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In Your Garden:

Compost

By Bill Brandis

The word, "compost," refers to organic matter that has been broken down into a black earth-like substance by micro-organisms, mainly bacteria, actinomycetes, fungi, algae and protozoa, and also by macro-organisms such as millipedes, centipedes, mites, certain beetles, spring tails, sow bugs and earth-worms. Even if compost appears to be finished, the rotting process continues until it becomes humus—a stable, dark brown, crumbly material. Compost and humus together, make up the organic matter referred to in analytical soil test reports.

Compost and humus fulfil many beneficial functions in the soil and for plant growth.

- They create good soil texture by forming soil clusters that contain small water-holding cavities and air-filled spaces, allowing excess water to drain to the subsoil, and providing moisture and air to plant roots and organisms.
- They contain nutrients that are released slowly according to the needs of the plants, thus prohibiting the build-up of nitrogen in the plant.
- They modify or "buffer" the effects of high acidity or alkalinity, allowing "tied-up" nutrients, particularly phosphorus, calcium and magnesium, to become available.
- They activate micro-organisms that break down mineral particles and release nutrients.

The art of composting

The main elements in plant and animal refuse are carbon and nitrogen. Carbon is used for energy, causing the compost pile to heat up. Nitrogen is used by proteins, needed for reproduction, and released as a plant nutrient when the organism dies.

Common backyard garden composters are easy to use.

The ratio of carbon to nitrogen, the "C/N ratio," for optimum growth is about 30 (30 times as much carbon as there is nitrogen). For example, the C/N ratio of fresh manure is about 14, while that of sawdust is zero. Both will eventually turn into compost but at

different rates. As a general rule, "green" plant refuse (grass clippings, weeds, etc.) is high in nitrogen, while the "brown" matter (leaves, straw, etc.) is high in carbon. To create an appropriate C/N ratio in a compost pile, approximately equal volumes of green and brown materials must be layered and mixed. If green refuse is in short supply, nitrogen-rich fertilizer - preferably blood meal can be added. In home garden composting, both elements are usually not available at the same time. This can be overcome by storing bagged leaves from the fall and using them when green refuse becomes available in spring and summer.

Compostable kitchen refuse includes coffee grinds and filters, fruits and vegetables.

To kill weed seeds and disease pathogens, the compost must heat up to at least 55°C for several days. This is not possible to achieve merely by adding bits of kitchen waste; it requires a refuse pile of at least one cubic metre. Each gardener has his or her own composting method and I have mine. By saving green refuse, and having stored fall leaves at hand, I can create a large pile of compost in a single operation. It is then possible to create the necessary green and brown layers and mix in chopped material. A layer of brush at the bottom will improve air circulation from underneath. Add a shovel-full of soil between the layers to inoculate the mass with organisms or add a commercial accelerator according to the package directions. Add water to the dry, bagged leaves, and a final layer of soil on top to prevent the mass from drying out.

There are two kinds of bacteria: aerobic and anaerobic. Aerobic bacteria require oxygen to break down sugars for energy, thus releasing carbon dioxide and water. Anaerobic bacteria, on the other hand, do not use air in metabolism but are far less efficient. When air supply is diminished, anaerobes take over and produce the very foul smelling products of ammonia, methane and alcohol. If the compost begins to smell, simply stirring it up will disturb the production of the anaerobes by exposing them to air.

Systematic building of the pile is necessary if compost is needed in short time, and if weed seeds and disease pathogens have to be killed. If the whole composting process seems too laborious, or if time is not a factor, refuse can just be added to the pile and eventually it will become compost; this can however, take up to two years to accomplish. On the other hand, if the C/N ratio and moisture levels are right, if the mass is turned every few days, and if the pile is large enough to develop internal heat, the compost will be ready in a month. If refuse is added regularly and no turning is done, the completed compost material will be at the bottom. With a container, it is then simple to lift the compost, move it to the side of the pile and stir the incomplete material back into it. The completed compost is what remains and is then ready to use.

There are other ways of making compost that require less work:

- Sheet composting: green and brown matter is spread on the surface and dug or roto-tilled into the soil;
- Mulching: spreads the material around the base of plants without incorporating it;
- Trench composting: material is buried in narrow trenches.

If the material used above is mainly brown, bacteria will rob the soil of its nitrogen, limiting the amount available for plant nutrition. As a result, extra nitrogen may be required.

Worm composting can be carried out on a balcony or indoors. A special variety of worm-redworms also called red wigglers or branding worms—is to be used. Kitchen waste can be composted easily.

Compostabte kitchen refuse includes coffee grinds and paper fitters, fruits and vegetables.

The organic material that passes through the worms several times makes their castings richer in nitrogen compared to regular compost. It is important to remember that the worms are unable to survive extremes of hot and cold, so location must be carefully considered.

If the amount of available finished compost is limited, it should be spread thinly over the surface of the soil not necessarily to increase the organic matter, but rather to inoculate the soil with living organisms to improve the biological processes. It should be recognized that

the number of bacteria in a teaspoon of compost is greater than the population of the entire world!

In conclusion, a word about peat moss. For decades, peat moss has been used as a soil amendment. It does improve the soil texture physically but not biologically. While increasing the ability of the soil to retain water, it contains no micro- or macro-organisms and no plant nutrients. It increases soil acidity, which is probably desirable only for rhododendrons, blueberries and other acid-loving plants. Environmentally, peat harvesting in wetland bogs is disastrous to the plants and animals in that environment, of which many are classed as endangered. Several decades ago, peat moss was the only available soil additive. Now, however, triple mix - a combination of compost, rotted manure and topsoil - is a much better substitute. Triple mix is available in bags from the nursery and can be delivered in cubic-metre bales.

Redworms and equipment for indoor composting are available from Natural Insect Control at 905-382-2904 or e-mail nic@niagara.com.

For general information on all gardening concerns, call the RBG Gardening Information line at 905-527-1158 ext. 226 or 1-800¬694-4769 or e-mail at grow@rbg.ca.

About *Pappus* Offprints

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