

Healthy Plants Require Balanced Growing Conditions

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By Scott Hieber

Balanced growing conditions promote healthy aquatic plants and hinder algae establishment. One way to have an unbalanced planted aquarium is to do what I did and put a high level of lighting on an aquarium without adding carbon dioxide (CO2). When you see algae, you probably have unbalanced conditions in your aquarium. Thus, my first high-light aquarium soon led to my first carbon dioxide setup.

I used a special type of air stone that emits extremely fine bubbles. I installed it in a glass-covered 30-gallon aquarium that had biowheels, a small canister filter, a lot of aquatic plants and an undesirable amount of what is called black beard algae (or BBA), which is technically a kind of red algae (*Audouinella*) and is sometimes called red beard algae. Despite what kind of algae it technically is, it seems to most often appear in planted aquariums. It has a green or grayish-black color, and always grows in short tufts like the business end of a child's small watercolor brush. It attaches firmly to leaves, gravel and filter tubes. My setup was workable, though I went through carbon dioxide rather quickly: about 5 pounds per month. This wasn't very costly - carbon dioxide is relatively inexpensive - but I was sure I could do better.

Ultimately, I switched to a small external CO2 reactor and removed the biowheels. A carbon dioxide canister holding 5 pounds of carbon dioxide now lasts well over six months. Controlling carbon dioxide consumption is not just a question of how much you put into the water but also how fast the carbon dioxide is shed from the water.

Carbon dioxide is the main (and for most aquatic plants the only) source of carbon, an essential element of all living things. I tried a few lighting setups, and finally settled on the pair of 55-watt power compacts, and adding supplemental carbon dioxide to my aquarium let the aquatic plants keep up with the very high level of lighting. I also added a couple of Siamese algae-eaters (*Crossocheilus siamensis*), which eat very fine plant material, including BBA. The algae disappeared over a few weeks, and aquatic plant growth increased dramatically. I had to start adding plant food, as the fish food was not enough even in a heavily stocked aquarium. Of course, if I had not added the high level of lighting, I could have gotten by without adding carbon dioxide and nutrients. But as I imagine many aquatic gardeners do sooner or later, I wanted to try high light levels and carbon dioxide to stimulate fast aquatic plant growth.