

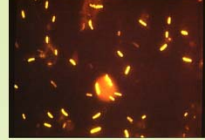
# “Life in Soil”



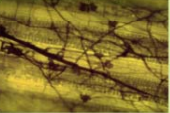
**Nitrogen-fixing Bacteria**  
(nodules formed where *Rhizobium* bacteria infected soybean roots)



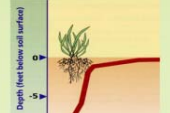
These bacteria have taken up a fluorescent stain, making them easier to count.



**Fungus beginning to decompose leaf veins in grass clippings**

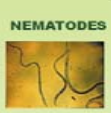


**Microbial Biomass**  
(decreases with depth)



Increasing total microbial biomass

**Predatory Nematode**



**Bacterial-Feeding Nematode**



**Root-Feeding Nematode**



**Fungal-Feeding Nematode**



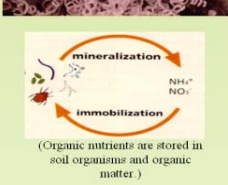
**Bacteria dot the surface of strands of fungal hyphae.**



A ton of microscopic bacteria may be active in each acre of soil.



**Actinomycetes**  
(decomposers: Bacterial cells that grow like fungal hyphae, give soil its earthy smell)



**Ciliate**  
(they eat Amoebas, Flagellates & Bacteria)

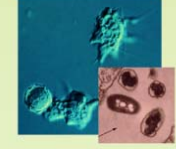


**Soil-Dwelling “Vampires”**  
(Amoebae that eat Fungi)



**PROTOZOA**  
(Ciliates, Amoebas & Flagellates are protozoa soil microorganisms)

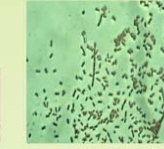
**Amoebae**  
(they eat Flagellates & Bacteria)



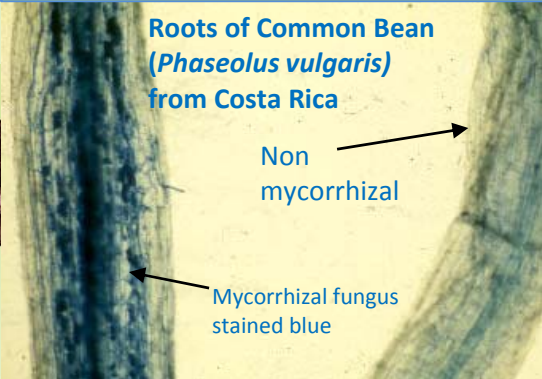
**Flagellate**  
(they eat Bacteria)



**Bacteria**  
(decompose Organic matter)



**Soils are not machines:**  
It's an ecosystem that needs to be Fed and Covered with Plants and residue at all times.

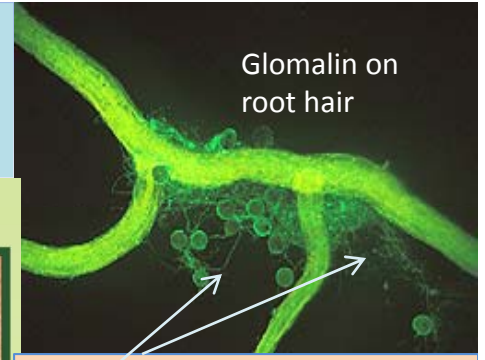


## Rhizosphere

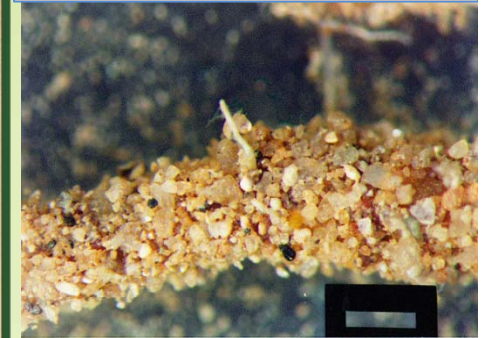
Root Surface



The Glues bind soils particles into aggregates and improves soil porosity and infiltration.



Fungal hyphae-produce humic compounds and organic “glues” (extra-cellular polysaccharides, proteins, lipids, etc...)



Mycorrhizal fungi and other members of the fungi family are -- soil structure builders

**Pseudoscorpion**



**Centipedes**



**Predators: Tiger Beetle**



**Predatory mites prey on nematodes, springtails, other mites, & the larvae of insects (this mite is 1 mm long)**



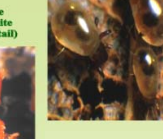
**Predatory Mite**  
(A predacious mite feeds on a springtail)



**Wolf Spider**



**Oribatid Mites shredding a leaf.**



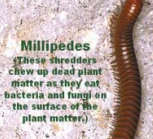
**Sawbees:** their powerful mouth-parts are used to fragment plant residue and leaf litter.



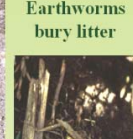
Dung-beetles are common in some pastures where they elaborately bury balls of organic waste and tend to their young underground.



**Millipedes**  
(These shredders chew up dead plant matter as they eat bacteria and fungi on the surface of the plant matter.)



**Earthworms bury litter**



**Earthworm burrow**



**Earthworms (Soil Engineers)**



**Earthworm burrow**



**Earthworm channels**  
(Sandy soil near Abiqui, NM)



**Earthworm casts**

