**Earthworms**

Earthworms are very important for soil health for a couple of different reasons. They mix in and contribute to the breakdown of organic matter in the soil; they aerate the soil, stopping it becoming too compressed; and they create plenty of space underground, meaning that water can drain away freely.

There are a variety of different species of earthworm in the UK, and all their different behaviours do different jobs for soil health. In a place with lots of earthworms, you get plenty of space underneath the soil, meaning that in the event of heavy rains water drains away freely. This prevents things like flash flooding. What you really need, not just earthworms, is a diversity of earthworms in your area. There are four different groups of earthworm in the OPAL ID guide: the stripy worms; the pale worms; the green worms; and the red worms. These break down into three functional groups: the endogeic worms; the anecic worms; and the epigeic worms.

Endogeic worms are the pale or green earthworms in the OPAL earthworm guide. They create lots of temporary horizontal burrows underground: not very deep, just about at root level. They eat soil and pull nutrients from that. They are particularly important for allowing the transport of nutrients underground.

The next group, the anecic worms, are the larger red earthworms in your earthworm guide, such as the lob worm or the black headed worm. These are particularly important for water drainage in the soil as they create deep, vertical, permanent burrows, as far down as three metres. As well as contributing to water drainage, they also contribute to the breakdown and mixing of organic matter into the soil. At night, they'll come up to feed, drag organic matter down, process it, and leave rich worm casts at the top of their burrows, creating lovely new soil.

The final group are the epigeic worms. These consist of the smaller red worms in your OPAL ID guide, and the stripy earthworms in the ID guide. These worms don't burrow, but live underneath a layer of organic matter on top of the soil, such as dead leaves. They are particularly efficient at making new soil from organic matter, and contributing to the breakdown of that organic matter. These worms are fast eaters and even faster breeders.

Just before we get started, a quick Health and Safety note. When doing the earthworm survey, please make sure you've got permission from the landowner before you dig anywhere. Also, because we're going to be working with soil, if you have any cuts or open wounds on your hands, please cover them up. Wear gloves, and make sure you wash your hands when you're finished.

To get started, we'll need to dig a soil pit. You'll want to measure out a 20cm by 20cm square on the ground and mark it out using sticks. Once you've done this, dig down by about 10cm. Luckily I've already made a start. Place this soil in a container so that no worms escape and sort any worms you find into another basin. Some worms burrow very deep, so what we'll do is we'll mix one teaspoon of mustard in 750ml of water and pour that in. Not only will this help us assess drainage, but it will also tempt any worms that are underground up to the surface. This does not harm the worms. Now we'll get down to sorting our worms: what you need to do now is very carefully remove any worms from your soil pit or your soil into a separate tray for sorting.

We now need to establish whether the worms are adult or juvenile. There are two ways you can do this. You can measure your worm, and if it's less than 2cm long then it's a juvenile. The other thing to look for is a saddle. The saddle is the part in the middle of the worm which is usually slightly wider than the body of the worm and also a different colour. Only adult worms have this, so if it's got a saddle it's mature; if it's not got a saddle, it's a juvenile.

Let's have a closer look at this worm. We've already established that it's an adult because it's longer than 2cm and it’s got a nice clear saddle on its back. So now we need to try and get it into one of those four groups. First instance, we can tell it's not a stripy earthworm, because when it's moving it's not got those clear stripes. Looking at the colouration of its head from its saddle to the front of its body, it’s not pale grey, pale pink or pale yellow, so it's not one of the pale or green earthworms. Instead, what we've got is a red earthworm, with a dark red, brown or purple head.

Once you've identified your earthworms, you can record them in a simple chart such as the one used in the OPAL Earthworm and Soil Survey. Once you've finished identifying your earthworms, rinse them off, return them to the soil pit, and put any soil you dug up back on top of the pit. Remember, the information you've collected is not just interesting for you to learn more about your natural environment, but if you upload the information onto the OPAL website, it allows scientists to enhance their understanding of both soil and earthworm science in the UK.