

REFERENCE SHEET - SOIL HEALTH ASSESSMENT TOOL KIT

METHOD FOR ASSESSING SOIL MACROFAUNA

MATERIALS:

1. Square-tipped shovel or hoe for digging a square hole.
2. Knife or machete to trim the edges of the hole.
3. Ruler at least 25 cm long to measure hole dimensions.
4. Large bags (e.g. feed or fertilizer sacks) to collect a block of soil.
5. Tray, wide basin, plastic on smooth ground, or other flat surface for spreading soil out and searching for macrofauna.
6. Tweezers to lift out smaller macrofauna.
7. (Optional) Alcohol to preserve macrofauna, and possibly formaldehyde for long-term storage, if macrofauna are brought to the laboratory for classification. You will also need small containers to store the macrofauna from each block or field in these preservative liquids.

PROCEDURE:

1. Using a ruler, mark a 25 x 25 cm square area using stakes, small flags or similar guides. It's a good idea to repeat the whole process and take at least two samples per treatment plot or land use being assessed.
2. Using a shovel and/or a large hoe, preferably flat-tipped, quickly dig out the soil to a depth of 20 cm and store the monolith in a large bag or sack. Try to ensure that the edges of the hole are vertical, so that the soil removed forms an even, square block, and dig the hole with as few strokes as possible to prevent macrofauna escaping into the surrounding soil. A large knife or machete can be used to square up the edges of the hole.

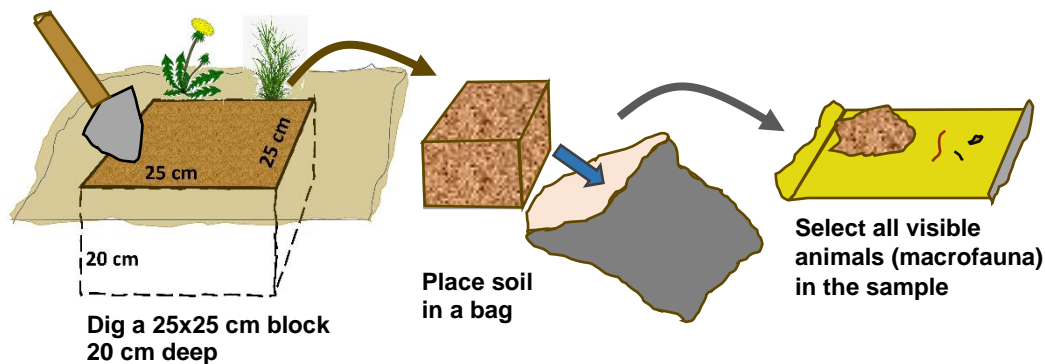


Figure 1. Start by digging up a block of soil in the field. Put the soil in a large bag. Then, working with small batches of soil at a time, find all the macrofauna and count it.

3. Look for and count any soil macrofauna. Find a comfortable place to work, well-lit and protected from sun, rain, and wind.
4. Working systematically, spread small quantities of soil at a time on a tray or other flat surface. Look for insects, worms, centipedes, or other visible animals moving on the soil. Examine small batches of soil at a time so as not to miss any macrofauna, about two handfuls or less in each batch of soil to be searched on the tray. You can return the searched soil to another sack for returning to the hole.
5. You may find earthworms, ants, termites, beetles, spiders, and insect larvae. Check the images below to see what some of them look like.
6. Prepare a chart or list on paper or a large sheet of paper, using the example below. Then, record the number of different animals as they are sorted. If working in a group, one person should be designated as a recorder for this job. Differences can be made by morphotypes and also well-known taxonomic differences, for example between beetles and ants. See the table below for an example. You can create different columns for different samples within the same field and for

different fields. When you've finished counting one or both blocks of the field, you can view two measures as indicators: THE TOTAL NUMBER of animals you've found (abundance) and the number of DIFFERENT TYPES of animals you've found (diversity).

7. If you want to preserve the macrofauna for more detailed identification later, you can place them in alcohol in vials or small bottles. Use one vial for arthropods that will remain in alcohol, and another one with soft-bodied organisms like larvae and worms. For these soft-bodied organisms, you will change out the alcohol for formaldehyde back in a laboratory or office. Preserving the macrofauna like this is optional and is only if you have access to expertise for identifying them more precisely.
8. Even if you are not saving the macrofauna, you can keep all the organisms from one block in a jar temporarily during the activity so that participants can visualize all the different types, before returning them to the soil afterwards.
9. If you're working with a group of farmers, you can carry out this same procedure on a plot of forest or a living fence, or on another site with relatively permanent vegetation and undisturbed soils, as a local benchmark to compare farmed fields to a soil that should have high levels of macrofauna. If your field approaches the number of such permanent vegetation, say more than half the number you find there, that's an indicator of good biological health.

EXAMPLE OF A TABLE TO RECORD THE NUMBER AND TYPE OF MACROFAUNA:

Type of organism	Site or sample 1	Site or sample 2	Comparison site (forest, hedge)	Etc.	
Earthworms					
Millipedes					
Centipedes					
Ants					
Termites					
Spiders					
Isopods					
Beetles					
Etc.					
Number of types					
Total number of organisms					

EXAMPLES OF MACROFUANA FOUND IN THE SOIL:



Larvae of various insects