



Home Grown - Community Owned Information Sheet



soil biology

A teaspoon of healthy living soil contains about a billion microscopic organisms. These include protozoa, fungi, bacteria and nematodes. There are larger organisms that live in soil too - earthworms, springtails, beetles etc.



Soil nematode

The soil ecosystem plays a vital role in determining many soil characteristics but because it is a relatively new science, much remains unknown about soil biology and about how the nature of soil is affected.



Soil bacteria

The soil is home to a large proportion of the world's biodiversity. The linkages between soil organisms and soil functions are incredibly complex

but very difficult to study.

We know that soil organisms break down organic matter, making nutrients available for uptake by plants and other organisms. The nutrients stored in the bodies of soil organisms prevent nutrient loss by leaching.

Microbial exudates act to maintain soil structure, and earthworms are important in creating air spaces within the soil and moving materials around. However, we have a poor



Millipede

understanding of how these populations function and interact.

The discovery of glomalin (a chemical produced by fungi that coats soil particles) in 1995 indicates that we lack the knowledge to correctly answer some of the most basic questions about the nutrient cycles in soils. We have much work ahead to gain a better understanding of how soil biological components affect us and the planet they share with us.

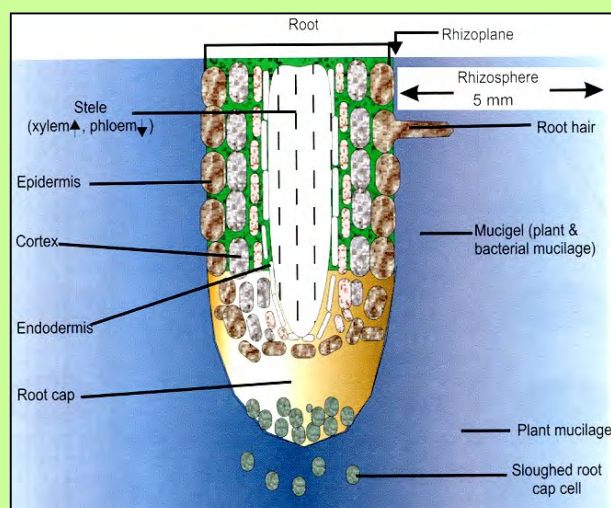


Soil protozoan

A healthy soil stores large amounts of carbon in different types of organic matter. The organic matter is important to all soil organisms, soil structure and carbon sequestration.

The Rhizosphere

The rhizosphere is the narrow region of soil that is directly influenced by root secretions and associated soil microorganisms. The rhizosphere contains many bacteria that feed on sloughed-off plant cells and the proteins and sugars released by roots. Protozoa and nematodes that graze on bacteria are also more



abundant in the rhizosphere. Thus, much of the nutrient cycling and disease suppression needed by plants occurs immediately adjacent to roots.

Mycorrhizal fungi



This mycorrhiza includes a fungus in the genus Amanita

Mycorrhizal fungi form a symbiotic relationship with the roots of most plant species (and while only a small proportion of all species has been examined, 95% of these plant families are mycorrhizal). They are typically found in the rhizosphere of a root system.

The fungus benefits from access to carbohydrates, such as glucose and sucrose supplied by the plant. The carbohydrates are transported from their source (usually leaves) to root tissue and on to the fungal partners. In return, the plant gains the benefits of the higher absorptive capacity for water and mineral nutrients by the fungi, thus improving the plant's nutrition.

Plant roots alone may be incapable of taking up phosphate, as it is often unavailable to plants, for example, in alkaline soils. The mycorrhizal fungus can, however, access these phosphorus sources and make them available to the plants they colonize.

Mycorrhizal plants are often more resistant to diseases, such as those caused by microbial soil-borne pathogens, and are also more resistant to the effects of drought.

Plants grown in sterile soils and growth media often perform poorly without the addition of spores or hyphae of mycorrhizal fungi to colonise the plant roots and aid in the uptake of soil mineral nutrients. The absence of mycorrhizal fungi can also slow plant growth in newly exposed soil and on degraded land.



Lob worm

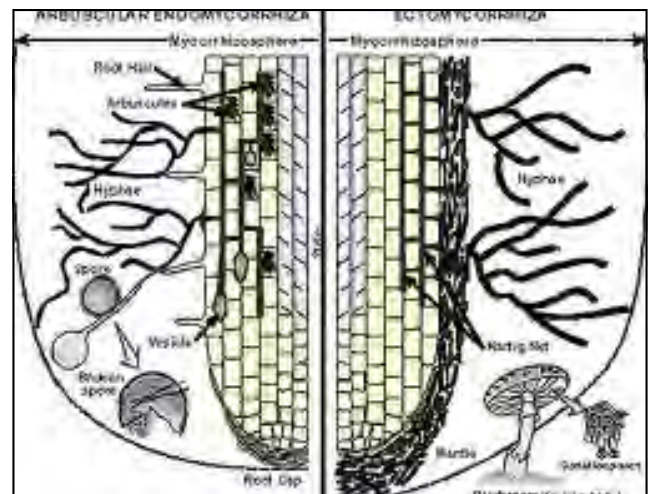
Allelopathy

Some plants secrete substances called allelochemicals from their roots. These inhibit the growth of other plants. For example walnut trees, particularly the Black Walnut, produce a chemical called juglone which inhibits any plants growing nearby.



Types of mycorrhiza

- Ectomycorrhizas (mostly in woodlands)
- Arbuscular endomycorrhizas (most vegetables)
- Ericoid mycorrhizas (heather family)



To keep your soil alive and healthy

- Keep organic matter levels high by mulching and adding compost
- Do not use pesticides, herbicides or inorganic fertilisers
- Use no dig gardening methods
- Never tread on it or compact it.
- Interplant different plants, so that many types of roots grow together



Springtail