

CARE AND FEEDING OF THE COMPOST COMMUNITY

Compost is alive. It gives life to the soil. Because compost is alive, it reacts with the soil by making the soil minerals more accessible to the plants. Composting is the return of part of the bounty that nature provides. The quality of compost is judged by the amount of microbiological life it contains.

Everything that is dead and decaying is nature's raw material for composting. Nature has centuries in which to accomplish the composting processes and can afford to use the low-heat, low oxygen approach. Humans have neither nature's time nor her patience; their composting methods are designed to speed up the natural processes. People can accomplish in weeks what it takes nature years to do.

The process of compost breakdown is complicated with many aspects, which are not yet fully understood. Fortunately, with a modicum of knowledge, the home gardener can produce compost of the same quality as that produced by an organic chemist.

Bacterial activators are present everywhere, but without food, moisture or warmth; they lie scattered, semi-dormant in the soil. When the proper environment is provided, the soil life begins to digest, create heat, increase its digestive rate and reproduce heroically. Decomposition occurs in three overlapping stages. At about 55°F, cool temperature bacteria called psychrophiles invade the compost pile and release nutrients in the form of amino acids. As the psychrophiles break down carbonaceous material, heat is released, which sets the stage for the intermediate temperature range group (70-90° F), the mesophiles.

The mesophiles are the real workhorses of the compost pile. So enthusiastically do they pursue their short life's goal of consuming everything in sight, that they destroy their working environment by raising the temperature of the compost pile to 104° + F.

The thermophiles take over the composting process without experiencing any of the difficulties that a change in personnel usually entails. They can drive up the temperature to nearly 200° F, and occasionally set a pile afire. The high temperatures destroy diseases and weed seeds. A really hot pile generates more humic acid, which is basic to releasing nutrients into forms that the plants can assimilate. There is also greater enzymatic action and faster reproduction for the organisms of a hot pile. Thus, the end product of hot composting will be superior to the cold pile. The pile should stabilize at about 140° - 160° F, where it will remain for a few days and then gradually cool down to where the mesophiles take over again, though at a slower rate of decomposition. A sustained temperature of 140° F for a few days is necessary to kill weed seeds and disease organisms. Temperatures over 160° F can lessen the value of the finished product. As the temperature begins to drop, incorporating air by turning and mixing the pile will usually reactivate the process and heat up the pile again. Compost serves as a reservoir of nutrients that are gradually released, as the plants need them. It also improves tilth and water-holding capacity of the soil. The presence of natural antibiotics and beneficial organisms help prevent pathogen buildup. Compost fosters a high level of chemical exchange that makes minerals more available from the parent soil. At the same time, the organic matter content from compost buffers chemical swings in pH, creating a more stable environment for the plant roots.

In the cooler stages of composting there are many fungi, insects and worms that attack the toughest parts of the pile. However, higher temperatures will drive them out, so adding earthworms to a pile should not even be considered when the temperature is rising. Usually they will return to work on the pile when conditions are again favorable.

Screened compost is an excellent addition for potting mixes and also is very good for covering seed rows. Compost can even be steeped in water and used as a liquid plant food both indoors and out. A shovel of compost steeped in five gallons of water will create a very mild, low-analysis fertilizer for plants. It is a positive gained from a negative, soil enrichment from a nuisance waste.

Here are the steps to your own pile of “brown gold.”

1. SHRED

Microorganisms are by definition small. The finer you shred and grind your organic matter, the more surfaces are presented to be attacked and the more easily and quickly it will be digested. A serious composter will probably end up purchasing a good quality shredder-grinder. This is a major outlay, though its long-term benefits far out weigh any initial cost. There is a possibility of compaction if the materials are too fine.

Shredding reduces the bulk of raw material, thereby enabling you to put more into your compost pile. You can put four times the amount of shredded leaves into the pile than you could of whole leaves in the same space. Dampened paper and cardboard, which constitute a sizable portion of a family’s waste, can be ground up into usable composting material. Avoid slick and colored paper, since these may contain heavy metals. You will also have the psychological satisfaction of converting junk mail into something usable. A concentration of a single material such as grass clippings, paper or leaves will tend to layer up. Feeding different materials into a shredder simultaneously creates a fine mix of particle size that will substantially reduce the turning time required.

If purchasing a shredder-grinder, be sure to get a well-made one as the vibrations and stresses on the machine are tremendous. Since it is easier to take the shredder to the material than the other way around, be sure it is truly portable. Ideally a half dozen families can share the cost and use of such a machine, as it is so efficient it can grind several compost piles and have time to spare. There are also attachments for a rotary lawn mower that make it serve as a shredder for lightweight materials. Manually operated and electric shredders are available as well. Even a slightly re-plumbed garbage disposal can make tasty garbage soup for the microorganisms of the compost pile. If you are physically inclined, you can chop up all materials by hand and get some great exercise at the same time.

Sending the materials through an animal’s digestive tract, preferably a ruminant’s, works very well. You will have contented animals, but they seldom will leave the end results neatly on your compost pile. Poultry, especially vigorous chickens, can be penned on a compost pile and will do a great deal of work shredding, removing seeds and insects and enriching the nitrogen levels.

2. CONTAINERS, LAYERING AND FEEDING

Since compost is alive, it requires food. It needs a balanced diet. Anything that is biodegradable and non-toxic can be used. Exclude plastics, glass, synthetic fabrics, aluminum cans, metal, wax paper and inorganic materials. Less obvious are some organic materials that present certain problems for the rapid

breakdown of the pile. Contaminated materials such as grass clippings on that which various weed killers have been used should be strictly avoided. Grease, whole bones, chunks of meat can all slow the decomposition process and attract unwanted scavengers. A large quantity of soggy material, especially if it has a tendency to cake or layer, should be avoided. Fruit wastes can create a problem with fermentation and alcohol production. If materials are well mixed, applied in thin layers or pre-dried, there will be fewer problems. Obviously chunks of wood and the like are not going to break down in the time frame of a one-season compost pile, unless finely ground. Avoid wood ashes since they can affect the pH of the compost. The carbon that they contain will be of more benefit to future archeologists than to your garden. It is best also to avoid cat, dog, pig, and human solid wastes, primarily because of parasites and pathogens.

Primitive societies return their wastes to the land where it will renew the soil. Highly developed modern societies such as ours, which create a far greater variety of wastes than any non-industrialized society prefer to spend money to destroy or bury wastes rather than utilize them for some beneficial purpose.

Garbage, grass clippings, hedge and tree trimmings, leaves, weeds, sod, hay, straw, and manure are only a small portion of what can be used. Consequently, any area, even a manicured suburb, has enough organic material to make many compost piles. Municipalities find that they have more waste than they can handle. Many cities now have programs to deliver leaves and other compost materials to your door free of charge. The only drawback is that you can accumulate a lot of the same kind of material all at once. However, with a little imagination you can hunt for nitrogen-rich materials to mix in. Grocery produce departments sometimes have to pay to have their trimmings and imperfect food hauled away. The same is true of food processing plants, breweries, cabinet shops, dairies, etc. Some cities separate compostable and non-compostable garbage and the composting is done with large equipment in huge windrows. In these areas, reasonably priced compost is sold to the home gardener. There is, of course, a certain satisfaction of having assisted at the birth of your very own compost and in knowing exactly what went into it, especially when the alternative is to pay someone to haul it away.

3. LIVING COMPOST NEEDS MOISTURE

Too much water, however, will eliminate oxygen and drown the desirable organisms. The pile will stink. Water can also cool the pile, retarding the composting process. With too little moisture the microorganisms will not be able to break down the pile. Providing adequate water is not as difficult as it seems. Vegetable matter, manure and grass clippings all contain moisture. To ensure even moisture throughout the compost pile, layer or mix wet and dry materials. If you have an excess of dry materials, sprinkle it with a garden hose or better still expose the pile to a good rain. Ideally, the pile's material will be like a squeezed out sponge. Once the pile has been adequately moistened, you can cover it loosely with plastic. This will help preserve the moisture that the decomposing pile generates and protect it from excessive rains that tend to leach the pile and reduce its value. As a rule of thumb, if your compost pile starts to stink there is too much water and if it swarms with ants, there is too little. Your compost is alive, but with improper care it will contain life you don't want.

4. COMPOST ALSO NEEDS AIR

If you just leave the pile long enough, it will decay without the physical work of turning it. Turning, however, hastens the decaying process and maximizes the heat build-up. Left alone, the pile will tend to pack and give off ammonia, as the beneficial organisms suffocate. Aeration can be improved by placing a 4-5" length of plastic leach line vertically in the pile when building it.

Turning frequency varies. Some gardeners turn the pile every ten days. If the weather is cold, turning should be less frequent since the outside temperature will slow or stop the decaying process. On the other hand, if the pile starts to smell bad, it should be turned immediately. Normally, you turn after the first heat has peaked and then has dropped. Turn it before the internal temperature drops below 100° F to reactivate the pile and increase the heat to continue the composting process. Turning will also subject materials on the outside to the internal breakdown process. As the compost approaches maturity, it cools and becomes light and fluffy. While turning can be hard physical work, it is still easier than spading hard clay soil. A garden fork, square shovel and pitchfork are the handiest tools for the turning process. By undercutting the pile, you will get a thorough mix of materials and will also be able to break up the large chunks more easily.

5. LOCATION

For your convenience the pile should be located near the garden with easy access so that new materials can be brought in easily. The pile should be in a well-drained area to prevent the accumulation of foul puddles. A water source nearby is handy. If you are in a cold area, place the pile in the open for maximum sun warmth. On the other hand, if you area is hot or windy the pile will do best with some shade and windbreak. Give the pile a permanent location. The soil underneath will become a bank account of microorganisms ready to attack your pile. There was a time when compost piles and underwear were forbidden subjects. Gardeners are proud of their compost piles and are even beginning to flaunt them as status symbols.

6. A REMOVABLE CONTAINER MAKES IT EASIER TO WORK THE PILE

Freight companies often have oversized or broken pallets that can be had free or at a small cost. The slatted sides of the pallets also afford better oxygen exchange to the pile. The pallets can be supported with metal fence posts driven into the ground. Brace them adequately as great pressure will be exerted outwards. When you wish to work your pile, just unwire the pallets and remove them. An unsupported pile has a distressing habit of creating “miniature landslides.” A container also requires less space relative to the mass. When building bins, avoid any wood treated with pentachlorophenol or fresh creosote, as these materials are phytotoxic. If aesthetics or wood preservation is a concern, paint the pallets.

The ideal container would have three compartments side by side. When the main and largest container has gone through its first heating, the compost can be forked into the second and a batch of fresh material put in the first. When the time comes to turn the second bin into the third, the first should be ready to migrate to the second bin. Thus you can set up a continuous supply of the black gold through your composting.

7. MAKE IT BIG ENOUGH AND VARY MATERIALS

The major mistakes in building a compost pile are making it too small and putting in too much of one material at a time. A pile, which is less than three feet high and nine square feet, will not have enough mass to heat up properly. Excessively high piles can compact under their own weight and require frequent turning to maintain oxygen levels. Also a larger pile is more difficult to turn than a smaller one.

Compost needs a balanced diet. Lush green materials contain mostly water and nitrogen. Too much of these can make a layer of slime. Woody material tends to be very dry and high in carbon that necessitates more nitrogen. Use thin layers or start out with all materials evenly mixed. Six inches would be maximum for a layer, though too much for something like grass clippings. If weeds try to establish themselves on

your compost, the pile is too cool or it is ready to use. Weeds rob nutrients and water and should be pulled and composted.

There are many commercial activators available for starting a compost pile, but rarely are they necessary. Unless it is dead, the natural soil contains enough organisms to start the compost working. Ruminant manure is also rich in the necessary organisms. If you live in the city and your neighborhood disapproves of your cows or goats, kitchen garbage run through a blender will usually breathe life into your pile.

The carbon-nitrogen (C/N) ratio in the pile helps to determine the rate of break down. A ratio of 400:1 (sawdust) shows that for every part nitrogen, your pile has 400 parts of carbon. For starting the compost pile a ratio of 25:1 is ideal. Grass clippings at 19:1 or food wastes at 15:1 can be added to bring the ration in line. With more carbon the pile will be very slow to break down, and with more nitrogen ammonia gas will be lost and desirable organic matter can actually be burned out.

Nitrogen usage goes through a definite cycle. In the early stages the organisms voraciously collect and use it. As the pile stabilizes, nitrogen will begin to be released into the soil, and in the last stage as the organisms die and decompose, the nitrogen locked in their bodies will be readily available. It is important to have adequate nitrogen in the early stages of the process to get the pile working well. If the pile does not heat up and the moisture levels are correct, it probably needs more nitrogen.

The pH level in compost also creates some unnecessary worries for gardeners. Most plants prefer a slightly acidic (6.5) soil and compost naturally stabilizes at 7.0 or lower. Do not add lime until the compost is actually used. It is better not to try to fortify the compost during the breakdown process as the pure compost will be more versatile.

Follow these steps and enjoy your harvest of compost.

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