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|  | The Microorganisms- Chemical Decomposers of Compost  Most microorganisms "feed" by chemically decomposing organic materials such as compost. These organisms are present throughout the entire process of turning organic materials into humus and generally aid the formation of fertile soil.  Bacteria-  [Bacteria](http://docs.google.com/images/bacteria.gif) are single-celled organisms that make up nearly 90% of the microorganisms that are found in compost. They are responsible for most of the decomposition that occurs and also most of the heat produced in the pile. In the pile, most of the bacteria are motile and take one of three forms: rod-shaped bacilli, sphere-shaped cocci or spiral shaped spirilla. The bacteria that dominate during the thermophilic stage are generally of the genus Bacillus (which means rod shaped). These thermophilic organisms flourish in some of the world's hottest environments (the hot springs and the deep sea volcanic vents) and can survive the harshest conditions by forming endospores. These endospores preserve the nucleic information in an extremely thick-walled cell casing that can be shed when conditions become favorable. This allows new bacteria to form after an extended dormant period.  When a hot compost pile cools down, mesophilic bacteria regain dominant status in the pile. The longer the pile is allowed to remain unchanged in its cooling state, the more diverse the mesophilic population will become, benefiting the top soil's local community.  Actinomycetes-  Actinomycetes are a filimentous bacteria that lack nuclei yet grow multicellular filaments like fungi. The enzymes of these organisms allow them to break down cellulose, lignin, chitin, and proteins. They form long, thread-like branched filaments visible on the outer 10-15 cm of the pile.  Fungi-  Fungi include molds and yeasts and are responsible for the decomposition of complex plant polymers (i.e. cellulose) in soil and compost. They attack organisms that are too dry, too acidic, or too low in nitrogen for bacteria to decompose. Fungi need oxygen to survive and generally form molds toward the outside of the pile.  Rotifers-  Rotifers are small multicellular organisms that are found in films of water in the compost. They are secondary consumers that feed on bacteria, fungi, and organic matter.  Protozoa-  Protozoa are one-celled microscopic animals found in the water droplets of compost that play only a minor role in decomposition. They gain food from organic matter but can also act as secondary consumers that ingest bacteria and fungi.  The Invertebrates (Macroorganisms)- Physical Decomposers of compost  Macroorganisms are visible to the naked eye. Primarily, these organisms physically alter the compost by literally chewing, digesting, sucking, churning, and digging through the organic matter.  Nematodes-  Nematodes, or round worms, are the most prevalent of all invertebrates in the soil. Some live on decaying organic matter but others are the predators of algae, other nematodes, protozoa, and fungal spores. Some nematodes are pests that suck the juices of fruit plants while others contribute to the decomposition of the soil. They resemble a fine hair under a microscope.  Snails and Slugs-  Snails and slugs are mollusks that travel in a creeping motion. Snails have spiral-shaped shells mounted on their backs while slugs are shell-less. They both attack plant debris in the compost pile.  Earthworms-  Earthworms constantly tunnel and feed on dead plants and decaying insects during the daylight hours. As the earthworm digests organic matter, the matter is passed out in "casts" that have large amounts of calcium, bacterial diversity, available nitrogen, magnesium, phosphorus, and potassium. These casts highly improve the compost as the organic material decomposes. The most common earthworm in compost is the red wiggler (Eisenia foetida), which are about 5 cm long and have jointed bodies that range in color between buff and maroon.  Sow bugs-  Sow bugs are fat bodied crustaceans with dark protective plates mounted on their back and small plate-like gills on the underside of their bodies. They have ten legs and graze on organic vegetation. Sow bugs look similar to pill bugs (a.k.a. roly-poly) but do not roll into a ball when threatened.  Fermentation mites-  Fermentation mites are transparent bodied creatures that are able to withstand aerobic conditions in compost. They digest organic material and generally are a good indicator of anaerobic conditions.  Beetles-  Beetles are insects that are second and third level consumers in the compost pile. The most common beetles in compost are the rove beetle, ground beetle, and the feather-winged beetle. The feather-winged beetles feed on fungal spores while the rove and ground beetles feed on insects snails, slugs, and other small animals.  Springtails-  Springtails are small wingless insects that have the marked ability to jump large distances when threatened. They chew on decomposing plants, pollen, grains, and fungi.  Ants-  Ants are insects with six legs, a head, a thorax, and an abdomen. Ants feed on many of the materials in compost but most importantly will bring materials such as potassium and phosphorus to the pile.  Much of the information of this section was found at [Cornell University's](http://www.cals.cornell.edu/dept/compost/html) compost homepage. |

*This Web Site is Best viewed with 256 or more colors.*

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