

Planted Tank Soil Substrate

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By Karen Randall

Q. I read with interest your recent article on setting up a plant/fish tank for your child's classroom. I've been working with our church school kindergarten to do just that. We are trying to move beyond tacky colored gravel and bubbling clam shells.

You mentioned a soil/laterite substrate in your article. What sort of top soil did you use? I am familiar with laterite and use it in my tanks, but have always been hesitant about putting soil in the bottom of the tank. Was it sterilized, screened, commercial or from your backyard?

A. Congratulations on your work with your classroom tank. You will be amply rewarded when you see how much the children get out of a more natural tank.

The subject of soil substrates is a "muddy" one! There are a lot of different variations of "soil." It can range from pre-bagged potting soil, which is really mostly peat, to whatever can be dug up in the backyard. Many of these substances are potentially useful, but they also range from difficult to manage to potentially toxic. For these reasons, I strongly urge those who are just starting with planted tanks to use commercially available laterite or other substrate additives produced specifically for the aquarium trade.

That said, many aquatic plants do grow better (bigger and faster) in a soil substrate. For the experienced aquatic gardener, soils can help grow some more difficult plants. Because some soft-water plants have trouble with the uptake of nutrients in harder water, soil substrates can also give plants a boost when conditions are not optimal.

Here are some guidelines for choosing a soil substrate if you do decide to experiment. First, you need to experiment. For any new soil source, first try it in a small tank, or, even better, do initial tests in pots that can be easily removed from the tank if necessary. Some aquarists choose to purchase either top soil or earthworm castings from a garden source, and others use potting soil, but keep in mind that the heavy organic load of the undecomposed peat can create low-oxygen conditions under some circumstances. If you choose potting soil, avoid any that contain fertilizers or perlite (which floats). If you decide to try digging your own, choose a site that is far from any source of contamination from pesticides, fertilizers or road wastes. And dig below material on the surface.

Start your tests with only small amounts of soil worked into the bottom third of the substrate. You can always increase the ratio of soil to gravel in subsequent tanks. Too much soil in the substrate (depending on the particular soil) can cause strongly anaerobic (no oxygen) conditions or lead to toxic conditions in the substrate, and even leach toxins into the water or leach enough nutrients into the water to cause algae problems. Only after at least six months to a year do I reach the point where I am comfortable using a test soil loose in the substrate of a large display tank. Testing is important — even potting soils vary tremendously from one brand to another.

The safest way to use soils in a display tank so it looks good all the time is to use soil in pots only for those plants that really need it. In my tap water, I cannot grow *Rotala macrandra* at all without soil. I keep it in pots that can be hidden behind other plants.

I use 3- to 4-inch diameter clay pots. Place a small stone in the bottom to cover the drainage hole, then fill the pot two-thirds full with soil. Cap the soil with an inch or so of plain fine gravel.

In the classroom tank, I did use soil in the substrate, but it was from a source I had used many times before. I also used a smaller amount of soil than in my home tanks, which I can monitor more closely. I used about the same amount of soil as I would laterite — no more than a cup or two mixed well into the bottom third of the gravel.