

Aquatic Plant Biology and Technology

Meeting the needs of aquatic aquarium plants is much more about knowing biology than buying technology.

By Karen Randall

Q. I have recently started purchasing aquatic plants for my planted aquarium, which last for about three or four months and then just wither away and die. The aquatic plants do not grow, and usually turn pale green. The roots seem to turn brown even though I fertilize and feed.

I have read books, and articles in different fish magazines about aquatic plants and how to keep them. It seems as though this could be a very expensive journey that I'm on.

Here are the conditions and aquarium setup for my 110-gallon aquarium. The aquarium is 60 inches long, and I have three 40-watt tubes in a 48-inch fixture. I have read about halogen lighting and know it is expensive, but is it better?

The aquarium substrate is sand gravel. My reading leads me to believe that a cable heater (expensive) is essential for undergravel aeration. Is this true?

I have two large outside power filters running on the aquarium at the present time. I'm using the regular cartridges along with carbon. I also have a large sponge filter running on a powerhead. I have read that a canister filter is needed for higher levels of carbon dioxide. Is this correct?

I live in a community where agriculture is big. Our tap water is very hard. When I do a water change, the first reading I get from my carbonate hardness test kit is a KH of 9. I then use water softener pillows arranged in a breeding net hung in the water flow. By the time for the next water change, the water is finally down to about 4 KH. Then I have to start all over again.

I purchased a tap water purifier, but only got about 15 gallons of water before it was exhausted. The pH stays at a constant 7.0. The nitrate level in the aquarium is over 25 parts per million (ppm), and the phosphate level is above 3 ppm. Because of the cost of using an ion exchange unit, I have been changing about 10 percent of my aquarium's water weekly.

I also wanted to know if I have to tear down my aquarium when I finally reach the stage of planting, or is it possible to plant an already established aquarium? Will I have to add substrate fertilizer and so on?

A. Let me start by saying that you can spend a fortune on gadgets if that aspect of the fishkeeping hobby appeals to you, but there is no reason you can't have a drop-dead gorgeous planted aquarium without spending a lot of money. In your case, the size of your aquarium dictates that you are going to have to spend more money than a person with a smaller aquarium, but I'm sure you realized that when you bought it.

My rule of thumb for planted aquarium lighting is 2 to 3 watts of full-spectrum fluorescent or metal halide lighting per gallon. This may need to be increased slightly for very large or deep aquariums. For your aquarium this means about 330 watts. It's not hard to see that with your current 1 watt per gallon, even if everything else in your aquarium were perfect for aquatic plant growth, the aquarium would be severely limited for light.

The least expensive fluorescent tubes and fixtures are the 4-foot length. Therefore, the least costly aquariums to light on a per gallon basis are 4 or 8 feet long. For 5- or 6-foot aquariums, you can stagger the 4-foot tubes for coverage, which will give you dimmer areas at the ends of the aquarium, or go to metal halide fixtures. Or you can use smaller (3-foot) tubes end to end, but with this option you will need to run a minimum of six tubes to achieve even a low-moderate light level, and 10 tubes or more if you want to include aquatic plant species that require more light.

You mention halogen lighting, but I suspect you mean metal halide lighting. Metal halides are not "better" for aquarium plants, but they make it possible to fit more light into a smaller space, which is an advantage with a very large or deep aquarium. If you can afford the higher up-front costs, metal halide lighting is actually more cost-efficient than most forms of fluorescent lighting in the long run, both in terms of electricity consumption and re-lamping costs.

The very minimum I would consider over an aquarium of this size would be six 4-foot tubes, either in a custom hood or in three shoplight fixtures staggered over the top of the aquarium. At this light level you will still need to be careful to choose low light-tolerant aquatic plants for the aquarium.

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