

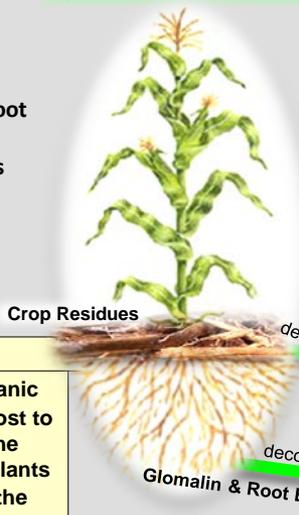
**Managing Soil Organic Matter (SOM) to build Soil Health**

**NOTE:** The Soil Food Web is sustained by the following

**Organic Matter sources:**

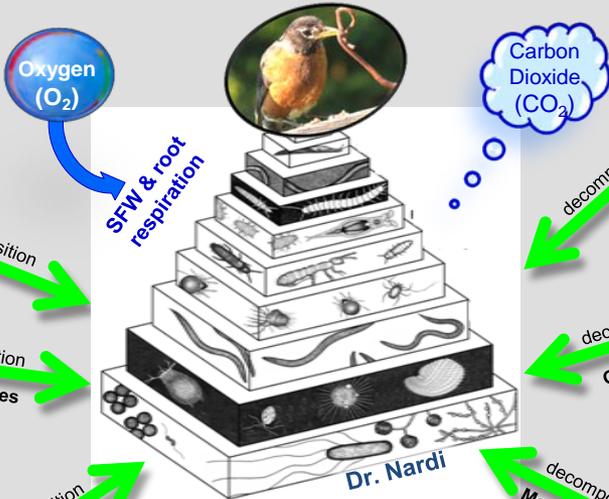
- Glomalin
- Root Exudates
- Surface Crop Residues & Root Residues
- Predator-Prey relationships
- Plant Symbiosis
- Soil Humus
- Manure
- SFW residues /wastes
- Compost

**Cash Crop (Primary Producer of OM)**



The Soil Food Web (SFW) is a complex association of organisms responsible for breaking down crop residues (plus root exudates/glomalin) and cycling plant-available nutrients in the soil.

SFW: Every trophic level must function for the SFW to function.



**Cover Crop or Pasture (Primary Producer of OM)**

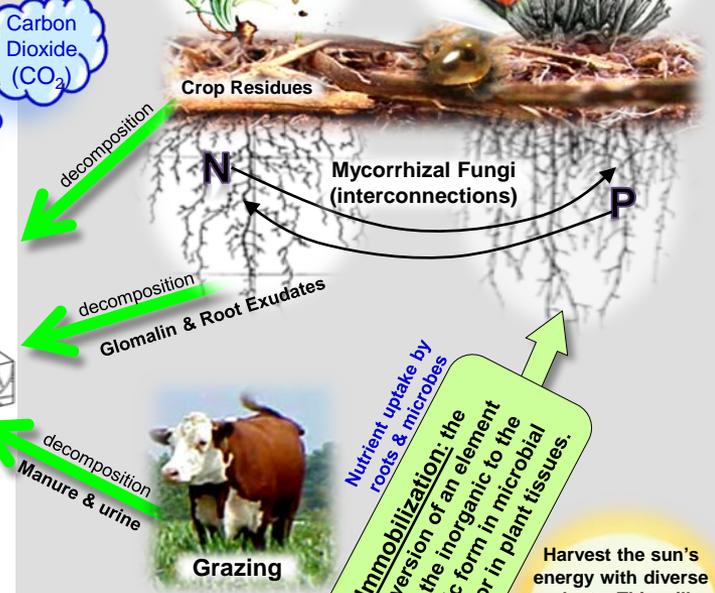


**NOTE:** The amount of organic material (**root exudates**) lost to the rhizosphere **during** the growing season of annual plants may be more than **twice** the amount remaining in the root system at the **end** of the growing season (e.g., assume that the mass of corn roots remaining in the soil **after** crop harvest is about 4,000 lbs./ac.). This would imply that **during** the growing season, about 8,000 lbs./ac. of **additional organic material** is available to the SFW. Also, Surface crop residues are an additional OM source for the SFW.

(Ref.: The Nature & Properties of Soils, 14<sup>th</sup> Edition revised, chapter 11.)



**Humification:** the process involved in the **decomposition** of Organic Matter (OM) and leading to the formation of humus.



**Mineralization:** the conversion of an organic form to an inorganic state as a result of microbial decomposition.

**Soil Humus (70 – 90% of SOM)**



Microbial action can transfer organic carbon from one pool to another. This also results in humus decomposition.

**Water-stable Macroaggregates** (formed by the SFW & Living Roots in a healthy soil. i.e., by implementing a Soil Health Management System)



Soil Humus forms water-stable microaggregates

OM inputs and its decomposition (i.e., OM oxidized to CO<sub>2</sub> by the SFW) will determine the % SOM.

**Factors affecting OM decomposition:** quantity & quality of OM inputs (C:N ratio), soil moisture content, pH, salinity, aeration & temperature.

**Soil Health Planning Principles:**

- Use plant diversity to increase the diversity in the soil biota
- Keep a living root growing throughout the year
- Keep the soil covered as much as possible
- Manage more by disturbing less
- Livestock integration where applicable

