

# How to count earthworms

Earthworms engineer the soil and contribute to plant productivity. They are also an important food source for native birds. As they are impacted by pH, waterlogging, compaction, tillage, rotation and organic matter management, they are a good indicator of soil health.

There are up to 10 common earthworm species in agricultural soils, which can be grouped into three ecological types: epigeic, endogeic and anecic. Each group has a unique role.

## How to identify earthworms

### Epigeic (litter-dwelling earthworms)

- Dark, red-headed worms
- Small size (<8 cm), 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



## 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

### 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)

- Milky-coloured worms, with increasing red or black pigmentation towards the head
- Large size (>8 cm), typically similar size to a pencil
- Make deep vertical tunnels, up to 2 m
- 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 2 cm to 15 cm, depending on species.



## Assessing earthworm populations

### 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 earthworm populations

**Tools:** Spade, pot, bottle of water and a mat. Record sheets available to download via [ahdb.org.uk/greatsoils](https://ahdb.org.uk/greatsoils)

**Procedure (standard):** Dig 10 soil pits per field following a standard W-shape field-sampling pattern.

**Procedure (soil health scorecard):** Dig three soil pits from a representative area. For guidance, visit [ahdb.org.uk/scorecard](https://ahdb.org.uk/scorecard)

Aim to spend five minutes hand-sorting the soil from each pit.

1

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

5

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

6

Return earthworms to the soil pit and backfill with soil

7

Repeat steps 1–6 until enough pits have been assessed.

## Further information

For more information on soil management and increasing earthworm numbers, visit [ahdb.org.uk/greatsoils](https://ahdb.org.uk/greatsoils)

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