

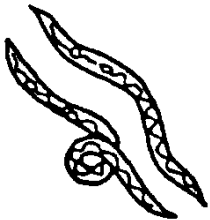


Composting 101

Macroorganisms

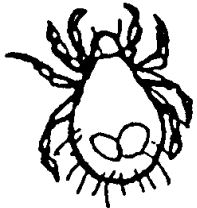
After the temperature decreases, or in the later stages of a slowly decomposing compost pile, the pile becomes a real zoo. Larger organisms, many of them feeding on the piles' earlier inhabitants, add diversity to the cast of characters in the compost pile. The following is just a sampling of this diverse group.

Nematodes, or roundworms, are the most abundant invertebrates in the soil. Typically less than one millimeter in length, they prey on bacteria, protozoa, fungal spores and each other. Though there are pest forms of nematodes, most of those found in soil and compost are beneficial.



As they feed among the mycelial fibers of fungi, nematodes are frequently trapped within the tiny "nooses" that develop on the strands of molds. Many species of mold are able to produce such snares, and it is said that chemicals produced by the nematodes stimulate the production of so-called nematode traps. Once caught within the fungal snare structure, the nematode is digested as an energy source for the fungus.

Fermentation mites, also called mold mites, are transparent-bodied creatures that feed primarily on yeasts in fermenting masses or organic debris. Literally thousands of these mites can develop into a seething mass over a fermenting surface. Because of this, they often become pest species in fermenting industries such as wineries and cheese factories. They are not pests in the compost pile.



Springtails, along with nematodes and mites, share the numerical dominance among soil invertebrates. Springtails are tiny ($1/16$ to $1/4$ inch) and white. When you reach your finger toward them, some spring away in all directions. Springtails are primitive insects with a pointed prong extending forward underneath their abdomen from the rear. By extending this "spring" they jump all over the place. They feed principally on fungi, although they also eat nematodes and small bits of organic detritus. They are considered to be among the most important soil organisms and are a major controlling factor of fungi



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populations. **Wolf spiders** are truly "wolves" of the soil and forest floor micro-communities. They build no webs, and merely run free hunting their prey. Their prey include all sizes of arthropods, depending on the size of the spider.

Centipedes are found frequently in soil micro-communities. They prey on almost any type of soil organism that is within their size range or slightly larger. Centipedes have a flattened body, and their legs are much longer than those of a millipede (thousand-legged). They are also much larger and faster moving.

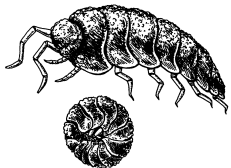
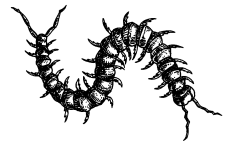
Millipedes are vegetarians that are helpful in breaking down organic matter. Millipedes have a worm-like body, and adults can grow to a length of one to two inches.

Sow bugs and **pillbugs** (Isopods) are small, fat-bodied, flat decomposers that closely resemble each other. The way to tell them apart is by the fact that only pillbugs are able to roll up into a ball. Like other crustaceans, sowbugs breath through gills and require a moist environment. They feed on rotting woody materials and highly durable leaf tissues. If you mulch your garden with organic matter, you are certain to see sowbugs in abundance because the decaying organic matter provides them with a source of food.

Sowbugs and pillbugs may occasionally feed on seedling, new roots, lower (*often partially decaying*) leaves, and fruits or vegetables laying directly on the soil or near a damp soil surface. They get blamed for more damage than they actually do, however, because they are frequently found in decaying fruit initially damaged by other pests such as snails or slugs.

If sowbugs become a problem in the garden surrounding a compost pile, try limiting the moist and decaying matter environment in which they thrive. Try to water early in the day so plants and the soil surface dry out by the evening. Choose mulch materials that are coarse enough to let water pass through easily so the surface next to crop plants will not remain damp for long. Elevate maturing melons and squashes on old strawberry baskets or pebbles.

Beetles have many representatives lurking through litter and soil spaces. The rove beetle, ground beetle, and feather-winged beetle are the most common beetles in compost. Beetles are easily visible insects with two pairs of wings. Most adult beetles, like the larval grubs of their species, feed on decaying vegetables, while some, like the rove and ground beetles, prey on snails, insects, and other small animals.



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Earthworms pass organic matter through their bodies, grinding it with the help of tiny stones in their gizzard. The material passes out of the worm's body in the form of worm castings, which are the richest and finest quality of all humus material. Fresh castings are markedly higher in bacteria, organic material, and available nitrogen, calcium, magnesium, phosphorus, and potassium than soil itself. As worms process organic materials, they coat the materials with a mucus film that binds small particles together into stable aggregates and helps to protect nutrients from being leached out by rain. Redworms are the type of earthworm used in worm boxes for composting. They process large amounts of organic material and they reproduce quickly.



Enchytraeids, commonly known as white worms, or pot worms are small (1/4 to 1 inch long), white, and segmented. They are so tiny they look like they might be newly hatched redworms. However, redworms have red blood; even newly hatched redworms are reddish. Enchytraeids can be common in home worm boxes.

Flies, including house flies, play an important part in the recycling and breaking down of all types of organic debris. Adults can feed on almost any kind of organic material. To control their numbers, keep

Good Bug-Bad Bug?

There is a common assumption that some bugs are "good" and others "bad." Remember that all creature have a niche that they fill, even "bad" bugs. Few bugs are bad for decomposition. However, concerns are valid when these creatures overly encroach on our "personal space." Following is a discussion about some of the insects people commonly label as "pests," including methods of managing their populations should they become a problem.



attractive food scraps, such as fatty foods, out of the compost pile. Turn the compost pile frequently and thoroughly, making sure the outsides are folded into the center, so that all portions of the mix are subjected to the heat (*larvae die at high temperatures*). Do **not** put kitchen scraps in a slow compost pile, as high temperatures may never be reached. Covering the pile with a dry material such as straw, old grass clippings, or carpet pieces of plastic is also helpful. The container used in the kitchen to collect food scraps should close tightly, and should be emptied regularly. Keeping the container in the freezer



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prevents fly problems and also solves any odor problems.

Snails and **Slugs**. Generally snails and slugs feed on living plant material, but they do attack fresh garbage and plant debris and do appear in the compost pile. While they are not considered a problem for the composting process, their proximity to the garden can, of course, be a problem. Both slugs and snails require a damp environment to survive; they avoid the sun and come out primarily at night or on cloudy days.

To control their numbers in the garden, eliminate, to the extent possible, all places where they hide during the day. Boards, stones, debris, weedy areas around tree trunks, and dense ground covers such as ivy are ideal sheltering spots. Handpicking can be very effective if done thoroughly on a regular basis. The best time to hand collect snails is in the early morning. Snails can also be trapped by laying out a shallow pan filled with stale beer, or a yeast and water mixture. It is best if the pan is laid in a depression so the snails and slugs are able to crawl into it more easily. Barriers can also be effective. Easy barriers to maintain are those made with copper flashing and screens. A well-tested barrier for keeping snails out of vegetables is a vertical copper screen surrounding a snail-free garden area. In addition, rove beetles, a common inhabitant of compost piles, are natural predators of snails.



Fruit beetles, in late summer to early fall, lay their eggs in compost piles and other decomposing plant litter. The larvae are fairly large (*about two inches long*) and C-shaped; the body is pale translucent white, and the head is dark brown.

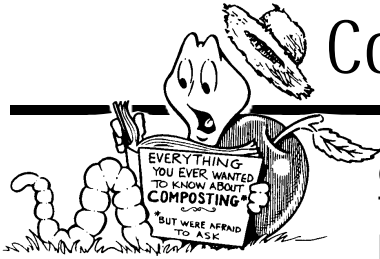
Because of their large size, the larvae can be disconcerting to stumble upon in the compost pile. While the larvae does not damage plants, the mature beetles do attack maturing soft fruit such as tomatoes, peaches, plums, figs and apricots. You may want to remove them from your pile and use them for bird or fish food.

Ants feeding on a variety of material, including aphid honeydew, fungi, seed, sweets, scraps, other insects, and sometimes other ants. Compost provides some of these foods, and it also provides shelter for nests and hills. They will remain, however, only while the pile is relatively cool. Ants in an open-air compost pile may also be an indicator that the pile is too dry. Ants may even benefit the composting process by bringing fungi and other organisms into their nests. The work of ants can also make compost richer in phosphorus and potassium by moving minerals from one place to another.



Earwigs are among the most readily recognized and most

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commonly complained about insect pests in gardens.

Therefore, people are sometimes concerned that earwigs may be attracted to compost piles. Earwigs forage at night, eating

the eggs, young and adults of small organisms such as insects, mites and nematodes, as well as algae, fungi and tender plant tips. Earwigs are easy to trap. Containers such as tuna-fish cans that hold ½ inch of vegetable oil or moistened bread crumbs can serve as traps. Because of earwigs' predilection for crawling into small spaces, rolled-up newspapers are also good traps. The traps, should be placed on the soil near plants just before dark. Shaking the trapped insects into a pail of soapy waters drowns them.



Cockroaches are not common in compost piles.

