

# The Soil Food Web

## The 'Holobiont'

The individual does not exist. All living things depend on a diverse community of organisms living within, on and around them forming an integrated, interdependent ecological unit.

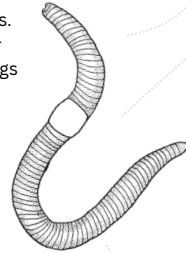
## Birds

Feed on soil fauna e.g. invertebrates and small animals, linking soil food webs to aboveground systems.



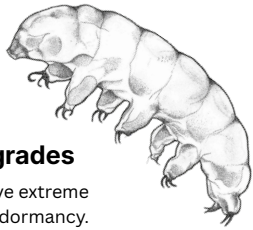
## Earthworms

Detritivores and engineers. Consume organic matter and microbes. Their castings are nutrient-rich and improve soil structure, aeration and water infiltration.



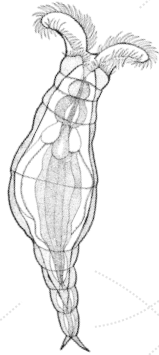
## Tardigrades

Can survive extreme stress via dormancy. Feed on bacteria, algae, plant matter and sometimes prey on nematodes and rotifers.



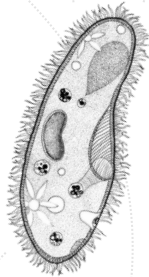
## Rotifers

Aquatic invertebrates in soil water films. Many have ciliated corona that generates a vortex drawing in bacteria and algae, accelerating nutrient cycling.



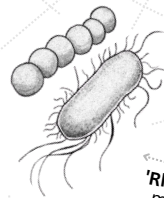
## Protozoa

Diverse grazers. Includes ciliates, flagellates and amoebae. Feed on detritus, fungi, algae and graze thousands of bacteria a day excreting plant-available nutrients.



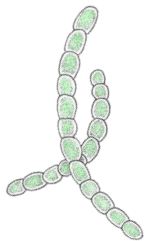
## Bacteria & Archaea

Single-celled pioneers. Includes nitrogen-fixers, symbionts and rapid decomposers. They drive nutrient turnover, promote plant growth, and can regulate processes like methane cycling.



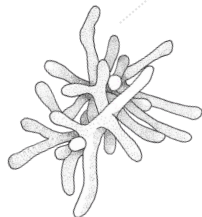
## Cyanobacteria

Photosynthetic pioneer microbes that can sequester carbon and fix nitrogen. They also form stabilising 'biocrusts'.



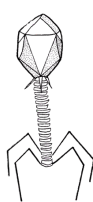
## Actinobacteria

Filamentous bacteria. Can decompose complex organic matter (e.g. chitin, lignin). Some are also responsible for the soil's 'earthy' smell after in rains.

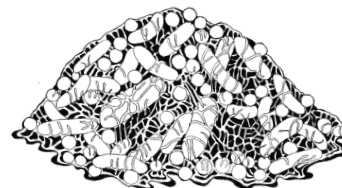


## Bacteriophages

Viruses that infect and rupture bacteria cells (lysis) that aids nutrient release back into the soil.



## Biofilms



**Biofilms** are structured microbial communities held together by a sticky EPS (Extracellular Polymeric Substances) matrix.

'Rhizophagy': Plants 'farm' microbes absorbing them through the roots for nutrients.

Sun

Plants convert carbon dioxide and sunlight into energy through photosynthesis

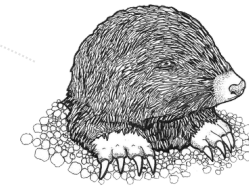
## Plants



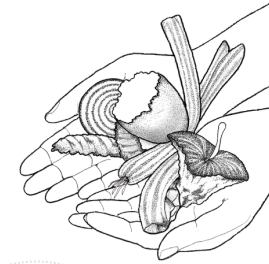
Organic matter and detritus

Carbon-rich plant root exudates are pumped into the soil and stimulate microbial activity in the rhizosphere

## Mammals



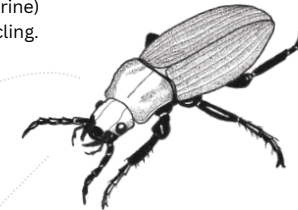
Animals like moles, mice and livestock alter soil structure through burrowing or trampling, while grazing and waste deposits (dung/urine) drive rapid nutrient cycling.



Humans interact with and shape soil food webs through actions that can build or degrade soil health. They also depend on healthy and diverse soil biology for nutrition and health.

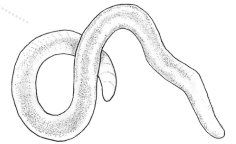
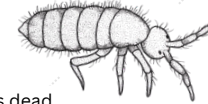
## Arthropods

E.g. beetles, centipedes, mites, spiders, ants and fly larvae regulate potential pests and fragment organic matter as predators, shredders and scavengers.



## Microarthropods

Litter transformers like springtails and mites fragment organic matter and graze on microbes, stimulating microbial turnover.



## Enchytraeids

Potworms. Graze on microbes like fungi and bacteria. Contribute to microaggregate stabilisation and nutrient cycling.

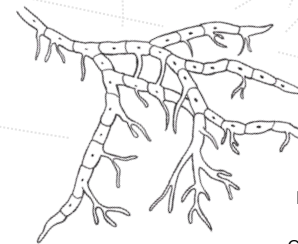
## Nematodes

Microscopic roundworms that can be omnivorous, feed on bacteria, fungi, plants (e.g. root feeders) or other nematodes. Release plant-available nutrients locked within microbial biomass.



## Fungi

Includes multicellular fungi and single-celled yeasts. Complex decomposers, plant symbionts (e.g. mycorrhizae), endophytes and parasites. Drive nutrient cycling and transportation and physically bind soil particles.



## Algae & Diatoms

Photosynthetic organisms including diatoms which capture solar energy at the soil surface, providing food for microfauna and contribute to stable aggregate formation.

