

## Planted Tank Substrates

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*By Karen Randall*

Q. I have been told that using a thin layer, about ¼ inch, of cat litter and then using a thick layer of pea-size gravel will help my planted tank. What, if anything, will this layer of litter accomplish for the tank and the plants?

I currently have a 70-gallon aquarium that contains Ludwigia, water sprite, Vallisneria and a couple of Java ferns. I currently use a liquid fertilizer once a week. The water temperature is 74 degrees Fahrenheit and the pH is at 7.0. I am new to the live plant aspect of the hobby and would like any advice as to how to keep my plants alive and thriving.

A. While it is definitely true that plain gravel substrates are not conducive to good plant growth, I am not a fan of kitty litter. There are other substrates that provide a better nutrient source for your plants, are easy to use and have an excellent track record. For those who are new to planted aquariums, my advice is to start your tank with a good commercial laterite (or laterite substitute) specifically marketed for aquarium use. Some people complain that laterite is too expensive, but in terms of the total cost of a planted tank, the price is tiny.

If you buy the most expensive laterite available, you will spend less than \$20 for an amount appropriate for a 55-gallon tank. If you do feel the need to experiment with cat litter, please be careful that the brand you choose is pure clay, with no added perfumes, deodorants, colorants and so on.

No matter what other materials you add to your substrate, pea size gravel is much too large for good root growth. I prefer gravel of about 1 millimeter in diameter, but good results can be obtained with gravel up to about 3 millimeters in size. For good root development, plan on approximately 3 inches of total substrate depth for smaller plants, and up to 6 inches for large plants with heavy root structures, like Echinodorus and Anubias.

Mix your gravel additives (whatever they may be) into the bottom one-third to one-half of the substrate. Then thoroughly wash the gravel that will go on top in running water. Use at least 1 inch of this very clean gravel to cap the layer containing additives. To fill the tank, place a shallow dish onto the surface of the substrate and very slowly allow the water to fill the dish and overflow. The more carefully this is done, the less cloudy the water will be. When the water level is about 4 inches above the substrate, you can add water a little faster.

Make sure you have adequate amounts of light for the plants you've chosen. Plan on at least 2 watts of fluorescent lighting per gallon, set on a timer to run for 10 to 12 hours a day. If you concentrate on plants that are tolerant of very low light levels (Java fern, Anubias, Java moss and some of the hardier Cryptocoryne species) you could get by with three 40-watt tubes.

Make sure you plant densely right from the start, and concentrate on fast-growing species. Plan on covering at least 70 percent of the substrate with plants, and of that, 70 percent should be fast-growing species. If you can't afford to buy an adequate number of plants at the pet store, you can "pad" your plant budget by purchasing big bags of water sprite, Salvinia or duck weed at a local club auction. All three of these plants grow rapidly and will keep the nutrient levels in your tank in check until you can get the plant mass up to a reasonable level. At that point you can remove most of the floating plants and pass them on to another beginning aquatic gardener!

If your water is quite soft and has a pH of 7.0 or lower, you may do just fine without supplemental CO<sub>2</sub>. If your water is harder, you may find that your plants do better with a little boost from added CO<sub>2</sub>. This can be accomplished easily and inexpensively with a pop bottle yeast reactor. Finally, make sure you don't overstock the tank or overfeed the fish, or you can end up with serious algae problems.