IMPROVING SOIL

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Soil is made up of organic matter, water, air, and minerals. The mineral portion is by far the largest and contains varying amounts of sand, silt, and clay.

Sand particles are largest. They feel abrasive or gritty. **Silt** particles are smaller and feel silky when wet. There is still a bit of grittiness in silt. **Clay** particles are very small and feel sticky when wet.

Most soils are a mixture of sand, silt, and clay. You can determine your predominant soil type by sending a sample to the University of Minnesota, or by trying a simple test at home. Fill a clear glass 1/3 full with soil. Add water to within 1/2" of the top. Stir well and set aside. The soil will settle out in three layers with sand on the bottom, silt in the middle, and clay on top. You can then see the proportion of each type of mineral in your soil.

Silty to slightly sandy soil is preferred in most gardens. This type of soil can be dug easily, holds water well but drains adequately, retains nutrients for an appropriate length of time, and has enough pore spaces for good air circulation.

How do you improve clay or sandy soil? It seems logical that you would add the opposite of what you have (i.e., incorporate clay into a sandy soil). Unfortunately, the scale of that type of project makes it impractical. A 400 square foot garden would need over 2 tons of clay to make just a 20% change in the texture of the soil!

Luckily, there is a much easier way to improve soil - add organic matter. Organic matter, such as compost, well-rotted manure, or peat moss, will benefit all kinds of soil. Organic matter helps sandy soil retain more water and nutrients. On the other hand, it helps break up the tight spaces between tiny clay particles and thus aids drainage and air circulation in clay soils. Organic matter is also a nutrient source and encourages earthworm activity. Peat moss should be soaked before use so that it is damp at time of incorporation.

Thoroughly incorporate amendments into the native soil. Do not just layer a few inches of "good black dirt" on top. That would set up a sharp interface of soil types that roots can't easily penetrate. Do not work clay soil when it is wet (unless you are *trying* to make concrete!). In most cases, the soil should be worked to a depth of 8"-12".

Although the formula will vary with your particular soil, a good rule of thumb for the average garden is to add 40 lb. of manure and 3 cubic feet of peat moss for every 150 square feet. Incorporate 1"-2" of compost into the top 6"-8" of soil.

Another aspect of soil to consider is pH. This is a measure of acidity or alkalinity. Most soils in this part of Minnesota tend to be alkaline. You can send a soil sample to the University or do the testing yourself with a kit purchased at the garden center. Most plants like neutral (7.0) to somewhat acid soil (about 6.5). To make alkaline soil more acid, add peat moss and/or some type of sulphur (iron sulphate, aluminum sulphate, soil sulphur). Do not apply sulphur when temperatures are above 80 degrees. To make acid soil more alkaline, add lime. Lime and sulphur do not permanently change the pH. Retesting and reapplication will be necessary from time to time.

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