

How many earthworms live in my soil? – A guide to determining earthworm abundance on your land



Important Considerations:

The assessment must be conducted during frost-free periods (including frost-free nights). Warm and dry summer months are also not ideal. Optimal conditions with high earthworm activity typically occur in March/April (up to the end of May if soil moisture is sufficient) and September/October, with soil temperatures between 5 and 15 °C.

Required Materials:

- Sickle, knife, garden shears, etc., in case the area is vegetated
- Infiltration ring with a sharp edge (e.g., 40 cm diameter = $1/8 \text{ m}^2$)
- Optional: 1-liter bottle for preparing the mustard suspension
- 10-liter container for transporting the suspension
- Collection container for the earthworms
- Mustard flour or mustard seeds for grinding
- Tweezers or other tools for collecting worms are recommended
- Small garden trowel

Preparation:

- Use either mustard flour or grind mustard seeds with a coffee grinder (e.g. yellow mustard (*Sinapis alba* L.) or preferably black mustard (*Brassica nigra* W.D.J. KOCH))
- Fill 100 g of finely ground mustard into a 1-liter water bottle and top it up with tap water (this intermediate step improves swelling and dissolution of the glycosides).
- Shake repeatedly and let sit for at least 24 hours.
- Pour the resulting suspension into an empty 10-liter container and top it up with another 9 liters of tap water.

Principle:

The ground mustard releases glycosides into the water, which irritate the earthworms' epidermis and cause them to move upward toward the soil surface, where they can be collected.

Procedure:

- Cut existing vegetation close to the ground and remove it
- Place the infiltration ring and press it lightly into the soil
- Pour in the suspension so the soil surface is fully covered
- Continuously refill over 20 minutes to keep the soil slightly flooded (amount used varies depending on soil moisture and infiltration rate)
- Collect emerging earthworms into the container
- After 20 minutes, remove the infiltration ring to allow the solution to drain
- Dig up the infiltration area to a depth of 15–20 cm and thoroughly screen the dug up soil for earthworms → Reason: smaller individuals of certain species may not reach the surface
- Count the collected earthworms and release them back onto the soil

Ergebnis:

- Determine the extraction area using the ring diameter and the circle formula.
 ➔ Example: 0.4 m ring diameter $\rightarrow \pi \times r^2 = \pi \times 0.2^2 = 0.125 \text{ m}^2$
 $1 \text{ m}^2 / 0.125 \text{ m}^2 = 8 \rightarrow (\text{collected worms}) \times 8 = y \text{ worms/m}^2$
- Ideally, repeat the procedure at three different locations and calculate the average.



Figure: Application of earthworm extraction using a mustard suspension in the field

Classification:

Earthworm Abundance (individuals/m ²):	Evaluation
0 to 10	extremely low
11 to 30	very low
31 to 100	low
101 to 200	medium
201 to 300	good
>300	very good

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