



# Urban Composting

Plants need more than just the nitrogen, phosphorous, and potassium, found in most so-called "balanced" fertilizers. They need dozens of micronutrients to grow strong and stay healthy.

Additionally plants benefit from being in an organically active soil. Organically active soil helps prevent bacterial and fungal diseases, and of course having organic matter in the soil attracts earth worms which further enrich the dirt. The one product you can get that adds all of these features is compost.

**Maybe you've been thinking about composting**, but aren't sure how to start. Or perhaps you heard compost piles are smelly, or attract bugs and mice. Whatever your lame excuse is, give it up. Here are 5 good reasons why compost is a great idea.



- 1. Composting Is Easy:** How much time and effort do you spend putting things in the garbage can? A few seconds each week.
- 2. Composting Is Dirt Cheap:** It costs next to nothing to start composting, aside from a tiny initial investment in a compost pail or bin.
- 3. Compost Makes a Healthy, Thriving Garden:** You really can't find a better soil amendment than compost. It loosens clay soils and helps sandy soils retain water.
- 4. Composting Is Good for the Planet:** Landfills everywhere are running out of room, and the EPA estimates that roughly 25% of the garbage in the U.S. is made up of yard trimmings and food scraps.
- 5. No Smell, No Pests:** The rumor that compost attracts bugs, mice or other pests is a dirty, stinking lie. Only compost done wrong smells, or attracts vermin.

There are a number of ways to compost, but on average, compost can be created using five methods:

- holding units
- turning units
- compost heaps
- soil incorporation
- vermicomposting

The focus of this article will be heap composting for beginners, as this is the easiest and least expensive method for most people.



# Urban Composting

With heap composting, there are no structures required, though you may use a compost bin if desired. Keep in mind that a compost heap or pile may not appear as neat and tidy as using a bin, but it is still one of the best options for newbies. You can also camouflage a compost pile with tall flowering plants or fencing.

You can start a compost pile any time of the year, but fall is the time of year when both nitrogen and carbon materials are readily available.

**Location:** One of the most important aspects for starting a compost pile is its location. Choose an open, level area with good drainage. You do not want your compost to sit in standing water. An area with partial sun or shade is also ideal. Too much sun can dry the pile out, while too much shade can keep it overly wet. Finally, choose a site that is easy for you to get to and avoid areas near dogs or other meat-eating animals.

**Size:** The recommended size for a compost pile is generally no smaller than 3 feet high and wide and no larger than 5 feet. Anything smaller may not heat up efficiently and anything larger may hold too much water and become difficult to turn. It is recommended to start your pile on bare ground rather than on asphalt or concrete. This impedes aeration and inhibits microbes. Placing a pallet underneath the pile is fine, however, if you prefer.

**Adding Organic Materials:** Many organic materials can be composted, but there are **some items that you should keep out of your compost pile**. These include:

- Meat, dairy, fat or oil products
- Carnivorous pet feces (e.g. dog, cat)
- Diseased plants, or weeds that have seeded
- Human waste
- Charcoal or coal ash (wood ash is ok though)



The key materials for composting are nitrogen/greens and carbon/browns. When starting a compost pile, the recommended practice is to layer or alternate these greens and browns, the same way as you would for making lasagna.

Your bulkier organic materials do best in the first ground layer, so start with a layer of browns, such as twigs (less than ½ inch in diameter) or straw, about 4 to 6 inches.

Next, add in some green materials, such as kitchen waste and grass clippings, again about 4 to 6 inches thick. Additionally, animal manure and fertilizers serve as activators that accelerate the heating of your pile and provide a nitrogen source for beneficial microbes.



# Urban Composting

- Continue to add layers of nitrogen and carbon materials until you reach the top or run out. Lightly water each layer as it is added, firming it down but do not compact.

**Aerobic Decomposition:** When organic material decomposes with oxygen, the process is called "aerobic." When living organisms, which use oxygen, feed upon the organic matter, they develop cell protoplasm from the nitrogen, phosphorus, some of the carbon, and other required nutrients. Carbon serves as a source of energy for organisms and is burned up and respired as carbon dioxide (CO<sub>2</sub>). The aerobic process is most common in nature, such as the forest floor, where droppings from trees and animals are converted into a relatively stable humus or soil manure. There is no accompanying smelling nuisance when adequate oxygen is present. A great deal of energy is released as heat in the oxidation of carbon to CO<sub>2</sub>. "Aerobic composting" requires a considerable amount of oxygen and produces none of the characteristic features of anaerobic putrefaction. In its modern sense, aerobic composting can be defined as a process in which, under suitable environmental conditions, aerobic organisms, principally thermophilic, utilize considerable amounts of oxygen in decomposing organic matter to fairly stable humus

**Moisture:** Aerobic decomposition can proceed at any moisture content between 30% and 100% if adequate aeration can be provided. In practical aerobic composting,



however, high moisture content must be avoided because water displaces air from the interstices between the particles and gives rise to anaerobic conditions. On the other hand, too low a moisture content deprives the organisms of the water needed for their metabolism, and inhibits their activity.

**Aeration:** Aeration is necessary for high temperature aerobic composting to obtain rapid odor-free decomposition. Aeration is also useful in reducing high initial moisture content in composting materials. Several different aeration techniques can be used with varying degrees of success. Turning the material is the most common method of aeration when composting is done in stacks. Hand turning of the compost piles or in units is most commonly used for small garden operations. Mechanical turning is most economical in large municipal or commercial operations. The most important consideration in turning compost, apart from aeration, is to ensure that material on the outside of the pile of units is turned into the center where it will be subject to high temperatures. In hand turning with forks, this can be easily accomplished. For piles or windrows on top of the ground, material from the outer layers can be placed on the inside of the new pile. Volume reduction during the stabilization period helps turning within the units.



# Urban Composting

**Organisms of the Compost:** In small-scale outdoor composting systems, such as backyard compost piles, soil invertebrates are likely to contribute to the decomposition process. Together with bacteria, fungi, and other microbes, these organisms make up a complex food web or energy pyramid with primary, secondary, and tertiary level consumers. The base of the pyramid, or energy source, is made up of organic matter including plant and animal residues.

Many kinds of worms, including earthworms, nematodes, red worms and pot worms eat decaying vegetation and microbes and excrete organic compounds that enrich compost. Their tunneling aerates the compost, and their feeding increases the surface area of organic matter for microbes to act upon. As each decomposer dies or excretes, more food is added to web for other decomposers.

**Nematodes:** These tiny, cylindrical, often transparent microscopic worms are the most abundant of the physical decomposers - a handful of decaying compost contains several million. It has been estimated that one rotting apple contains 90,000. Under a magnifying lens they resemble fine human hair.

Some species scavenge on decaying vegetation, some feed on bacteria, fungi, protozoa and other nematodes, and some suck the juices of plant roots, especially root vegetables.

**Mites:** Mites are the second most common invertebrate found in compost. They have eight leg-like jointed appendages. Some can be seen with the naked eye and others are microscopic. Some can be seen hitching rides on the back of other faster moving invertebrates such as sow bugs, millipedes and beetles. Some scavenge on leaves, rotten wood, and other organic debris. Some species eat fungi, yet others are predators and feed on nematodes, eggs, insect larvae and other mites and springtails. Some are both free living and parasitic. One very common compost mite is globular in appearance, with bristling hairs on its back and red-orange in color.



**Springtails:** Springtails are extremely numerous in compost. They are very small wingless insects and can be distinguished by their ability to jump when disturbed. They run in and around the particles in the compost and have a small spring-like structure under the belly that catapults them into the air when the spring catch is triggered. They chew on decomposing plants, pollen, grains, and fungi. They also eat nematodes and droppings of other arthropods and then meticulously clean themselves after feeding.



# Urban Composting

**Earthworms:** Earthworms do the lion's share of the decomposition work among the larger compost organisms. They are constantly tunneling and feeding on dead plants and decaying insects during the daylight hours. Their tunneling aerates the compost and enables water, nutrients and oxygen to filter down. "As soil or organic matter is passed through an earthworm's digestive system, it is broken up and neutralized by secretions of calcium carbonate from calciferous glands near the worm's gizzard. Once in the gizzard, material is finely ground prior to digestion. Digestive intestinal juices rich in hormones, enzymes, and other fermenting substances continue the breakdown process. The matter passes out of the worm's body in the form of casts, which are the richest and finest quality of all humus material. Fresh casts are markedly higher in bacteria, organic material, and available nitrogen, calcium, magnesium, phosphorus and potassium than soil itself."

**Beetles (left):** The most common beetles in compost are the rove beetle, ground beetle and feather-winged beetle. Feather-winged beetles feed on fungal spores, while the larger rove and ground beetles prey on other insects, snails, slugs and other small animals.

**Ants:** Ants feed on aphid honey-dew, fungi, seeds, sweets, scraps, other insects and sometimes other ants. Compost provides some of these foods and it also provides shelter for nests and hills. Ants may benefit the compost heap by moving minerals especially phosphorus and potassium around by bringing fungi and other organisms into their nests.

**Flies:** During the early stages of the composting process, flies provide ideal airborne transportation for bacteria on their way to the pile. Flies spend their larval phase in compost as maggots, which do not survive thermophilic temperatures. Adults feed upon

**Compost Pile Maintenance:** Your compost pile should be moist, but not soggy. Most of your water will come from rain, as well as the moisture in green materials, but you may need to water the pile yourself on occasion. If the pile gets too wet, you can turn it more frequently to dry it, or add more brown materials to soak up excess moisture.

Once you turn the pile the first time, these materials will get mixed together and compost more efficiently. Keeping the compost pile turned on a frequent basis will help with aeration and speed up decomposition.

