










Biological soil properties – Exercise B02

## EARTHWORMS COUNTS

*Reference posters n. 15a, 15b*

<p>RELEVANCE</p>	<p>The amount and diversity of soil earthworms are indicators of biological activity and soil health. Through their burrowing, feeding, digestion and casting, earthworms improve soil porosity and aeration, water infiltration and conductivity, aggregate size and stability, as well as nutrient cycling and root growth<sup>1</sup>. Therefore, the higher the abundance and diversity of these organisms, the better the soil quality<sup>2</sup>.</p>	
<p>MATERIALS</p>	 <p>Trowel</p>	 <p>Plasticsheet</p>
<p>PROCEDURE</p>	<p>1) Using the trowel, dig up to a 20 x 20 x 20 cm of soil block. Remove the litter layer if present</p>	 <p>© FAO 2011</p>
	<p>2) Place the soil block on the plastic sheet</p>	 <p>© FAO 2011</p>
	<p>3) Collect and count the total number of earthworms, and, if possible, sort them by type (see some examples and characteristics in the table below)</p>	 <p>© FAO 2008</p>

NAME	CHARACTERISTICS	PICTURE
<i>Dendrobaena veneta</i>	Small to medium-sized species with reddish pigmentation with a banded or striped appearance, the tips of their tails are often cream or pale yellow.	 © F. Ashwood
<i>Aporrectodea longa</i>	Clearly developed saddle, slightly wider than the rest of the body. Darker at one end, with a red-brown pigmentation. Longer than 8cm when not moving. Relatively thin.	 © F. Ashwood
<i>Allolobophora chlorotica</i>	Green or pale pink colour. Approximately 5 cm length. Often curls up in the hand. Yellow ring on body.	 © F. Ashwood
<i>Octolasion cyaneum</i>	Distinct yellow tail. Blue-grey to a pale rosy pink colour.	 © FAO 2011

ADVANTAGES OF THE METHOD	Easy to assess with few tools needed. No specific knowledge is required.
LIMITATION OF THE METHOD	The method is not exhaustive of biological diversity. It is subjected to climatic conditions (try to avoid carrying out this exercise when the weather is too dry or too humid). It is subjected to the season, therefore, for year-to-year comparison earthworm counts must be made at the same time of year, and preferably during the winter. In tropical seasonal climates, the earthworm population should be assessed preferably towards the end of the rainy season, when most of the individuals have reached the adult stage <sup>3</sup> .
QUESTIONS TO BE ADDRESSED	How many earthworms can be counted within the soil sample? How many different species are there? If none or few can be detected, it is possible to guess why? And how to increase them?

EVALUATION EXAMPLES <sup>1</sup>		
POOR	MODERATE	GOOD
0-4 earthworms in a 20 x 20 x 20 cm of topsoil block, with predominantly 1 species.	4-8 earthworms in a 20 x 20 x 20 cm of topsoil block with preferably 2 or more species.	More than 8 earthworms in a 20 x 20 x 20 cm of topsoil block, with preferably 3 or more species.

<sup>1</sup> [https://orgprints.org/id/eprint/30582/1/VSA\\_Volume1\\_smaller.pdf](https://orgprints.org/id/eprint/30582/1/VSA_Volume1_smaller.pdf)

<sup>2</sup> <https://www.fao.org/3/mc981e/mc981e.pdf>

<sup>3</sup> Lavelle, P. (1983). soil fauna of tropical savannas. II. The earthworms. *Ecosystems of the World*.