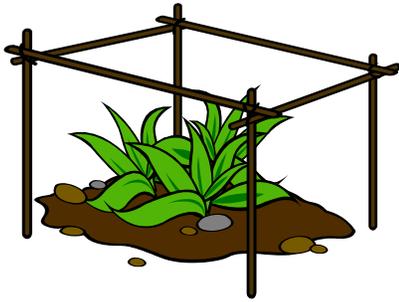


Planted Tank Basics



Introduction to Planted Tank

Summary:
Basic setups,
Lighting, CO₂,
and Nutrient
Supplementation

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Planted tanks can be confusing at first especially with all the equipment, terms, supplements, and plant availabilities. This guide will help break it down to its basics so that you can better understand the necessities of plants and your desired outcome.

Types of Setups:

Low Tech Setup:

- Low light
- Liquid Carbon Supplement (Optional)
- Rich Substrate (Optional)
 - o Grow Less demanding plants such as Anubias, Java Ferns, Cryptocoryns, Swords, & Mosses.
 - o Ie. Foregrounds: Crypt Parva, Dwarf Saggitaria, Marsilea Minuta.

Medium Tech Setup:

- Medium Light
- Liquid Carbon Supplement, DIY CO₂ or pressurized CO₂ (ALL Optional)
- Rich Substrate or added fertilizers
 - o Grow some less demanding stems & foregrounds as well as ferns, mosses, anubias, swords and Crypts.
 - o Ie. Cabomba, Myriophyllum, Mattogrossense, Dwarf Sagitaria...etc.

...Cont. Types of Setups

High Tech Setup:

- High light
- Pressurized CO₂
- Added fertilizers, rich substrate or both
 - o Grow most stem plants and foregrounds
 - o Ie. Ludwigia sp, Rotala, sp, Hygrophila sp., Blyxa Japonica, Glossostigma, Dwarf Bahv Tears

Lights:

Lights control the speed of growth.

The more light you have the faster your plants will grow. However, if the tank is unbalanced, algae will grow faster as well. Different plants have different light needs. The amount of light your plants receive depend on many different factors such as the quality of fixture, ballasts, reflectors, bulbs, distance from plants, shaded corners or placed blocked by floating plants, etc. Additionally, plants only use specific color range in the color spectrum. Therefore what might be bright to you may be almost useless to a plant. 6500k is usually a good way to start looking for bulbs, however cheaply made bulbs may not have the full spectrum that better quality or plant specific bulbs have.

Low Light: (40 or less μ moles PAR)

- Achieved by using stock fixture, brooder lamp, or even desk lamps using the right bulbs for plants or natural sunlight.
- Spiral compact fluorescent for plants or 6500k

...Cont. Lights:

Low Light:

- GE Energy smart daylight
- For sunlight, use indirect sunlight

Medium Light: (40-60 μ moles PAR)

- Achieved using T5HO, T5, T8 bulbs.
- High Watt Light fixture on a hanging kit can be used to raise or lower depending the amount of light you want to give your tank.
- Floating plants are also a good way to reduce your light.
- DIY CO₂, liquid carbon supplement, or no CO₂ can be used depending on your plant choice. Using less light will help keep everything balanced, less trimming, and offers more flexibility to remedy problems before algae takes over.

High Light: (70 or more μ moles PAR)

- Achieved using 2 or more T5HO bulbs or metal halides.
- "Overdriving Plants"
- Best used with CO₂ for precise control of the CO₂ for the overdriven plant's needs.
- Naturally there is enough CO₂ and nutrients in the water for normal speed of growth however with stronger lights you are pushing for accelerated plant growth therefore their needs increase.
- Crucial to keep everything balanced as algae can take over faster if your plants cannot outcompete it.

...Cont. Lights:

High Light:

- Faster growth but less margin for error..

CO2:

CO2 is Carbon Dioxide. Plants need carbon to make their food which is done when the lights are on.

Therefore an unsafe level can be had when the lights are off. The harder you are driving the plant with lights, the more CO2 they will need. This also depends on the plant selection you have and their CO2 needs.

- CO2 can be obtained by natural breathing of fish, a liquid carbon supplement, the gas formed from a yeast & sugar reaction, or from a CO2 tank itself.

NO CO2 or Natural CO2:

- It's possible to have a happy aquarium without CO2. Fish breathe out CO2 so more fish equals more CO2. But this also means more waste, in turn creating more ammonia and nitrates which plants uptake. But more fish can be a very difficult balancing act between just the right amount and too many. Plants that do not need the high amounts of CO2 will do very well and having low light can drive the plants just enough to use the natural surrounding CO2.

...Cont. CO2:

Liquid Carbon Supplement:

- Seachem Flourish Excel can be dosed daily or weekly and provides the needed carbon for the plants.
- Brightwell Carbon Supplement

DIY CO2: (Recipes are online)

- CO2 caused by yeast and sugar reaction.
- Achieved using 2L bottle, airline tubing, mix sugar, yeast & Water to create CO2.
- Use airstones, wooden air diffusers, & powerheads to diffuse the CO2.

Pressurized CO2:

- Used for precise control over your CO2 injection.
- Consists of CO2 tank, regulator, needle valve, and diffuser. Optional items are solenoids, bubble counters, and check valves.
- CO2 tanks can range in different sizes from 5 lbs. and up or a small paintball size tank.
- Regulator changes the pressure from the CO2 tank into your desired lower working pressure. Regulators can be a paintball specific regulator, standard single stage, or a industrial grade dual stage regulator.
- Needle valves are used to control the precise amount of CO2 you want. A diffuser is at the end of the CO2 to be diffused into the water.

...Cont. CO2:

- Solenoids are an electronic on/off switch and most users plug these into a timer to turn the CO2 on & off with their lights at specific times.
- Bubble Counters gives you a visual reference of how many bubbles/sec. you are injecting into your tank.

Nutrients

Fertilizers are the nutrients that plants need in order to produce their mass. Fish wastes might be enough nutrients to help the plants along, but if you are driving the plants harder, then it's best to use enriched substrate or fertilizer products.

- Macronutrients: Nitrogen, phosphorous & Potassium.
- Trace Minerals usually found together in the same bottle.
- Some plants feed heavily from their roots & others feed heavily from their leaves so it's good to have nutrients for both.

No Added Supplements:

- Fish waste & uneaten food produce nutrients and sometimes minerals from your tap water. In low light setups, this may be enough to give the plants the nutrients they need.

Root Tabs:

- Tablets that you stick under the substrate next to the roots of plants. This slowly releases nutrients for the plant roots to absorb. This works well for heavy root feeders ie. amazon swords.

Enriched Substrate:

- Products ie. Aquasoil, Eco-complete, Flourite where nutrients are contained in substrate & slowly released overtime.

Liquid Fertilizer:

- Seachem Flourish line. Expensive for larger tanks.

Dry Fertilizers:

- Dry form of the specific chemical needed. Cheaper for larger tanks.
- You will need to use measuring devices.
- A simple guide to determining your tank needs is the Estimative Index Method which is simply overdosing nutrients throughout the week and at the end of the week, 50% water change to reset the tank. This way, one can rule out all nutrient deficiencies and will never reach toxic levels if dosing according to the proper measurements.
- Drawback to using Estimative Index Method is that it can be a little intimidating at first but it can save you a lot of money in the end.

