

GREATSOILS

How to count earthworms

Importance

Earthworms improve plant productivity, are principally responsible for engineering the soil environment and are an important food source for native birds such as the song thrush. There are up to 10 common earthworm species in agricultural soils and these can be grouped into three ecological types: epigeic, endogeic and anecic earthworms – each group having a unique and important function. Earthworms are an indicator of soil health, being impacted by pH, waterlogging, compaction, tillage, rotation and organic matter management.

What do earthworms tell us?

- **A good presence of earthworms across a field** means the benefits are likely to be widespread
- **High numbers of earthworms** indicate the potential for significant benefits to plant productivity
- **The presence of each ecological group** indicates the potential for specific earthworm benefits, such as carbon cycling, nutrient mobilisation and/or water infiltration

How to identify earthworms

Epigeic (litter-dwelling earthworms)

- Dark red-headed worms
- Small (<8cm) in size, typically about the length of a matchstick
- Often fast-moving (most likely to escape from the worm pot!)

Sensitive to: Tillage (detrimental) and organic matter management such as manure applications (beneficial)

Roles: Carbon cycling and prey for native birds



Endogeic (topsoil earthworms)

- Pale-coloured and green worms (not red)
- Small to medium size
- Often curl up when handled, and green worms may emit a yellow fluid
- The most common earthworm group found in arable fields

Sensitive to: Organic matter management (beneficial)

Roles: Soil aggregation and nutrient mobilisation for plants



Anecic (deep burrowing earthworms)

- Dark red or black-headed worms
- Large size (>8cm), typically similar size to a pencil
- Make deep vertical tunnels, up to 2m
- Often found below surface earthworm casts or midden residue piles
- Feed at night, foraging the soil surface around their burrow for litter
- Commonly found in grassland but often absent from ploughed fields and where there is no surface litter

Sensitive to: Tillage (detrimental) and organic matter management such as manure applications and straw return (beneficial)

Roles: Deep burrows that improve aeration, water infiltration and root development



Identifying adults and juveniles

Adult earthworms have a clearly developed **saddle** (reproductive ring) and juveniles do not.

You may need to rinse worms with water to determine if a saddle is present.

Size is not a good indicator of maturity as adult earthworms typically range in size from 2cm to 15cm, depending on species.



Assessing earthworm populations in just 60 minutes

When is it best to count earthworms?

Spring and autumn are the best times to carry out earthworm assessments.

Timing the sampling after warm, wet conditions often provides the best earthworm population estimates.

How to assess the earthworm populations

Tools: Spade, pot, bottle of water, mat and a record sheet available to download at ahdb.org.uk/greatsoils

Procedure: Dig 10 soil pits per field following a standard W-shape field-sampling pattern. Aim to spend five minutes hand-sorting the soil from each pit.

1

Dig out a soil pit (20cm x 20cm x 20cm) and place soil on mat

2

Hand-sort the soil, placing each whole earthworm into the pot

3

Count and record the total number of earthworms

4

Separate earthworms into adults and juveniles (see above)

5

Return juveniles to the soil pit

6

Count and record the number of each type of adult earthworm (see overleaf)

7

Return earthworms to the soil pit and backfill with soil

8

Repeat steps 1–7, until 10 soil pits per field have been assessed

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