Rio Grande Community Farms
Healthy Soils
March 2013
http://www.nm.nrcs.usda.gov/technical/handbooks/iwm/nmiwm.html

The Natural Resources Conservation Service, formerly the Soil Conservation Service, works hand-in-hand with the American people to conserve natural resources on private lands.
Thanks to Ana Gomes and Rudy Garcia!

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NRCS Natural Resources Conservation Service

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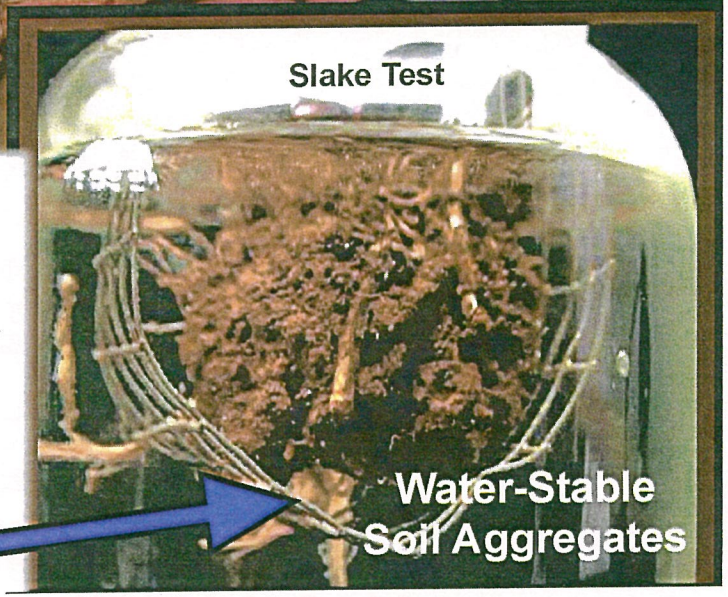
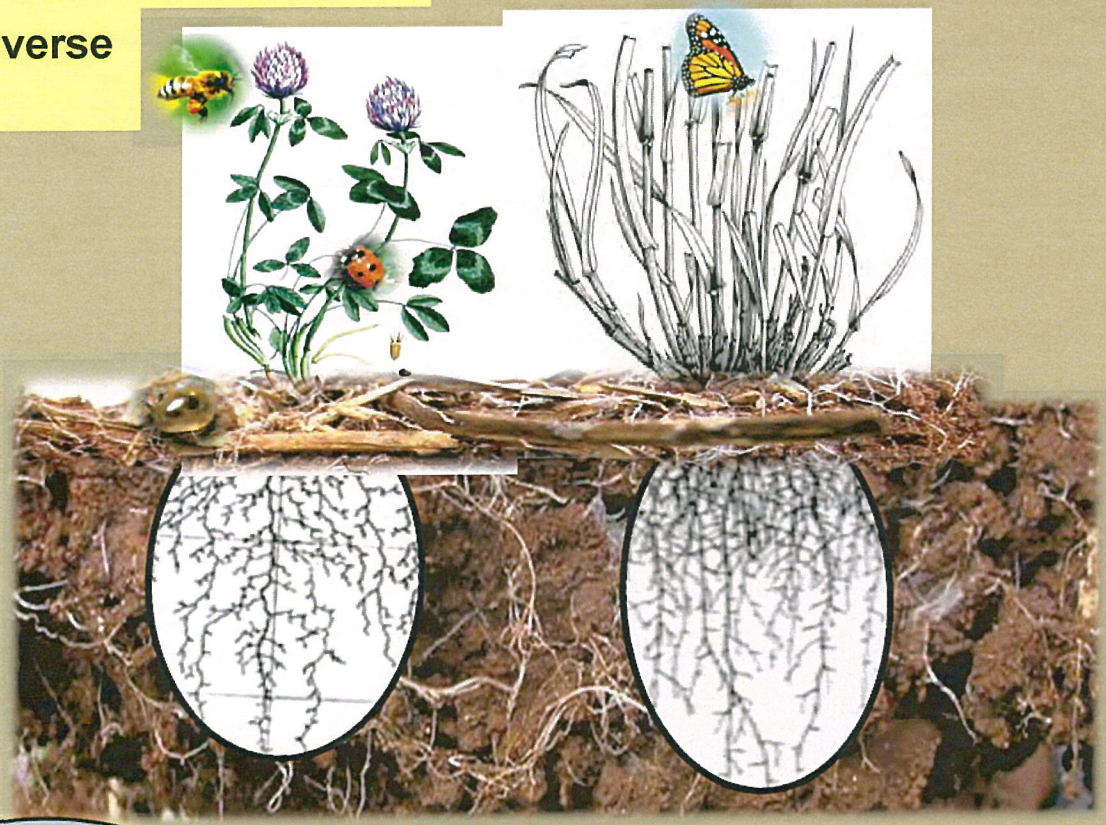
Soil Health: What is it?

- Productive Soils
- Good Tilth/Structure
- High Organic Matter
- Earthworms
- Water-Stable Aggregates



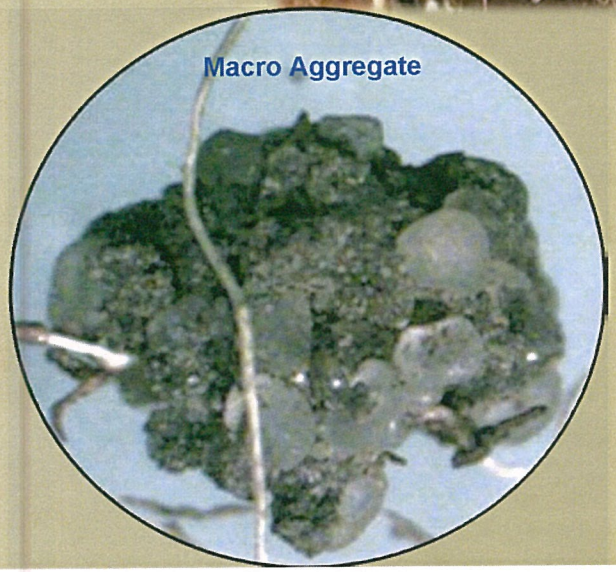
Building Soil Organic Matter (SOM)

To maintain a diverse Soil Food Web



GOALS for Building Healthy Soil:

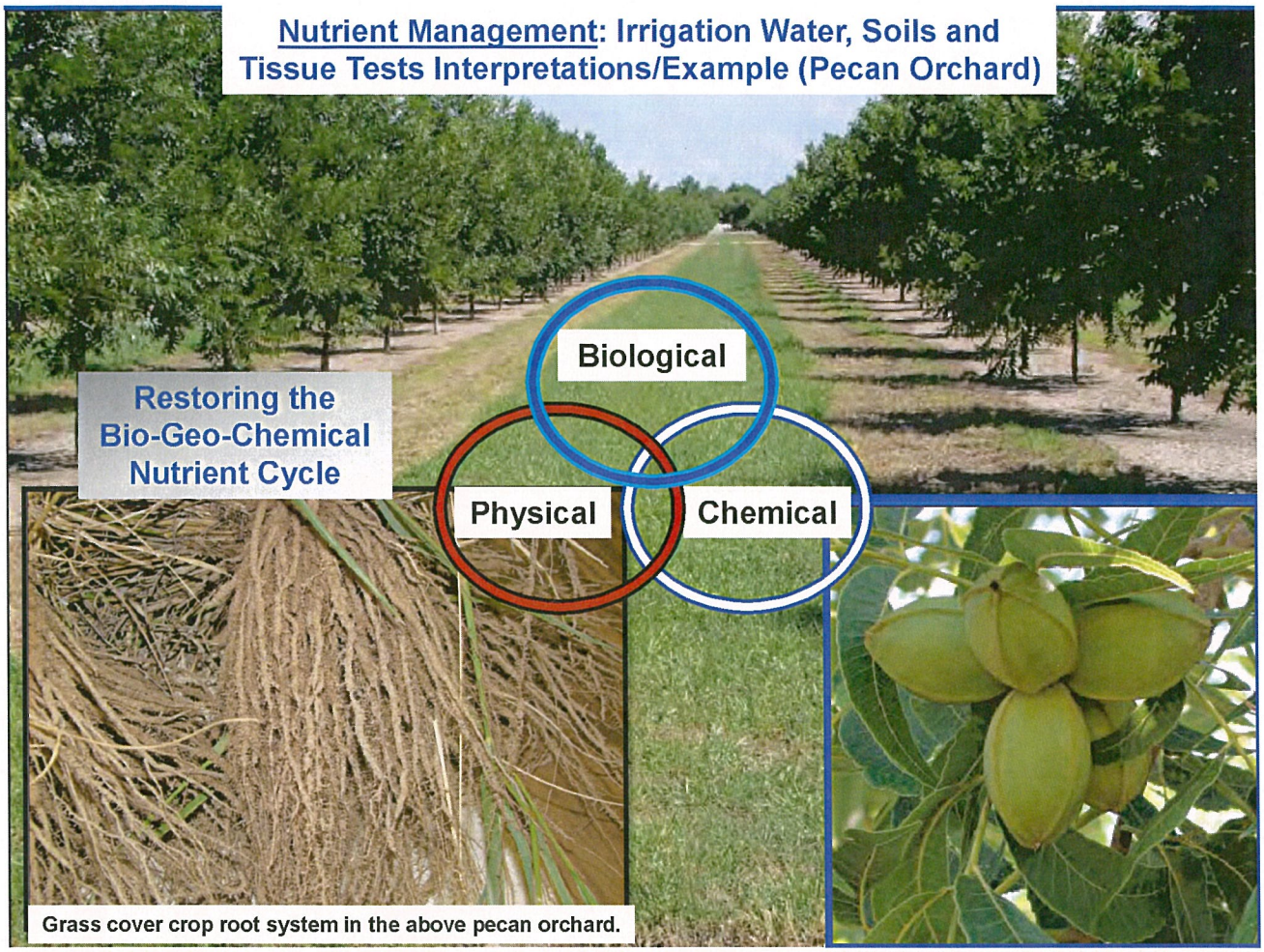
- Crop Diversity
- Living Roots throughout the year
- Cover the soil
- Less Soil disturbance
- Livestock integration where applicable



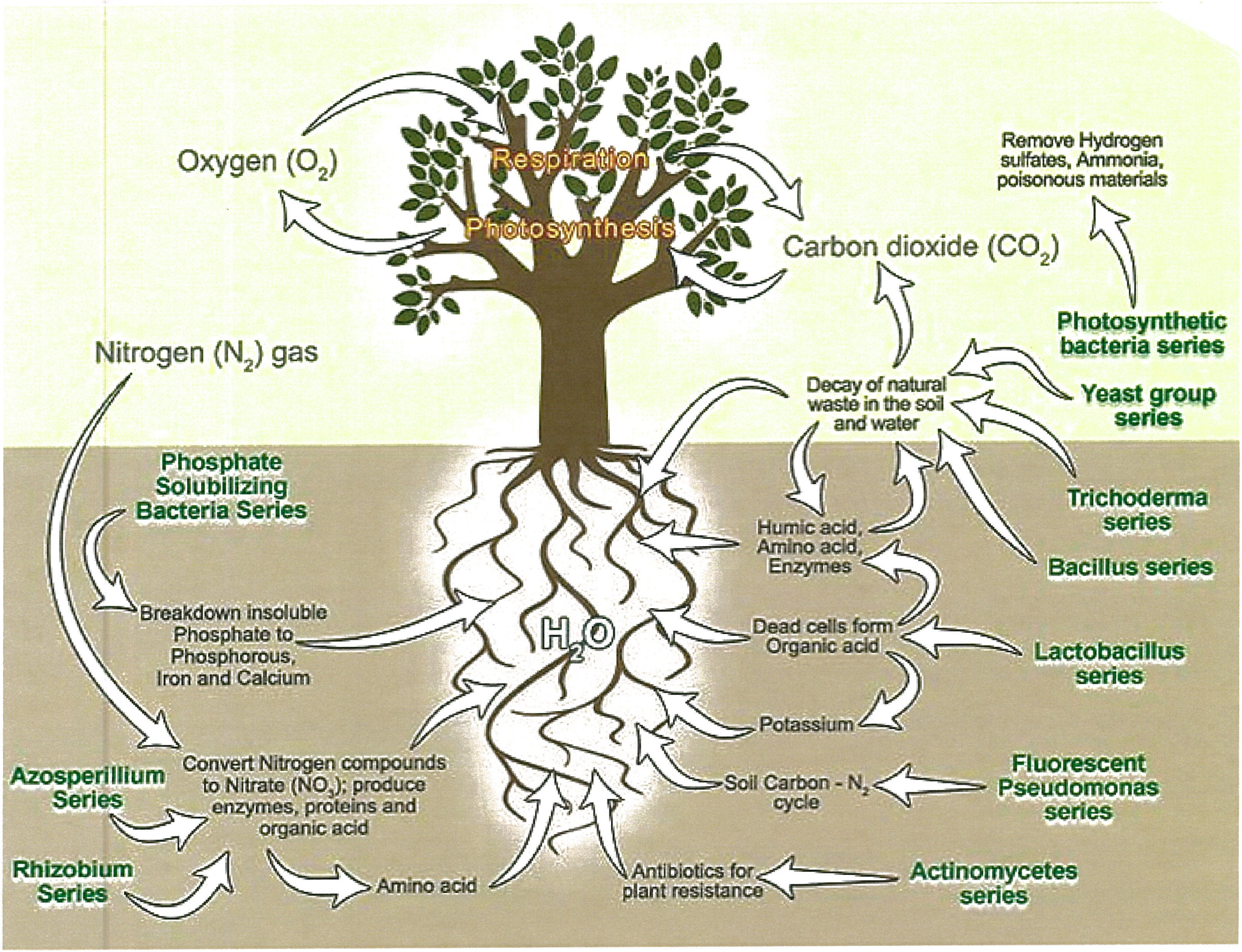
SOM Builds Healthy Soil

Water-Stable Soil Aggregates

Nutrient Management: Irrigation Water, Soils and Tissue Tests Interpretations/Example (Pecan Orchard)



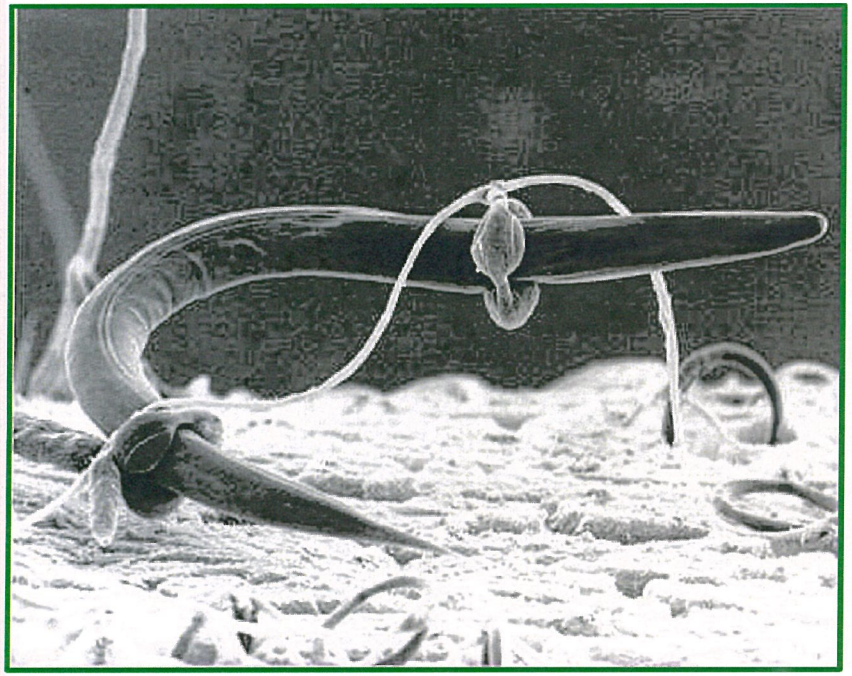
Grass cover crop root system in the above pecan orchard.

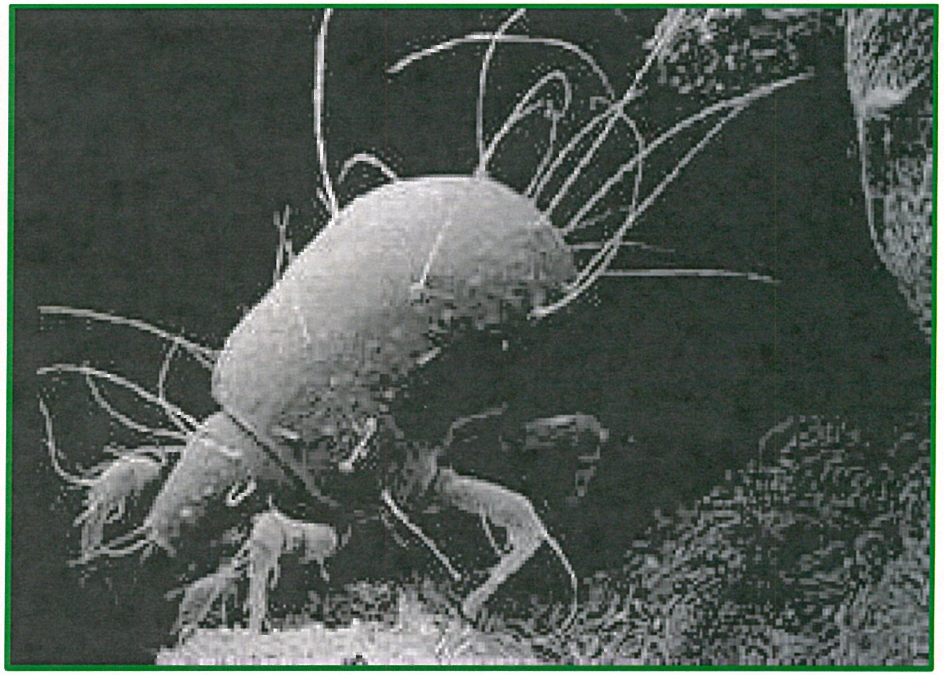

Oxygen (O_2)
Respiration
Photosynthesis
Carbon dioxide (CO_2)
Remove Hydrogen sulfates, Ammonia, poisonous materials
Photosynthetic bacteria series
Nitrogen (N_2) gas
Decay of natural waste in the soil and water
Yeast group series
Phosphate Solubilizing Bacteria Series
Trichoderma series
Humic acid, Amino acid, Enzymes
Bacillus series
Breakdown insoluble Phosphate to Phosphorous, Iron and Calcium
H_2O
Dead cells form Organic acid
Lactobacillus series
Potassium
Azosperillium Series
Convert Nitrogen compounds to Nitrate (NO_3); produce enzymes, proteins and organic acid
Soil Carbon - N_2 cycle
Fluorescent Pseudomonas series
Rhizobium Series
Amino acid
Antibiotics for plant resistance
Actinomycetes series

UGLY

OR

BEAUTIFUL???

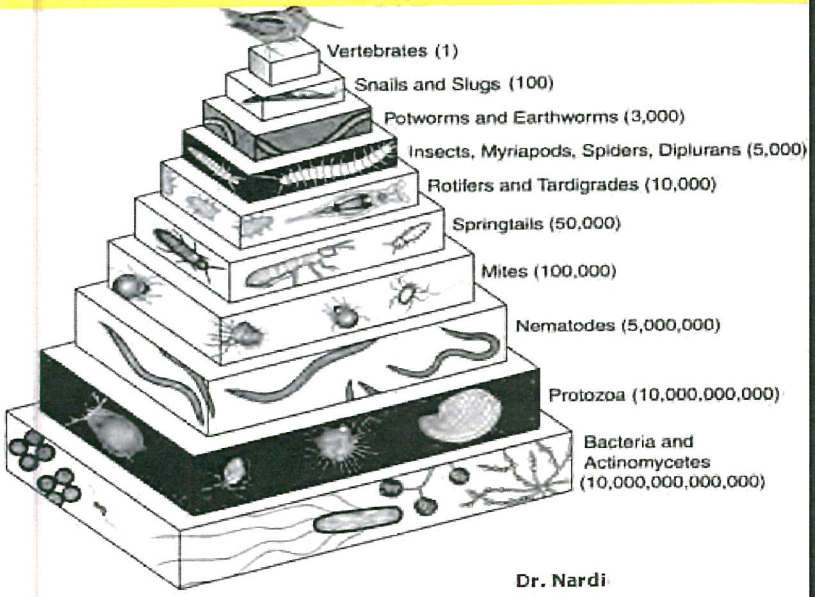




A healthy root system = A healthy surface soil.

Creating a Soil Habitat is the first step to managing soil biota for long-term soil quality, soil health, and productivity.

Every trophic level must function for the soil food web to function!



Rotted Fence Post Principle

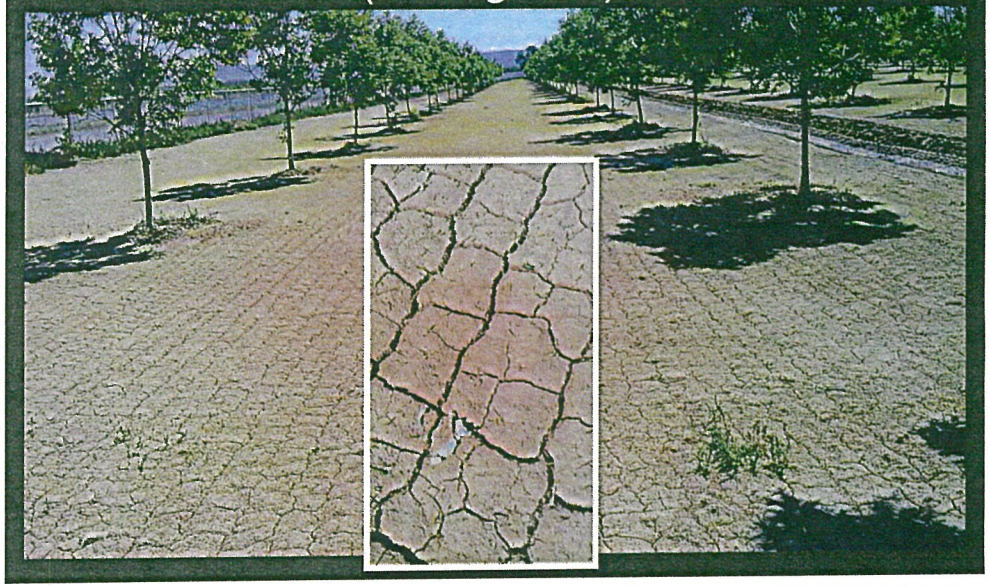
Decay of wood is greatest a few inches below the soil surface, where oxygen and moisture are in plentiful supply and create a zone of maximum biological activity.

Most soil microorganisms are aerobic and use oxygen as the electron acceptor in their metabolism.

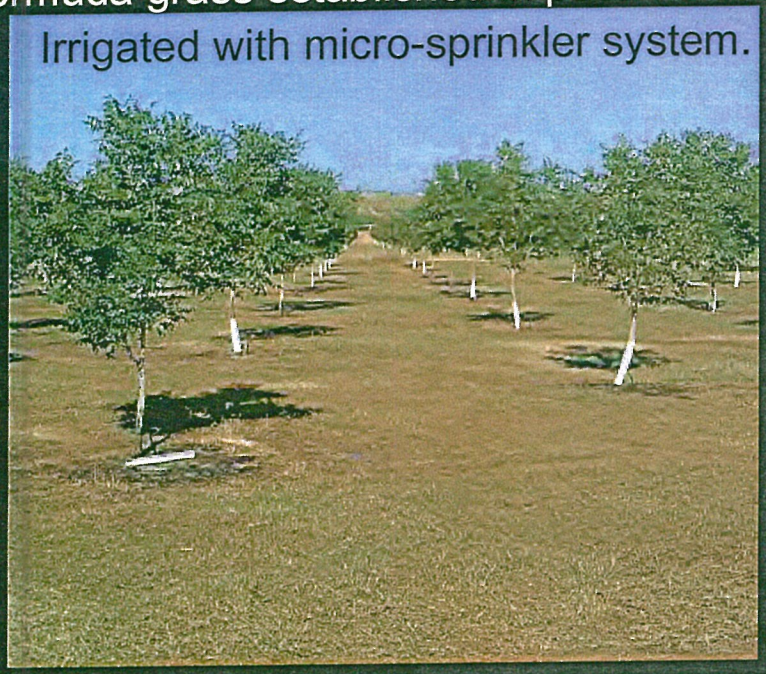
The zone of greatest microbial activity usually occurs just a few inches below the soil surface where optimal temperature, moisture, oxygen and nutrient conditions exist.

Conventional Tillage in Pecans

Bermuda grass planted in pecan orchard (1st Irrigation).



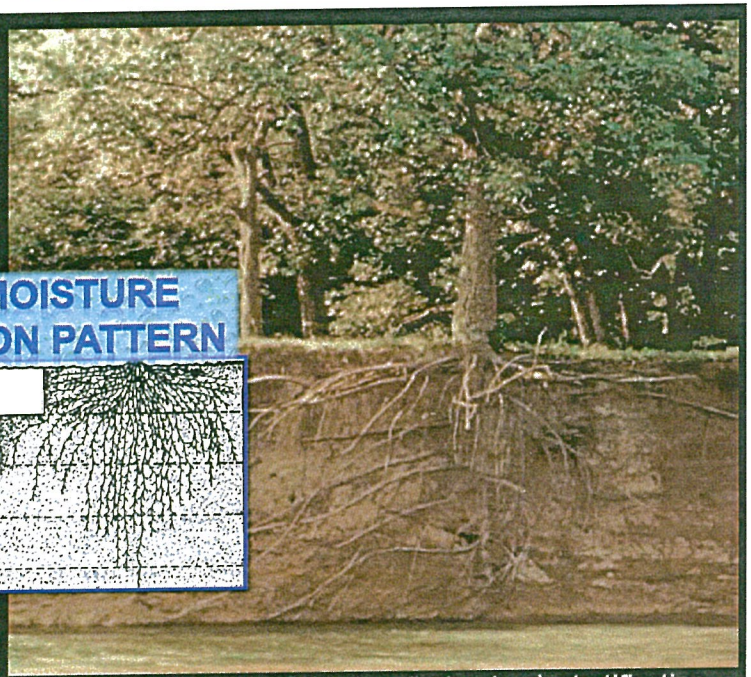
Bermuda grass established in pecan orchard. Irrigated with micro-sprinkler system.



Applying compost.

Compost applied on top of dormant Bermuda Grass.

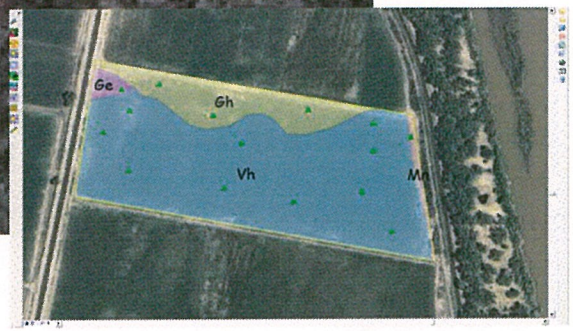
Bermuda grass (early growth).



Emphasis on understanding the soil profile (texture & structure), stratification, root depth, water quality (ECiw, SAR, ph), crop salt tolerance, drainage, etc.

Earthworm openings.

Know your soils



WEB SOIL SURVEY http://websoilsurvey.nrcs.usda.gov/app/

NRCS LOCAL OFFICE

Crop Rotation/Cover Cropping systems

(Some recommendations)

Matching *objectives* with species

Nutrient scavenging/cycling

brassicas*, *small grains*, *annual ryegrass

Bio-drilling

brassicas*, *sugarbeet*, *sunflower
sorghum-sudan*, *sweet clover*, *alfalfa

N-fixation

***clovers*, *vetches*, *lentil*, *winter pea*,**
chickling vetch*, *sun hemp*, *cowpea*, *soybean

Grazing

brassicas*, *clovers*, *small grains*, *a. ryegrass*, *sorghum-sudan

Bio-activation/fumigation

brassicas*, *sorghum-sudan*, *sun hemp*, *sesame

Weed suppression

brassicas*, *sorghum-sudan*, *cereal rye*, *buckwheat

Thank you! From the NRCS Albuquerque Field Office and Logan Peterson
Here are some useful links to good information:

Agronomy
http://www.nm.nrcs.usda.gov/technical/tech-notes/agro.html

Integrated Cropping Systems
http://www.nm.nrcs.usda.gov/technical/handbooks/iwm/nmiwm.html

Ecological Sites
http://esis.sc.egov.usda.gov/

Pollinators
http://www.xerces.org/

Soil testing Labs

Inter Ag Services Laboratory
http://www.iaslabs.com/Tests/Soil-Test.aspx

Servi-Tech Laboratories-Amarillo
http://www.servitechlabs.com/Services/Soil/tabid/63/Default.aspx

Colorado State Univ.
http://www.soiltestinglab.colostate.edu/

USUAL
http://www.usual.usu.edu/forms/soilform.pdf
Ward Laboratories
http://www.wardlab.com/FeeSchedule/SoilAnalysis.aspx

Dellavalle Laboratory, Inc.
http://www.dellavallelab.com/

Western Laboratories
http://www.westernlaboratories.com/

Analytical Sciences Laboratory - 208-885-7900
University of Idaho

Albuquerque Field Office at 6200 Jefferson NE - Room 125

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