup> October 2014.**

Species	Grid Reference	Number	Habitat	Comments
<i>Allolobophora chlorotica</i>	TQ776654	2	Deciduous Woodland	Small fragment on woodland, 0.5 hectares. Hazel planted 10 years ago, but woodland is older. Hornbeam present.
<i>Lumbricus rubellus</i>	TQ776645	2	Deciduous Woodland	Unmanaged ancient woodland. Limited ground vegetation and lots of dead wood. Sycamore present.

**Table 5: Records collected through ditch/stream sampling in one site in Capstone Farm Country Park by Kerry Calloway and Rachel Julie Clark on 18<sup>th</sup> October 2014.**

Species	Grid Reference	Number	Habitat	Comments
<i>Apporectodea caliginosa</i>	TQ782645	7	Orchard	Sampled edge of small ditch running between orchard and track.



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**Table 6: Records collected through woodchip sampling in one microhabitat site in Capstone Farm Country Park by Kerry Calloway and Rachel Julie Clark on 18<sup>th</sup> October 2014.**

Species	Grid Reference	Number	Habitat	Comments
<i>Allolobophora chlorotica</i>	TQ776645	1	Play Area	Wood chip in a play area. The woodchip was lined underneath.
<i>Apporectodea caliginosa</i>	TQ776645	4	Play Area	Wood chip in a play area. The woodchip was lined underneath.
<i>Apporectodea longa</i>	TQ776645	1	Play Area	Wood chip in a play area. The woodchip was lined underneath.

**Table 7: The volunteers that were involved in the earthworm sampling in Capstone Farm Country Park and the identification of specimens.**

ESB recorders involved in specimen collection	ESB recorders involved in specimen identification
Keiron Brown	Keiron Brown
Richard Burkmar	Richard Burkmar
Kerry Calloway	Kerry Calloway
Rachel Clark	Rachel Clark
Daniel Goosh	Vicky Gilson
Sam Fowler	Salma Mostafa
Vicky Gilson	Nadia Moreno
Keith Lugg	Olivia Morton
Bethany Smith	Emma Sherlock