

Soil ecology

with Dr Camila Filgueiras

Talking points

Knowledge and Comprehension

1. What are nematodes and what role do they play in soil ecosystems?
2. Why are Camila and her team developing new ways of extracting, rearing and identifying nematodes?

Application

3. Camila says, “Smart SOD makes it possible to ask completely new questions. What fraction of the nematodes in this soil are actually alive? Is there an unknown species in this sample?” What other questions would you like to ask?
4. What skills do you think are most important for someone working in soil ecology today?

Analysis

5. What are the NEMA Device and Smart SOD, and how do they compare to other available options for studying soil organisms?
6. What process did Camila follow when creating a) the NEMA Device, and b) the Smart SOD, from identifying a need to production and testing?

Evaluation

7. How useful do you think the NEMA Device and Smart SOD instruments are for studying soil health? Why is it important to understand soil health in order to address climate change and food security?
8. To what extent do you think human activities such as intensive agriculture, pollution and land-use change pose a threat to soil ecosystems, compared with the benefits gained?

More resources

- This series of TED talks cover lots of different topics about soil, including the microbial life it contains: [ted.com/playlists/907/ted_talks_on_dirt](https://www.ted.com/playlists/907/ted_talks_on_dirt)
- Camila recommends reading ‘The State of Knowledge of Soil Biodiversity’ reports from the Food and Agriculture Organization of the United Nations: [fao.org/interactive/soil-biodiversity](https://www.fao.org/interactive/soil-biodiversity)

Activity

In this activity you are going to study soil samples from different locations and have a go at extracting nematodes. You will need:

- A teaspoon
- Sealable, clean containers for collection
- A microscope or hand lens
- Paper towels or fine cloth
- Clear cups or jars
- A pipette

In a group, arrange to collect soil samples from three or four different locations between you – two teaspoons of soil for each location. Keep your samples cool, moist and sealed, and store your soil sample so that it does not become contaminated.

You are now going to try to extract nematodes from your samples. You may not find nematodes in each sample, but if they are present then these steps should help you to extract and observe them:

1. Place each sample separately onto its own piece of thin, damp paper towel or fine cloth, which will act as a filter.
2. Put the filters containing your samples over clear cups or jars containing water, so that the bottom of the soil is just in contact with the water.
3. Leave for about 24 hours, so any nematodes present can swim out of the soil and into the water.
4. Carefully use a pipette to gently collect a drop of the water from the bottom of the container, and examine it using a hand lens or microscope.

For each sample, make notes and sketches of what you see. Consider the following questions:

- Do you think any of your samples contain nematodes or other living organisms?
- What differences do you notice between the different samples?
- If nematodes or other organisms are present, are there different amounts of them in different samples?
- What reasons can you think of for differences between the different samples, based on the locations they were collected from?
- What might you do differently in future experiments?