

Wood County Clay Soils

<http://www2.wcoil.com/~rfrobb/hoytville3.html>

<http://www.bachmans.com/tipsheets/Soils/WorkingWithClaySoil.cfm>

Working With Clay Soils

Just what is clay soil and why does it matter? Actually, just what is soil anyway? It's a combination of sand, silt, clay, minerals and organic matter that also contains some air and water. Clay soils are sometimes referred to as heavy soils and sandy soils are called light. To be classified as clay soil, it should be made up of about 50% clay particles, the finest particles found in soil.

As far as the gardener is concerned, clay soil can cause a number of problems. On the positive side, clay isn't necessarily all bad. It has good moisture and nutrition retention. But that same "good" moisture retention can also be a problem. Clay soil drains slowly. So, as snow melts and rains set in, clay soil tends to remain saturated long after average or sandy soils have drained. It is also much slower to warm up in spring. Clay compacts easily making it hard for the roots to penetrate, resulting in stunted root systems. With clay soil, there are often problems with frost heave and root damage as the soil freezes and thaws during changing weather. More often than not, clay soil is alkaline (has a high pH) and that can be hard on plants too. And worst of all, the stuff is heavy, sticky and hard to work!

Testing Your Soil Texture

Knowing just how much clay is in your soil can be confusing. And it can vary in different parts of your yard. This is especially true in areas of new construction in suburbs in our area. Too often the subsoil is heavy clay that has been severely compacted by heavy equipment. Then, as if it undid all that damage, a layer of top soil is spread over the compacted clay. If you're lucky, this layer may be a foot deep. More likely, it will only be a few inches. It is important to know if this is the situation since it will affect the drainage and the rooting of the plants. Because soil types aren't always consistent around the yard, it's a good idea to test several samples. Since the clay layer may not be very deep (or there may be a layer of clay hidden beneath a layer of lighter top soil) it is also a good idea to check for drainage with a percolation test.

There are several easy, inexpensive ways to determine just what type of soil you have. First, take a handful of moist soil and feel it. Rub some between your fingers. Sandy soil is rough and gritty and breaks up easily. Clay soil is sticky and feels like plastic. Silt is the middle ground, with much smaller particles than sand and it feels slippery when wet. A heavy clay soil will form a solid lump that is difficult to crumble when it's squeezed together. It's hard to get sandy soil to form a lump and it easily crumbles. Another easy way to check the soil is with a quart jar filled about half way with a sample of your soil and then topped off with water. If you have it, add a teaspoon of Calgon. Put the lid on the jar and shake it energetically until everything is swirling around. Then set it aside and let it settle until the water clears. The sand particles are the heaviest and they will settle to the bottom within a few minutes. Within an hour or two, the silt will have formed the next layer. The fine clay particles will finally settle, but it may take a day or so. Organic matter may remain floating around on the top. Looking at the layers, you can now see, comparatively, just how much sand, silt and clay make up your soil. If the clay layer makes up half or more of your sample, you have a heavy clay soil. Soil that is equal parts of clay, silt and sand is called loam. Sandy soils have very little clay.

The best way to do a percolation test is to dig a hole about 2 feet deep and a foot wide. Fill that hole with water and let it drain completely. Now fill it again and keep track of how long it takes to drain. If it drains in less than 12 hours, the soil should be able to support plants that require well-drained soil. If it takes 12-24 hours to drain, the soil is best suited to plants that tolerate heavy or clay soils. If it takes more than 24 hours for the hole to completely drain only trees that withstand occasional flooding will survive.

Options for Dealing With Clay Soil

What can you do if you have clay soil? The first option is to decide whether to work with it as it is or try to change it. The easiest and best course of action is to simply select plants that are suited to such a site. There are quite a few attractive landscape plants that do well in clay soil. The following list indicates some of the best trees and shrubs for clay soil, but it is important that their other needs be met too (sun/shade, acid/alkaline, well-drained/moist).

Trees Best Suited To Clay

Norway and Silver Maple
Ohio Buckeye and Horsechestnut
River Birch
Hawthorn
White, Black and Green Ash
Common Honeylocust
Kentucky Coffeetree
European Larch and Tamarack
Apples and Crabapples
Aspen and Cottonwood
Bur Oak and Eastern Pin Oak
Swamp White Oak
Willow
Lindens
Elms

Shrubs Best Suited to Clay Soil

Chokeberry
Siberian Peashrub
Redtwig Dogwood
Russian Olive
Forsythia
Honeysuckle
Ninebark
Potentilla
Alpine Currant
Willow
Snowberry
Lilac
Arborvitae
Arrowwood and Nannyberry Viburnum
European and Highbush Cranberry Viburnum

Other Trees That Tolerate Clay

Balsam and White (Concolor) Fir
Freemani, Red and Amur Maples
Gingko
Black Walnut
Norway and Black Hills Spruce
Austrian, White and Scotch Pines
Japanese Tree Lilac

Other Shrubs That Tolerate Clay

Serviceberry
Barberry
Pagoda Dogwood
Diervilla
Winged Euonymus
Winterberry
Junipers
Sumac
Rugosa Roses
Spirea

Planting and Care Tips for Clay Soil

There has been a lot of research done on the best methods for planting in clay soils. Before you dig the hole, examine the plant. Carefully remove enough soil from the top of the roots to find the root flare on the trunk of the plant. This is the spot where roots start growing out away from the trunk. Sometimes it will be an

inch or two (or even more) below the surface of the soil in a container or ball. It is very important that the root flare be located. It should be at or just above the surrounding soil level when planted. (Large B&B plants should be planted 2-3 inches above the adjacent soil level, smaller container plants should be planted 1-2 inches above the adjacent soil level.) Measure from the root flare to the bottom of the root mass and dig the hole just that deep. Do not disturb the soil any deeper or the plant may settle lower after it is planted. The hole should be at least twice as wide as the root ball and the hole should be shaped like a large bowl, gradually getting shallow towards the edges. Avoid straight sides on the hole and be sure to rough up the surfaces. Another important recommendation is to avoid drastic changes in soil type. It is best to fill back this hole with the same soil you removed from the hole. Soil amendments can mixed into the top 6 inches surrounding the planting hole.

What about adding gravel in the bottom of the planting hole? This is an old practice that needs to go away. The University of Minnesota has done extensive research on this concept and found that adding gravel to the bottom of a planting hole or container actually makes the problem worse. It forms what is called a perched water table and makes the soil above the gravel hold even more water. So save that gravel for some other project. Don't throw it into the hole!

When working with clay soils, avoid automatic watering systems, especially those designed for turf grasses. Landscape plants in clay soils are often drowned by automatic watering systems. Always check to see if the plant needs water before doing so. Check a few inches below the soil surface. The top may be dry, but it could still be wet enough down where the roots are. Keep in mind that the newly disturbed soil around the plant is loose and will hold more water than the surrounding area.

Another tip that helps landscape plants in clay soils is to plant early in the season so they will have adequate time to send out new roots before the ground freezes in fall. Also, organic fertilizers are best for clay soil.

Amending Clay Soil

Unfortunately, many of the other plants that we want to grow will either struggle or fail to survive in clay. So the next option is to make changes to the soil. If you opt to change and amend the soil, it is very important to understand that it will take lots and lots of the right type of amendments. Just adding a bag or two of sand or manure will only make the situation worse. The key to amending clay soil is to amend a large area and use enough coarse sand and coarse organic matter. Avoid trying to change a small area. Plants will have a difficult time making the transition to the surrounding clay soil, effectively limiting their growth to the amended area. And again, remember not to work clay soils while they are wet.

Two of the best amendments for clay soil are coarse sand and coarse organic matter. Coarse sand is also sometimes called builders' sand. The particles are relatively large, especially when compared to the finer sands used for sandboxes and such. The fine sands may actually make your problem worse. There are lots of types of organic matter available for gardening but not all of them will help improve clay soil. It needs to be coarse. Avoid fine-textured material such as peat moss or the packaged manures. If possible, find a source for a coarse compost or manure. Check with your city to see if they have a compost site for leaves and such.

How much? And how? First, calculate the area you are amending. Length x Width = Square Feet. Ideally, you should use equal parts of coarse sand and coarse organic matter to amend the soil, but extra sand can be used if necessary. You will need to cover the area with a 3-4 inch layer of organic matter and a 3-4 inch layer of sand. Bagged products won't be practical, since they usually hold a half cubic foot or less and would only cover a couple of square feet. Look for a source of bulk material. It will probably be measured by the cubic yard (27 cubic feet). The general rule of thumb is that one cubic yard will cover approximately 100 square feet with 3 inches of material. One hundred square feet may sound like a lot of space, but that is only a 10' by 10' area. A mature tree's roots can fill many times that area. First spread the organic matter over the area to be amended and work it into the top 6 inches of the soil. Next spread the sand over the clay/organic matter layer and mix it in. A tiller works well for this task. If you don't own one, they can be rented.

Check the pH and texture of any amended soil on a regular basis to see how it is changing. The organic matter will decay and seem to disappear. Since clay soils tend to be naturally alkaline and the decaying organic matter will slowly acidify, it will be important to have the pH tested to check its continued suitability for the plants you are growing.

Soil Conditioners and Gypsum

There are several products called soil conditioners or clay conditioners. These products are new to the gardening market and sound promising. Most of them are only practical for small areas. The jury is still out on just how helpful these products are, but we encourage you to give them a try and let us know how they worked for you.

Gypsum often comes up when discussing clay soils. Gypsum is a mineral product similar to lime. Lime is calcium carbonate and gypsum is calcium sulfate. Billed as an amendment that will help improve soil drainage, it isn't clear whether it is very effective in our soils which are already very high in calcium. Gypsum

has been used effectively in areas where the soil is very salty. The sulfate part of gypsum will also help to slightly acidify the soil.

Additional Bachman's Information Sheets

Planting Guide for Trees and Shrubs

Understanding Your Soil

Soil pH

Acidifying Soil

Landscape Plants for Special Situations

Recommended Products

Quality Tools and Gloves

Soil Test Kits

Coarse Sand