

An Introduction to Soil Microbes

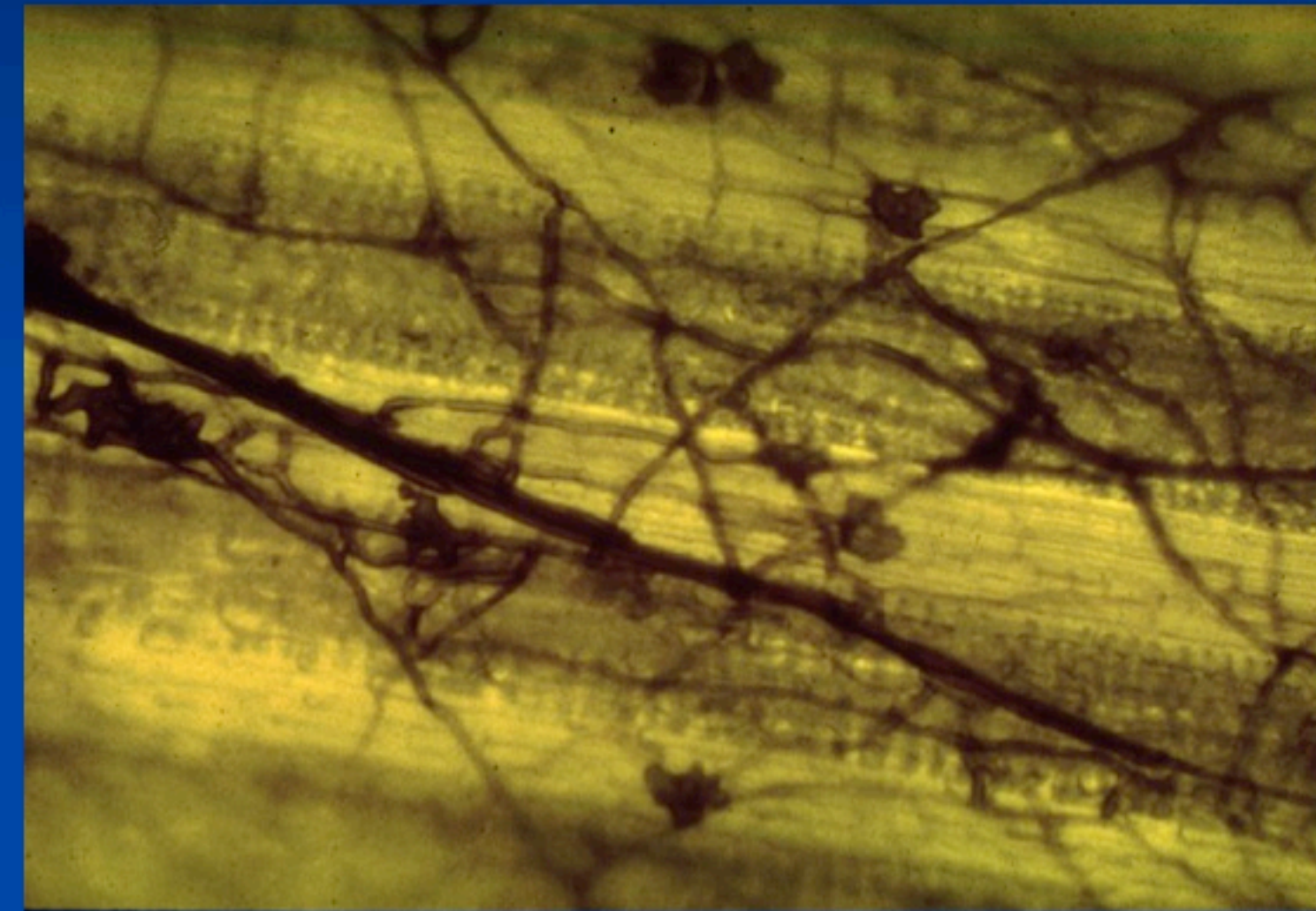
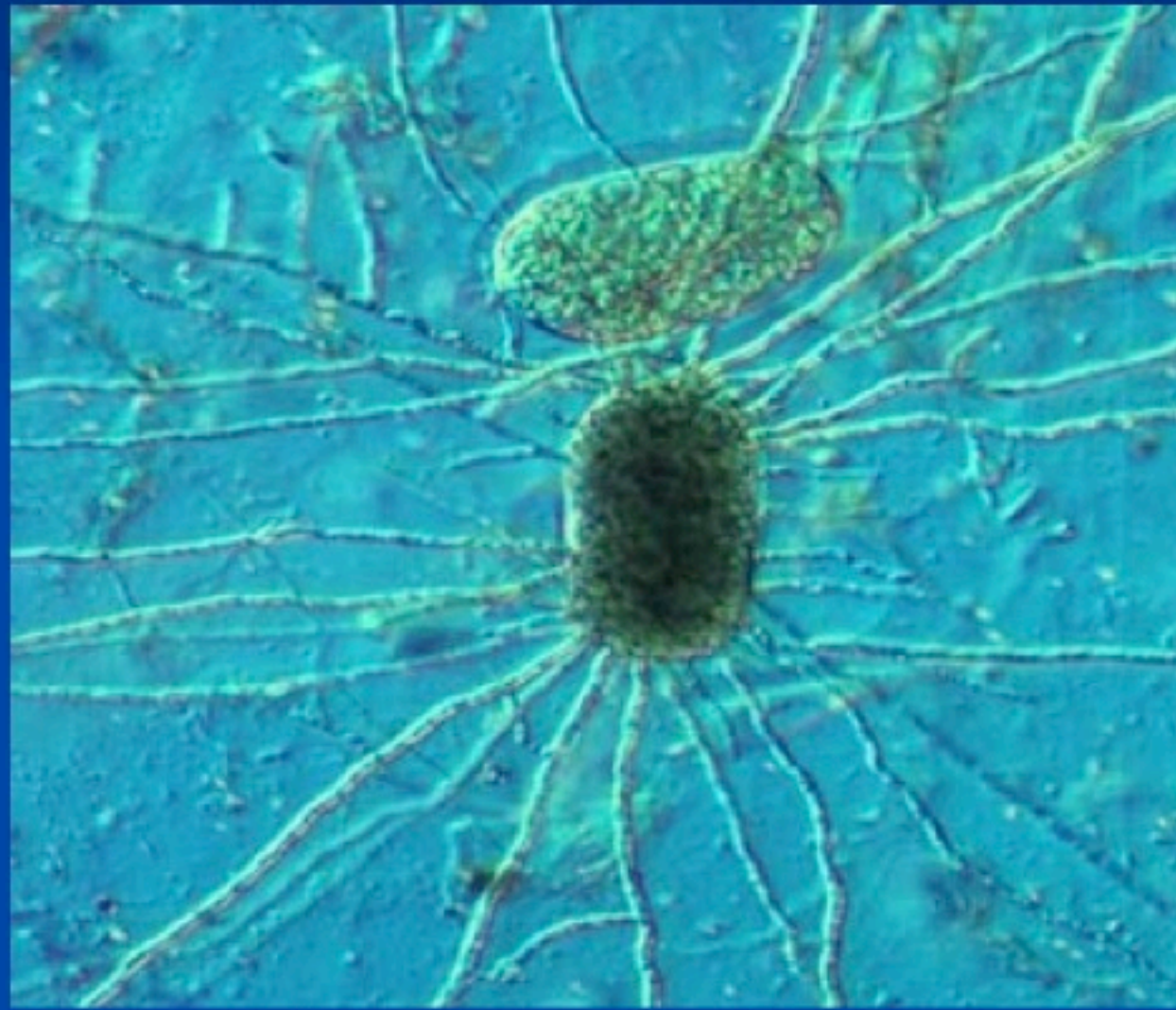
A visual tour of the most common types

- Fungi
- Bacteria (including actinomycetes)
- Protozoa
- Nematodes

Fungi

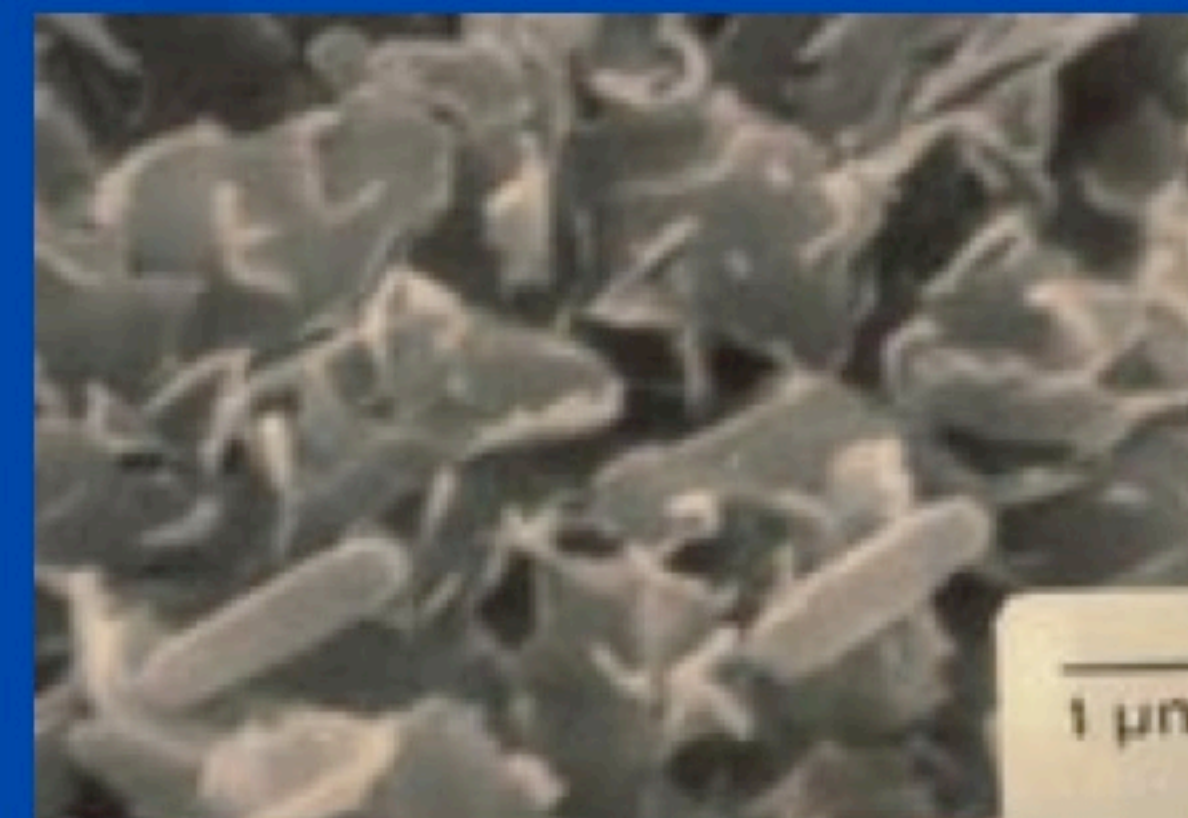
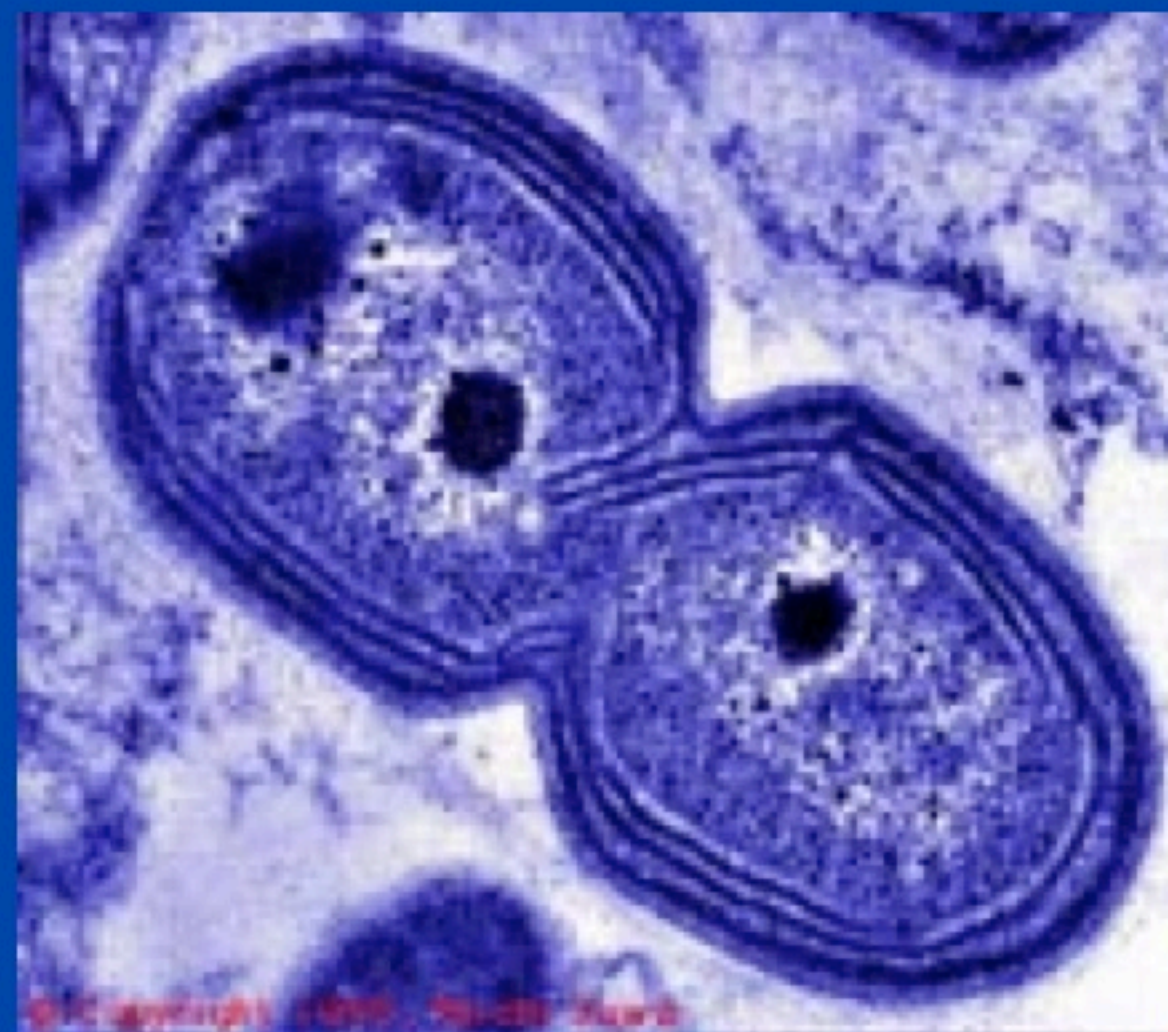
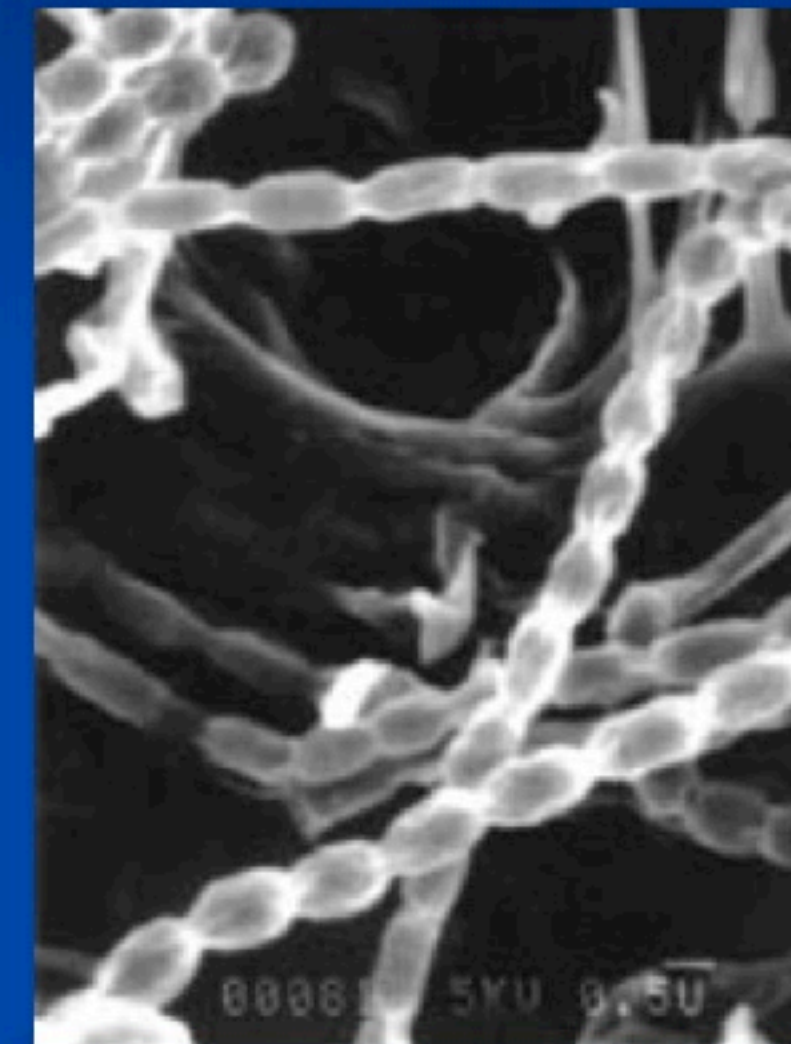
Clockwise from top right: nematode-eating fungi, leaf-decomposing fungi, ectomycorrhizal fungi on tree roots, ectomycorrhizal fungi.

Images courtesy of US Department of Agriculture



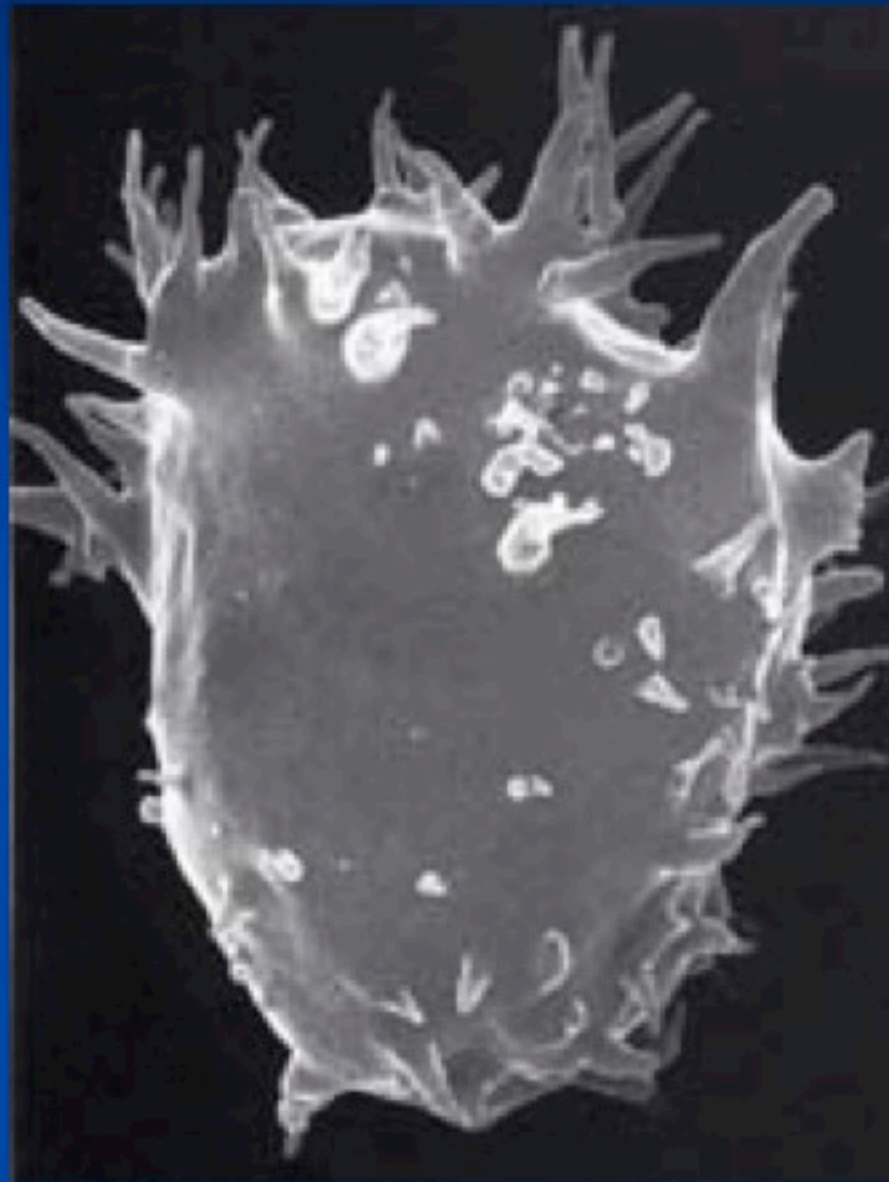
Soil Bacteria

Clockwise from top right: actinomycete filaments, actinomycete spores, bacteria on clay particles, bacteria cross section.
Images courtesy of US Bureau of Land Management



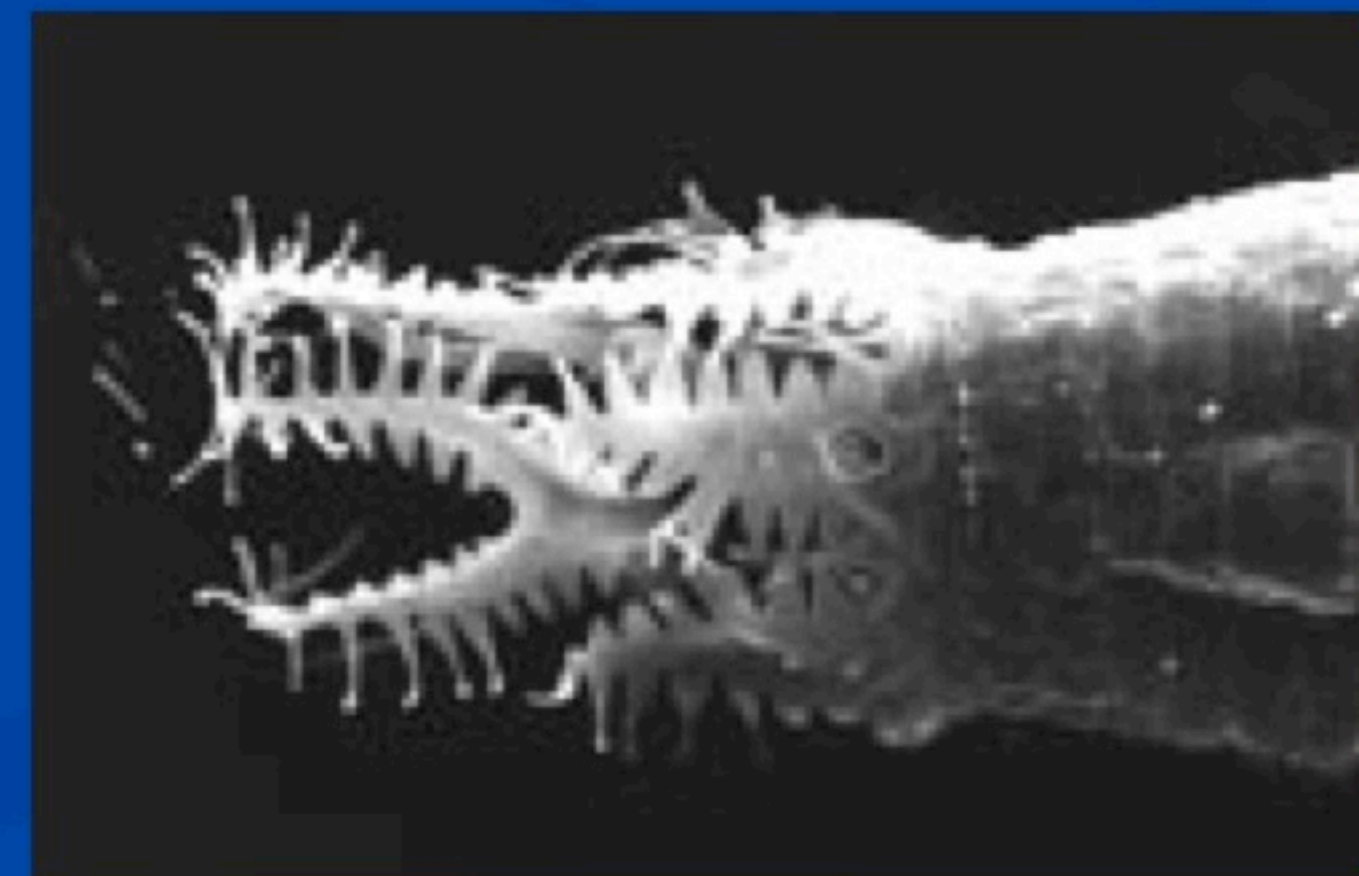
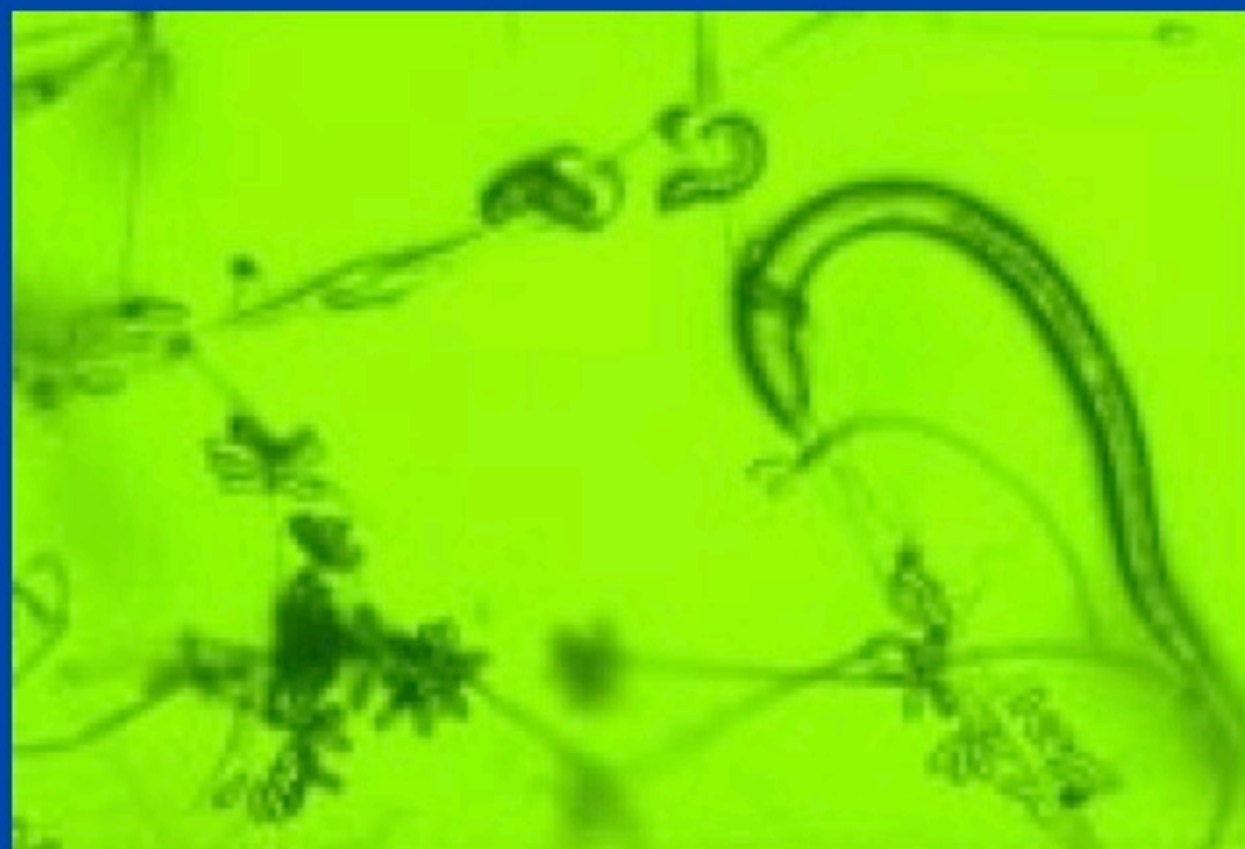
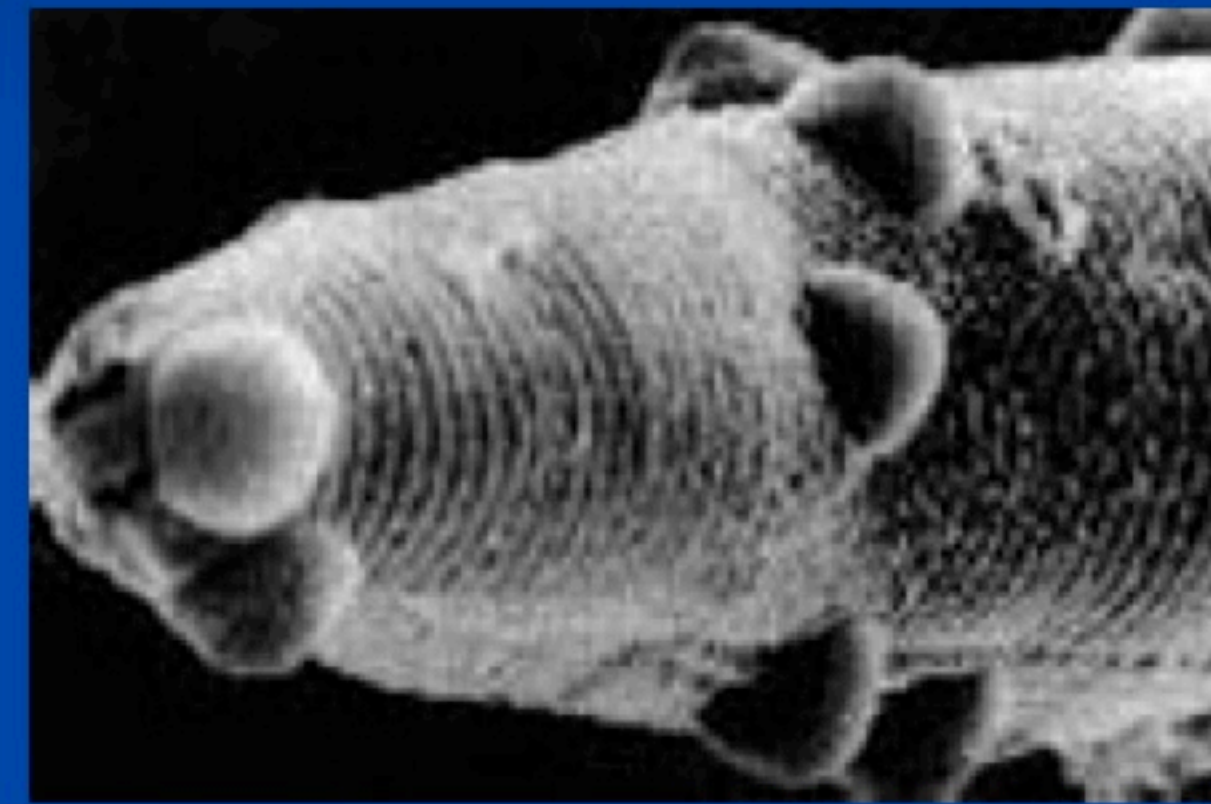
Protozoa

Clockwise from top right: amoeba, amoeba in protective shell, flagellate, ciliate. Images courtesy of US Bureau of Land Management

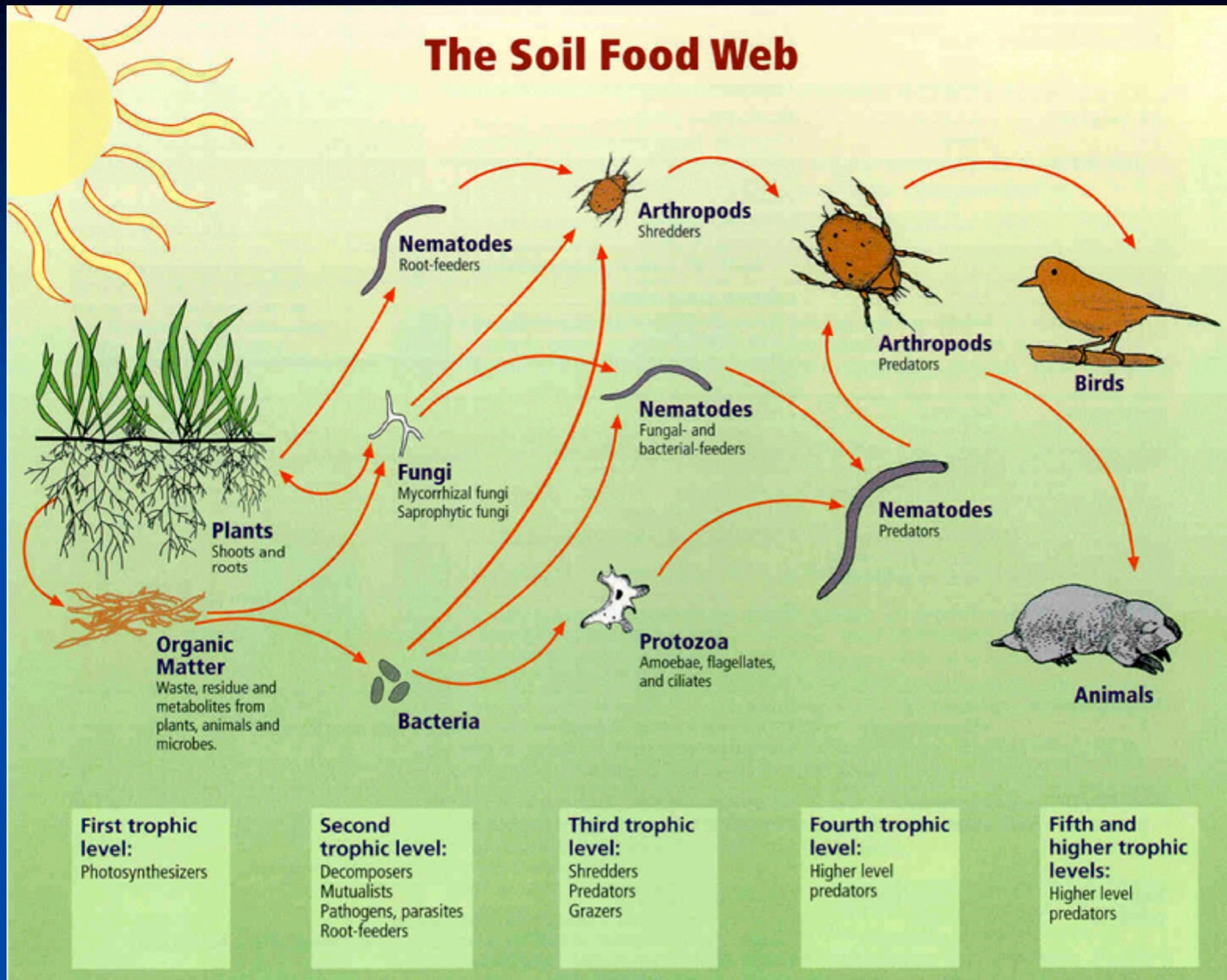


Nematodes

Clockwise from top right: full view, parasitic bacteria growing on plant-parasitic nematode, head of predaceous nematode, nematode being captured by fungi constricting rings. Images courtesy of US Bureau of Land Management



The Soil Food Web



Soil food web showing plants, organic matter, microbes, invertebrates, and birds and mammals.

Image courtesy of USDA Natural Resources Conservation Service, <http://soils.usda.gov/sqi>

Factors affecting soil microbial activity

- Amount of organic matter available to soil organisms underground
- Type of organic matter available—
“digestibility”
- Soil conditions (moisture, temperature and oxygen)

Approximate mass of different soil biotic groups

Source: *Soil Ecology*, 1999, by Ken Killham

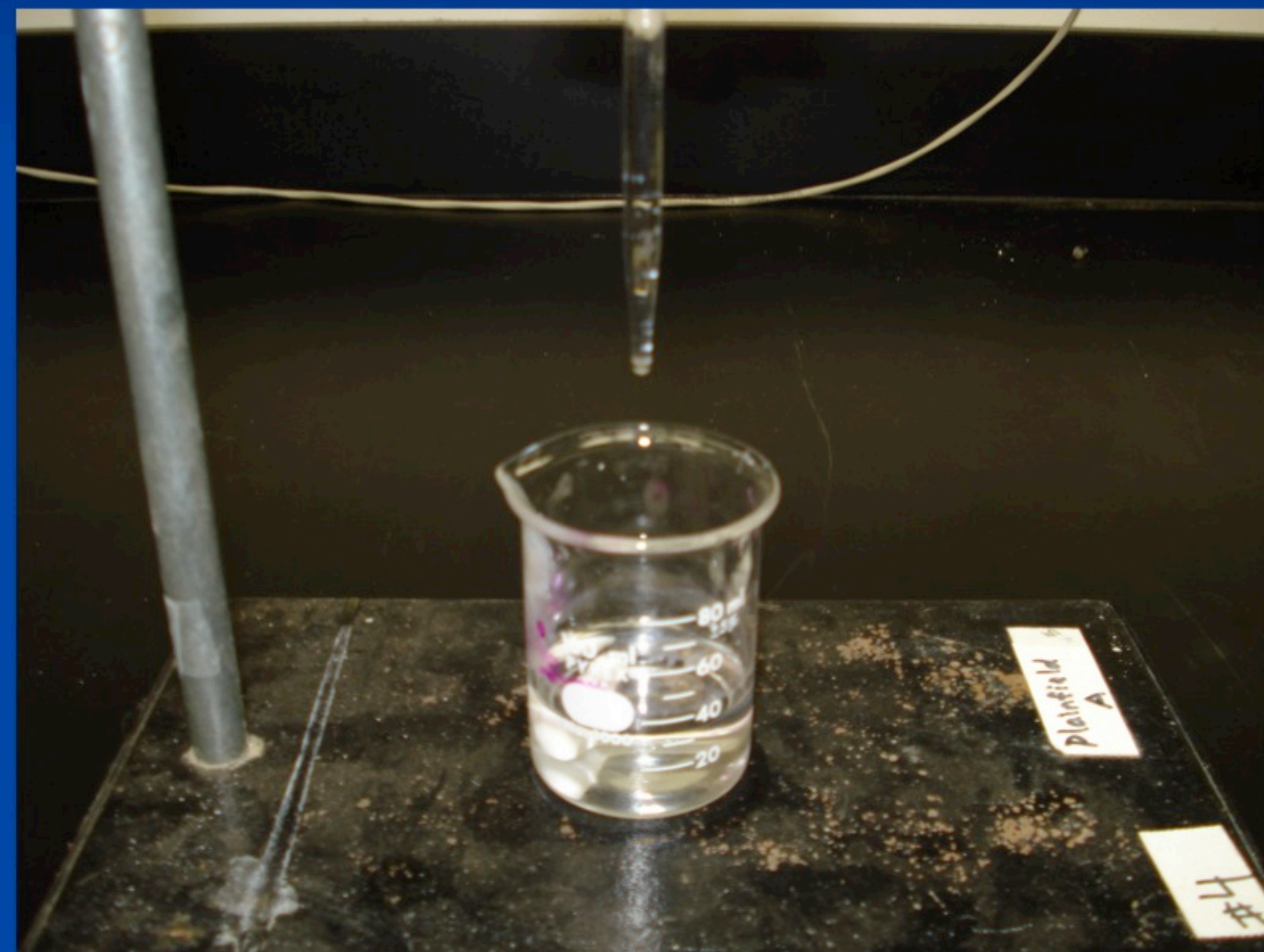
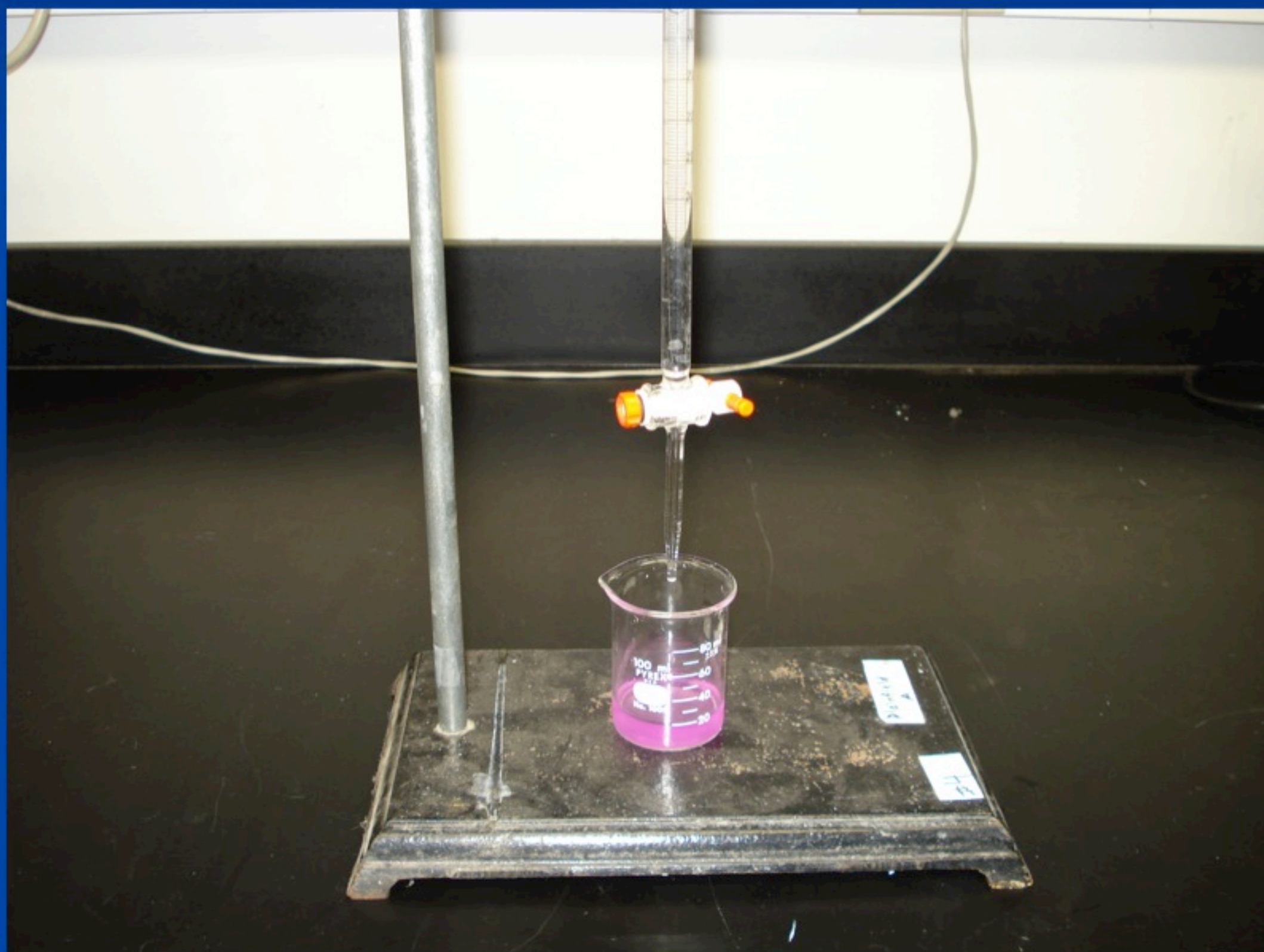
Component of soil biota	Biomass (tons per hectare)
Plant roots	Up to 90 but usually ~20
Fungi	2-5
Bacteria	1-2
Actinomycetes	0-2
Protozoa	0-0.5
Nematodes	0-0.2
Earthworms	0-2.5
Other (e.g., invertebrates)	0-0.5

Experimental set-up



Setting up CO₂ trap
(jar lid goes on, trap lid is
saved for later)

Titration



Activity developed by Stephen Laubach, University of Wisconsin-Madison Department of Curriculum and Instruction and Kevin Budsberg, UW-Madison Department of Soil Science, in Dr. Teri Balser's lab at University of Wisconsin-Madison with funding and other support from the Great Lakes Bioenergy Research Center

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