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# THE DECOMPOSERS: IF YOU BUILD IT, THEY WILL COME

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From *The Curious Gardener*, Spring 2008

## ***A compost pile is an eco-system; provide the food and the guests will come!***

Spring-like weather brings up the urge to prune and plant, to top dress or mulch with compost...

Compost! What's been happening in that compost bin all winter? Let's go see!

Your compost pile is very much like a meal set out for guests. *Decomposers*, a diverse group of small and sometimes microscopic organisms are your dinner guests. The end product of these single-celled and multi-celled organisms is beautiful, brown, earthy-smelling compost. And you needn't make a special effort to bring these guests to the table (compost pile). All you need to do is provide the meal, that is, the compostable materials and suitable conditions, and they will come!

Some folks are surprised and even dismayed at the list of bacteria, fungi, insects, spiders, and earthworms that do come to the compost bin. But fear not, they each have a role in compost-making. So let's take a look at this group of diners, ahem, decomposers and what they accomplish.

### **The Dinner Guest List: Microorganisms**

*Bacteria* begin the breakdown process of the organic matter in your compost pile. They make it easier for larger decomposers to continue the composting process. There are many different types of bacteria doing this work, and each type thrives on different conditions and many kinds of organic matter.

Conditions that are conducive to their work include proper moisture, temperature, air, a proper balance of carbon and nitrogen, and lots of surface area to work on will allow bacteria to reproduce rapidly.

Bacteria are single-celled organisms which we can only see with a microscope. It would take 25,000 of them laid end to end to take up an inch of space! Bacteria are also less mobile than other organisms, and therefore they are less able to escape conditions that become unfavorable, like a drop in temperature or too little moisture.

Some bacteria thrive at temperatures near 55 degrees, others between 70 to 90 degrees and still others at conditions above 113 degrees. This group of decomposers are also divided into those that thrive in oxygen rich (aerobic) environments and those that can live in the absence of oxygen (anaerobic).

*Fungi* take over the composting process near the final stages of the pile when the pile contains more easily digestible organic matter. Fungi are primitive plants that are single or many-celled that form long threads or filaments (like mushrooms). Fungi live on dead or dying material, a perfect organism for your nearly completed compost.

*Actinomycetes* (āk'tə- nō-mī'sēt') have been described as part bacteria and part fungus. They live at medium temperatures in the compost bin. What you see is grayish cobweb-like threads that give the compost a pleasant, earthy smell like that of a rotting log. They are noticeable during the late stages of composting, and they benefit the process by liberating carbon, nitrogen, and ammonia, thus making these nutrients available to higher plants in the food web.

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## Macroorganisms

During the late stages of composting when the temperatures are decreasing, larger organisms add diversity interest to your compost dinner guest list. Some of these guests feed on earlier arrivals!

*Nematodes*, or roundworms, are the most plentiful organisms without backbones (called invertebrates) in the soil. They are less than 1 millimeter in length, and they live on bacteria, protozoa, fungal spores, and each other. We've all heard about nematodes that cause problems in the garden, but the majority of nematodes in the soil and compost are beneficial, despite their eating habits!

*Fermentation mites*, sometimes called mold mites, are tiny, transparent organisms that eat yeasts in organic debris or fermenting masses. In wineries and cheese factories these mites are pests, but in the compost pile they are beneficial.

*Springtails* are 1/16 to 1/4 inch in length and white. They are primitive insects with a pointed tail extending forward underneath their abdomen, allowing them to leap into the air when disturbed. These creatures feed principally on fungi and sometimes on nematodes and organic debris. They are important members of the decomposer's club and a major controller of fungal populations. They can be plant pests if their numbers become high, however, keeping the compost pile from becoming too wet will keep their population under control.

*Wolf Spiders* are considered "wolves" of the soil and forest floor insect community. These insects do not build webs, but run free and hunt their prey. They eat many kinds of arthropods.

*Centipedes* are frequently found in soil communities, including compost. They eat almost any type of soil organism about their size or slightly larger. Centipedes have a segmented body, flatter than an earthworm with one pair of legs per segment. They are smaller and move faster than millipedes. Centipedes never curl up when provoked, but can inflict a venomous bite.

*Millipedes* have a hard, segmented body with two to four pairs of legs per segment and can grow up to six inches long. They are vegetarians and help to break down organic matter. Millipedes curl up when disturbed.

*Sowbugs and pillbugs (Isopods)* closely resemble each other with their small, fat-bodies. Only pillbugs roll into a ball. Both types of *Isopods* feed primarily on decomposing organic matter, but can occasionally eat seedlings, new roots, lower leaves, and fruits or vegetables lying directly on the soil or near a damp soil surface. If these crustaceans become a problem in the garden elevate fruit off the soil and consider watering early in the day so plants and the soil surface can dry out by evening.

Beetles can be seen readily, having two pairs of wings and a hard skeleton on the outside of their bodies. The most common beetles in compost are the rove beetle, ground beetle, and feather winged beetle. Some larval stage and adult stage of beetles feed on plant material and others like the rove beetle and the ground beetles work in the clean up spot, eating snails, insects, and other small animals.

*Earthworms* consume organic matter, and the material that passes out of their bodies, called castings, are the richest and best quality of all humus material. Fresh castings have a higher level of bacteria, organic material, and available nitrogen, calcium, magnesium, phosphorus, and potassium than soil itself.

*Enchytraeids* (Eh kee try' ids) are white worms or pot worms. They are 1/4 to 1 inch long, white segmented and might be thought to be newly hatched redworms. They are in fact related to redworms and they eat decomposing vegetable matter such as brown, slimy lettuce. Yum!

*Ants* eat many types of material including aphid honeydew, fungi, seeds, sweets, scraps, other insects, and other ants. Ants remain in composting material only while the pile is relatively cool. If ants are evident in an open-air pile it indicates that conditions are dry. Control of ant populations in piles involves keeping it as moist as a wet, but wrung out sponge.

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*Earwigs* forage at night and eat the eggs, the young, and adults of small organisms such as insects, mites, nematodes as well as algae, fungi, and plants. If Earwigs are pests in the garden they can be trapped by using empty containers such as tuna-fish cans with 1/2 inch of vegetable oil into which they will crawl but not be able to leave.

We can see that given the opportunity in our compost bins, many diverse organisms work at different stages and in different temperatures to transform our organic waste into much needed soil enhancing material. Though these Decomposers are not welcome at my real dinner table, I'm overjoyed to see them at the smorgasbord of my compost bin. And I am happy to maintain the right conditions and keep the organisms coming back for more!

## References

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