Soil Types and Root Health

We have two basic soil types in the Tallahassee, FL area. Our soil is either sand or clay or some combination. In the red hills we might have sandy or sandy loam topsoil over red clay. Often the topsoil has been eroded or removed and the clay is on the surface. The clay is rich in nutrients but does not drain. In the coastal plain area we have several sandy types of soil. There old sand dunes which might be deep and very well drained. Sometimes the soil has enough clay to be nutrient rich but is often washed quite clean. There are high water table flatwoods soils requiring extensive earthworks to raise most trees high enough above the water table. And we have sand over limestone karst terrain. I often ask about soil so I can recommend a rootstock. Many people have some idea of their soil type, but many just say dirt. I don't know what that means. I assume they mean topsoil with organic matter, or they have no idea. Topsoil is very thin in this warm wet climate. It is never deep enough to be well drained to the planting depth of potted plants. It is necessary to figure out what your soil is so you can plant properly.

Clay Potting

Unfortunately most local gardeners, landscapers, nurseries, and other seemingly knowledgeable folks tell people to dig a big hole and add organic matter. Digging a hole in clay and planting youe tree in a bucket is called clay potting. People think a bigger hole will work. Any hole is the problem. Even a 50 foot deep hole in clay will fill up with water. We get five feet of rain per year. You can't **see** it below the soil's surface, but that hole fills with water and drowns the roots. The organic matter starts decomposing and removes all the oxygen. Then the anaerobic organisms decompose the tree's roots. I have seen this too frequently in Tallahassee. The rest of the world seems to understand the well drained soil concept a little better. I naively followed this advice and killed many trees in my youth. I learned about well drained soil and planting on mounds from gardening books intended for the country as a whole. Florida gardening books forget that Northern Florida has continental soils. You have to plant on mounds of well drained soil. At my farm in Quincy I can scrape up enough sandy topsoil for planting mounds. Sometimes you have to bring in sand. I prefer mounds to boxed raised beds, but either works.

Organic Matter

The recommendation to mix in organic matter is not as unwise as clay potting but is not the best either. Modern research has shown that trees grow when a natural soil profile is retained. That means fill the planting hole with native soil. If there is a distinct topsoil and subsoil layer, then put each type at the corresponding level. Any compost, mulch, or so called "good soil" should be spread on the soil surface away from the trunk. The mulch goes on top. This is the same as natural soil in forests and what trees have evolved for. Be careful to keep the mulch away from the trunk. It may cause stem rot. You put the fertilizer and compost outside the planting hole to encourage the roots to grow into the soil to reach it. This is what is meant by established. The tree becomes established when it grows roots well into the surrounding soil. Bananas and figs like heavy layers of compost and mulch.

General Planting

Plant in well drained soil. If needed, plant on a mound or raised bed. Mulch any slopes. Spread fertilizer, compost, and mulch around the tree to encourage the roots to reach out for nutrients. A tree is stronger and more healthy with a good foraging root system. Dormant deciduous trees may do better planted bare root. You won't need a mound because there is no void to collect water. Even a potted tree can be bare rooted. Shake the potting soil off and spread the roots. It is good to get a soil pH meter. Adding pine bark mulch or sulfur will increase acidity lowering pH. Lime or wood ashes raises pH.

Charcoal/Biochar/Terra Preta

Ancient Amazonian farmers learned to improve their highly weathered, acidic, and infertile soil by adding charcoal ,fish bones, ashes, broken pottery, and compost. They must have had an industry making this mixture. The scale and amount produced is too big for these soils to simply be a waste product. Unless the population was larger than we think. We now understand the chemistry of these materials. The charcoal helps clay to drain, holds water in sandy soil, and stores nutrients that might otherwise wash away. Microorganisms take nitrogen from the air and make it available to plants. Plants can get the nutrients from the charcoal but water can't wash it away. The compost does most of these things, but it decomposes and disappears. The charcoal lasts for millennia at least. Barbeque charcoal is not good for the soil. Biochar or agricultural charcoal has to be cooked at a different temperature. The volatiles have to be cooked off, but the carbon chains can be degraded by high temperatures. Some species like pears have vigorously foraging root systems and do not need fertilizer or biochar in our area.

Soil Ecosystem

The soil ecosystem is very important. It is best to not disturb it as much as possible. I recommend cover crops like perennial peanut , clover, alfalfa, warm and cool season grasses, and other good forage crops. I like grazing critters in orchards. It is best to spread amendments on the soil surface and let nature incorporate it into the topsoil. I would spread amendments between trees and keep mulch away from the trunk.