

# The “Dirt” on Soil

*The Basics of Soil and Soil Amendments*

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Soil is perhaps the most important factor of success in the garden. This fact sheet will cover what you need to know about soil and how to alter the soil to your, and your garden's, advantage.

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Here are some terms you need to be familiar with:

**Clay:** the smallest soil particle, has high capacity to absorb nutrients; clay soils are poorly drained

**Sand:** the largest soil particle, has low capacity to absorb nutrients; sandy soils are extremely well drained

**Silt:** soil particle larger than clay but smaller than sand

**Soil Texture:** the relative content of particles (sand, silt and clay)

**Soil Structure:** how the soil particles are arranged

**Loam:** describes soil that has a relatively equal content of clay, silt and sand; loam soils are well drained and are desirable for most plants

**pH:** basically, the measure of the acidity (a pH of less than 7.0) or alkalinity (a pH of more than 7.0) of the soil; most plants prefer a slightly acidic soil; the pH affects the availability of nutrients to the plants

**Fertility:** the measure of available nutrients in the soil

**Organic matter:** matter derived from living organisms

Soil is approximately 25% air, 25% water, 5% humus (decaying organic matter on the soil surface), and 45% sand, silt or clay particles.

Soil *texture* is nearly impossible to alter, so management techniques focus on changing the soil *structure*.

## Evaluating soil

Finding a soil type that is ideal for you takes a little research. Once you have a soil test done from your garden site, you will know the current makeup of your soil. Deciding what you want to grow and researching what requirements those plants have will let you know how you need to amend the soil.

### *Soil texture:*

Most soil in central Ohio is clay (that is, there is relatively more clay than silt and sand particles). This is hardly ideal; we need to utilize techniques that loosen the heavy soil, increase the soil's ability to take in water and air, and as a result increase the quality and quantity of our harvest (be it food or flowers).

### *pH:*

Most plants like a slightly acidic soil, somewhere between 6.0-6.5. If the pH isn't in the desirable range, nutrients that do exist in the soil are not able to be absorbed into the plants. However, some plants prefer different pH levels, so be sure you understand the requirements of the plants you choose.

## Amending Soil Step-by-Step

### 1. Soil Test

The very first step is to have a soil test done. Many agricultural labs provide soil-testing services to the general public.



Lead contamination is a concern when growing food plants. Lead poisoning is one of the most common pediatric health problems in the United States. Lead in the soil can come from lead-based paint, leaded fuel emissions and industrial sites. Be sure your soil-testing agency provides information on lead content. Keep in mind that if lead is at a dangerous level in your garden site that you can still garden there, but you **must** take certain precautions (such as using raised beds or growing only ornamental plants).

2. pH

Your soil test will let you know the pH of the soil, and may make recommendations on lowering or raising the pH, depending upon what you want to grow. Lime can be added to raise the pH if the soil is too acidic (this doesn't happen too often in central Ohio). pH can be lowered by the addition of organic matter and/or using certain chemicals.

3. Fertility

The soil test will give you an analysis of the nutrients and minerals present in the soil. Any deficiencies (needs) can be corrected by the addition of organic matter and/or using chemical fertilizers.

4. Drainage

Water should drain from a garden within a few hours after rainfall or watering. If your garden site is poorly drained, you can correct the problem by installing 4" drainage tiles two feet below the surface. You may also want to explore other options, including building raised beds.

5. Adding Organic Matter

The best thing you can do for your soil and garden is to add organic matter. OM loosens heavy clay soil, helps sandy soil hold water and nutrients, provides nutrients to plants and soil microbes, makes soil easier to work, increases the soil's ability to take in water and air, and increases the quality and quantity of harvest.

OM comes in many forms. Compost, Com-Til (available from the City of Columbus), peat moss, sawdust, wood chips, composted manures and cover crops are all examples of OM. When adding OM to the garden apply 3-4 inches and till under to a depth of 8 inches.

6. Cover Crops

Planting cover crops such as rye, buckwheat and clover can have several benefits to your garden. Cover crops control weed growth, prevent soil erosion during winter and early spring, absorb nutrients from the soil to prevent leaching by melting snow and rain, aerates soil and improves water movement thru the soil and adds organic matter and nutrients to the soil when turned under.

Sow cover crops in the fall (read seed labels for exact requirements).

Cut back or till under before the plants set seed.

Turn under at least two weeks prior to planting. The soil becomes very active with microbial life at first and therefore too "hot" for new plantings.

7. Composting

Composting is a great way to recycle waste and provide the best available soil amendment for your garden. Composting techniques vary, so you just need to choose the one that is right for you.

8. General Soil Preparation Hints

- ✓ Do not turn the soil when it is too wet! This can do irreparable harm to your soil. Use the "squeeze test" to determine if the soil is dry enough to turn. Grab a handful of soil and squeeze it into a ball. If the soil remains intact, it's too wet to turn. If the soil crumbles when released the soil is ready to turn.



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- ✓ Have a soil test completed every two-three years.
- ✓ Add plenty of organic matter.
- ✓ Use raised beds where compaction or drainage is a problem.
- ✓ Ideally, you should loosen/turn the soil 8-10 inches deep for annual plantings; turn 12-16 inches deep for perennial plantings.
- ✓ Modify the soil to meet the needs of specific plants.
- ✓ Mulch to conserve moisture and moderate soil temperatures.
- ✓ Use cover crops in the “off” season.
- ✓ Rotate crops yearly.

### **Sources and Further Readings**

*Secrets to Great Soil: A Grower's Guide to Composting, Mulching, and Creating Healthy, Fertile Soil for Your Garden and Lawn*, by Elizabeth P. Stell, 1998, Storey Books.

*Start With the Soil: The Organic Gardener's Guide to Improving Soil for Higher Yields, More Beautiful Flowers, and a Healthy, Easy-Care Garden*, by Grace Gershuny, 1997, Rodale Press.

*The Sustainable Vegetable Garden: A Backyard Guide to Healthy Soil and Higher Yields*, by John Jeavons & Carol Cox, 1999, Ten Speed Press.