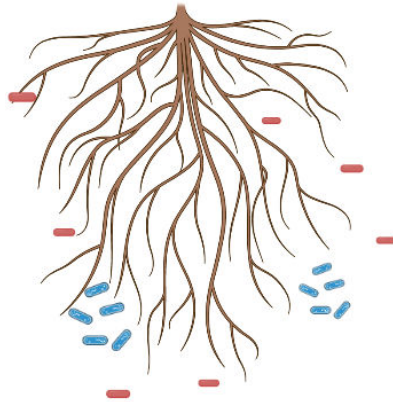


## Benefits of Soil Microbes

Microbes play a very important role in the health of the soil as well as the plant. Worm Power is teeming with beneficial microbes that are part of essential functions in the rhizosphere. The rhizosphere is the area where roots, soil, and microbes all intermingle, and these interactions affect the soil and plants above. What are the benefits of soil microorganisms?



Created in BioRender.com [bio](#)

**Breakdown of Organic Matter.** Soil microbes are associated with soil carbon because they play an essential role in decomposition. Microbes need a source of nutrients such as soil organic matter. Soil organic matter is a natural carbon-based material like leaves, roots, or larger soil organisms that are in the process of being broken down by microorganisms. Soil organic matter can change the soil's physical properties like aggregate stability as well as its chemical properties like cation exchange capacity.

**Soil Structure.** The amount of soil organic matter affects the soil structure by enhancing aggregate stability and improving water infiltration and aeration. Many bacteria produce polysaccharides that coat soil surface particles that affect soil structure. This substance causes sand, silt, and clay particles to bind together to form stable microaggregates that improve the soil structure.

**Nutrient Uptake.** Some bacteria produce secondary metabolites called siderophores that scavenge for Iron in the soil. Siderophores also form complexes with other essential elements like Molybdenum, Manganese, Cobalt, and Nickel.

Some bacteria can also convert nitrogen from the air into a form that plants can use through the process of nitrification. The other ways a plant gains nitrogen from microbes are during the Rhizophagy cycle when the roots break down the microbes' cell walls and nitrogen and other plant nutrients are taken from the microbes. Access to micro and macro nutrients decreases the plant's risk of deficiencies and improves crop yields.

**Plant Health.** Microorganisms can help reduce disease pressure that can kill or reduce plant yields. Beneficial bacteria and fungi in the soil interact with pathogens and can deter or lessen the damage caused by harmful pathogens. The plant also produces stress compounds like antioxidants in the presence of microbes, which prepares the plant to defend against pathogens. Research by Cornell University has shown that the microbes in Worm Power prevented *Pythium* on young seedlings (pictured below).

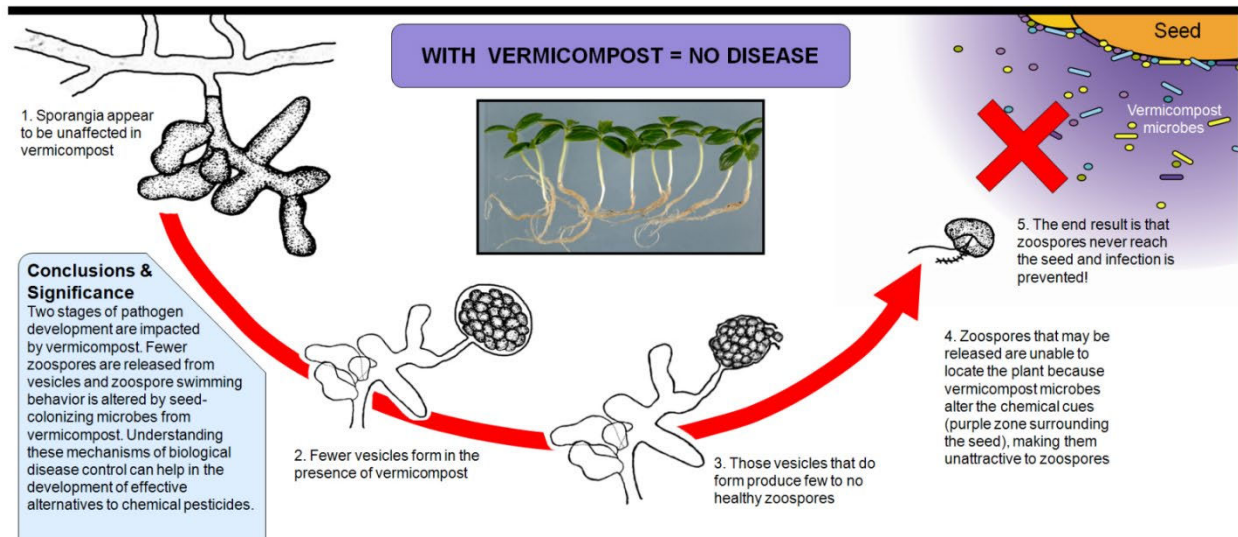


Photo credits: Kent Loeffler Technical assistance: Hillary Davis, Monica Minson Additional funding, NY Farm Viability Institute, Organic Farming Research Foundation, Organic Crop Improvement Association, CALS Andrew C. Mellon

**Plant Growth Promotion.** Some soil microbes can produce plant hormones and are referred to as Plant Growth Promoting Bacteria or PGPB. Some of the species found in Worm Power Liquid Extract have been associated with plant hormones like Auxin, Cytokinin, and Gibberellins. Auxin is associated with the elongation of cells in stems and regulates plant growth. Cytokinins promote cell division and cell expansion during leaf cell development. Gibberellins are involved with germination, cell elongation, and internode growth.

Soil microbes have important different functions within the rhizosphere and numerous benefits for the plant. Healthy soils promote healthy plants and having a diverse microbe population is critical to this process. At Worm Power, we have hundreds of naturally derived microbes within our Worm Power vermicompost and Worm Power Liquid Extract to promote diversity and functionality for your soil and plant needs.

-Lanae Wilhelmi | Agronomist