



Backyard Gardening

Composting and soil

Backyard Gardening

- Thanks to the Athens Foundation for funding this project as well as:
- The Amesville Grange 798
- Village Productions

Why organic gardening?

- Pesticides/herbicides can leach into water
- Chemicals can combine to potentiate
- Chemicals can kill helpful insects
- Traditional gardens increase erosion
- Eutrophication

Organic gardening

- Has three legs to its foundation:
- QUALITY NUTRITION: SOIL/COMPOST
- BIODIVERSITY: PROPER VARIETIES
- TECHNIQUES: WATERING, MULCHING, PEST CONTROL, TIMING



Start with the soil...

- Soil is the foundation for plant nutrition
- It is alive
- It has particles:
- Clay, minerals, sand, organic matter



What plants need from soil...

- Plants need nitrogen, potassium, phosphorous, and other minerals
- Plants extract water
- Roots need air
- Plants need neutral pH



Organic soils are alive...

- Soil improvement can be achieved by:
- Adding compost
- Loosening soil
- Mulching
- Crop rotation



Composting

- Decomposing organic materials:
- Leaves, kitchen scraps, grass, manures, etc
- Process is speeded by balancing nitro-carbon ratio and keeping moist



Composting

- Composting is a process that allows naturally occurring microbes to convert yard waste, such as leaves and grass clippings, to a useful organic soil amendment or mulch. Gardeners have used compost for centuries to improve the physical condition of soil and to add some of the nutrients needed for plant growth. Incorporating compost into light, sandy soil helps it hold both moisture and nutrients, while adding it to heavy soil improves drainage.
- To produce compost efficiently from yard waste several conditions must be met. The micro-organisms responsible for decomposition need oxygen, water, and nitrogen. Particle size also affects efficiency. The smaller the plant pieces, the more rapidly they will break down. Use a shredder or power mower to chop up leaves and small twigs before adding them to the pile.

Composting

- To save space, keep your yard looking neat, and speed composting time, plan to contain your compost in some type of structure. Typical dimensions of a compost pile are 5' x 5' x 5'. Simple bin-type structures can be built from woven wire fencing and metal posts. More permanent and elaborate structures can be made from rot-resistant wood, wire, and metal posts.



Composting

- Many organic materials can be composted besides grass and leaves: non-woody shrub trimmings or twigs less than 1/4 inch in diameter, faded flowers, weeds, leftover plants at the end of the gardening season, lake plants, straw, coffee grounds, eggshells, fruit and vegetable scraps, shredded newspaper (black and white print), small amounts of wood ash, and sawdust. Sawdust requires the addition of extra nitrogen; wood ash raises compost alkalinity and may result in nitrogen loss from the pile.
- There should be little need to compost grass, since clippings may be safely left on the lawn if you mow regularly and remove only 1/3 of the blade length each time. If you do compost grass, mix it with other yard waste. Grass clippings, alone, pack down and restrict airflow which limits the availability of oxygen that is needed for decomposition.
- Some things should NOT be composted. Pet feces can transmit diseases. Meat, bones, grease, whole eggs, and dairy products attract rodents and other animals. Badly diseased or insect-infested plants and weeds that are loaded with seed may not heat up enough to be rendered harmless.

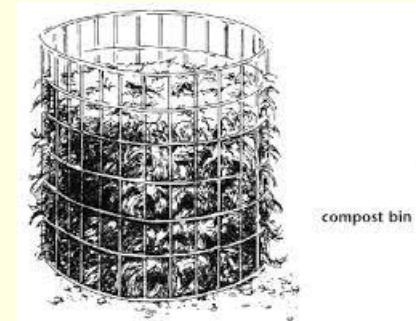
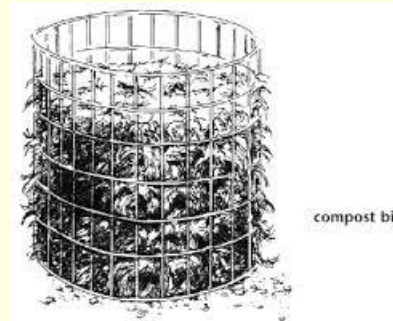
Composting

- Build your compost pile in layers. Begin with eight to ten inches of leaves, grass, or plant trimmings. Water it to the point of being moist, but not soggy. Then add a nitrogen source, such as ammonium nitrate, ammonium sulfate, or an inexpensive high nitrogen lawn fertilizer without herbicide.
- Sprinkle the pile with $\frac{1}{3}$ to $\frac{1}{2}$ cup of fertilizer per 25 square feet of surface area (a 5' x 5' bin). If you live in a rural area and have access to livestock manure, you can use a two-inch layer of manure as your nitrogen source. You may choose to add a one-inch layer of soil or completed compost over the nitrogen to increase the number of decomposing microbes in the pile. However, most leaves and plant scraps have enough micro-organisms to get the job done without the addition of soil or compost. Repeat these layers until the pile reaches a height of five feet, watering each time you add new layers.



Composting

- An active compost pile will heat to somewhere between 130° and 160° Fahrenheit. As the center cools, turn the pile to help speed decomposition and minimize any objectionable odors. You will need to do this once or twice a month. Continue to water your compost pile periodically to keep it moist but not soggy. You can add a little fresh material when you turn the pile, but generally, you're better off beginning a new pile.
- A well-managed compost pile will be ready in two to four months in the warm season, whereas an untended pile will take a year or more to decompose. When completed, your compost pile will be about half its original height, and will have a pleasant, earthy smell.



Soil development

- The *living* portion of soil is made up of plant roots, and of the numerous microbes and other living organisms that improve soil structure by breaking down organic material.
- The *recently dead* components include deceased soil organisms, green plant material and fresh manures. They decompose readily, and release nutrients quickly.
- The *very dead* portion is humus, the final residue of organic matter breakdown that's important for soil structure and disease suppression.
- For fertile soil, all three forms of organic matter should be present at all times.



Soil development

- **Plant cover crops.** Growing cover crops is perhaps the most valuable strategy we can adopt to feed our soil, build up its fertility and improve its structure with each passing season. Freshly killed cover crops provide readily available nutrients for our soil microbe friends and hence for food crop plants. Plus, the channels opened up by the decaying roots of cover crops permit oxygen and water to penetrate the soil.
- Legumes (clovers, alfalfa, beans and peas) are especially valuable cover crops, because they fix nitrogen from the atmosphere into forms available to crop plants. Mixes of different cover crops are often beneficial. For example, in mixes of grasses and clovers, the grasses add a large amount of biomass and improve soil structure because of the size and complexity of their root systems, and the legumes add nitrogen to help break down the relatively carbon-rich grass roots quickly.



Soil development

- **Cover the soil with mulch.** An obvious way to keep the soil covered is to use organic mulches. Some people advise against using high-carbon materials such as straw or leaves, since soil microbes “rob” available nitrogen from the soil in order to break down the excess amounts of carbon. This is only true, however, if we incorporate these high-carbon sources into the soil. I once tilled in some coarse compost containing large amounts of oak leaves not yet fully decomposed, and found that crops grew quite poorly there the entire season.
- However, if high-carbon materials are laid down *on top of soil* as mulches, there won't be any problem. The mulch retains soil moisture and protects against temperature extremes. Microbes, earthworms and other forms of soil life can “nibble” at the mulch, and slowly incorporate their residues into the topsoil. Actually, high-carbon mulches are preferable for weed control to materials that decompose readily, since they persist longer before being incorporated into the soil food web. (Every gardener who has used mulches knows the story: You put down a thick layer early in the season, then suddenly one day notice — the garden ate my mulch!) Even so, it is usually necessary to renew mulches that are in place for the entire growing season.

Soil development

- **Try low-tech tillage.** There are almost always better alternatives to tillage, especially power tillage, which inverts and mixes the different layers in the soil profile, disrupts the soil food web and breaks down the “crumb” structure we have worked so hard to achieve. Even in the case of cover crops, which must give way to the planting of a harvest crop, it is not necessary to turn them into the soil, as usually recommended.



Soil preparation: raised beds

- Raised beds offer; 1) Deeper soils, 2) Hold moisture, 3) Easier to work in wet weather, 4) Limit erosion, 5) Easy to weed



The benefits of gardening

- Is an enjoyable form of exercise.
- Increases levels of physical activity and maintains mobility and flexibility.
- Encourages use of all motor skills – walking, reaching and bending – through activities such as planting seeds and taking cuttings.
- Improves endurance and strength.
- Helps prevent diseases like osteoporosis.
- Reduces stress levels and promotes relaxation.
- Provides stimulation and interest in nature and the outdoors.
- Improves wellbeing as a result of social interaction.
- Provides nutritious, home-grown produce.

Americans and veggies...

- Most consumed vegetables: potatoes, tomatoes, beans, peas, lettuce
- Most nutritious vegetables: collards, kale, beets, carrots, spinach, chard, broccoli



The yields...

