Soil for Water

SOIL TALK WORKSHOP SERIES
ECOSYSTEM FUNCTION
Principle One:
Nature Functions in Wholes
# The Brittleness Scale

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<tbody>
<tr>
<td>Rainforest</td>
<td>Desert</td>
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<td>Humidity year-round</td>
<td>Humidity erratic</td>
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<tr>
<td>Vegetation breaks down quickly</td>
<td>Vegetation oxidizes</td>
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The Ecosystem is Dynamic

- Poor Function
- Excellent Function

- Low Biological Diversity
- High Biological Diversity
The Four Ecosystem Processes

- Mineral Cycle
- Solar Energy Flow
- Water Cycle
- Biological Dynamics
Fig. 1 The large and small water cycles on land
A Last Look at Effective and Non-effective Water Cycles

Effective Water Cycle

- Low
- Low
- Low
- High
- High
- High
- High
- Effectiveness of precipitation

Non-effective Water Cycle

- High
- High
- High
- High
- Low
- Low
- Low
- Low
sun → (producer)
air → (producer)
water → (producer)
soil → (producer)

consumers (herbivore) → (detritivores)
consumers (omnivore) → (detritivores)
consumers (carnivore) → (detritivores)
The Soil Food Web

First trophic level: Photosynthesizers
Second trophic level: Decomposing Mutualists, Pathogens, Parasites, Root-feeders
Third trophic level: Shredders, Predators, Grazers
Fourth trophic level: Higher level predators
Fifth & higher trophic level: Higher level predators

Plants
Shoots and roots.

Organic Matter
Waste, residue, and metabolites from plants, animals, and microbes.

Nematodes
Root-feeders

Arthropods
Shredders

Nematodes
Predators

Fungi
Mycorrhizal fungi
Saprophytic fungi

Protozoa
Amoebae, flagellates, and ciliates

Bacteria

Arthropods
Predators

Birds

Animals
Seven Functions of a Healthy Soil Foodweb

- Retain nutrients
- Cycle nutrients
- Build soil structure
- Suppress diseases and pests
- Colonize plant surfaces
- Produce plant growth-promoting substances
- Decompose toxic compounds
ROOTS WITH MYCORRHIZAL FUNGI
High or Low Function?