



# Aquatic Plant Basics

Live plants create natural beauty in an aquarium, but they also promote a balanced ecosystem and provide many benefits to your fish including:

- Producing oxygen and consuming CO<sub>2</sub> during the day, which benefits fish, helps with filtration and stabilizes pH.
- Preventing algae growth by removing nitrate and phosphate from the water.
- Keeping your fish healthy and colorful by providing them with valuable cover and habitat. This lowers stress and boosts their immune systems, and when fish know they have refuge nearby, they tend to stay out in the open where you can see them.
- Creating a source of food for fish that feed on the natural microbes that colonize plant leaves as well as others that feed directly on the plants themselves.
- Producing spawning sites for many fish species as well as valuable refuge for newly hatched fry.

Whether you just want to add a few plants for accent or set up a dedicated aquatic garden, understanding the basic needs of aquatic plants will help maximize your success and enjoyment with your aquarium. Aquarium plants need the following to thrive:

- Clean, moderately soft water
- Full spectrum light
- Nutrients
- Suitable substrate (for rooted plants)

## Water Requirements for Aquatic Plants

Most aquarium plants do best at a pH between 6.5 and 7.8, general hardness of 50 ppm to 100 ppm and alkalinity between 3° and 8° dKH (54ppm – 140 ppm). Nitrates should be below 10 ppm and phosphates below 0.5 ppm to prevent nuisance algae from growing on leaves. Temperature should be between 74° and 80° F. Change 10% of the water weekly or 25% bi-weekly and use Reef Carbon or Organic Adsorption Resin in your filter to remove organic pollutants that tint water and reduce light penetration. Use reverse osmosis or deionized water with Aqueon® Freshwater Renewal or Kent Marine® RO Right added if your tap water is unsuitable for use with aquatic plants.

Proper circulation is important to plants as well. It ensures a steady supply of nutrients, inhibits algae growth and prevents the accumulation of organic debris on leaves.

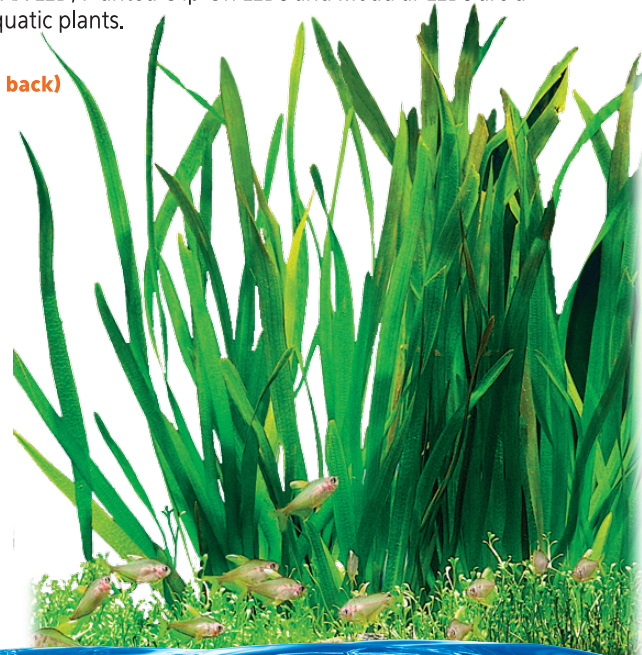
## Light Requirements for Aquatic Plants

Choosing the right light for a planted aquarium depends on which species you want to grow and how tall your aquarium is. Some plant species need more intense light to thrive, and because light does not

penetrate water very well, a stronger light source is needed for taller aquariums. Aquatic plants do best under full spectrum light with a Kelvin rating or “color temperature” between 6,500K and 8,000K. Always choose a light source specifically designed for growing aquarium plants; those designed for houseplants do not have the correct Kelvin rating. High Output T5 fluorescent and LED offer the best lighting for aquarium plants.

Exercise caution when using “watts per gallon” to decide how much light your plants need. The term “watts per gallon” has long been used to help aquarists determine the correct amount of light for live plants and corals. Until recently, this formula worked well since standard fluorescent was the most common type of lighting in the aquarium industry. The introduction of high output T5 and LED lighting has complicated matters somewhat, making “watts per gallon” no longer valid. Here’s why: Wattage is a measurement of how much electricity a light consumes, not how much light energy it produces. Light intensity is measured in lumens, not watts, and different sources of light produce different amounts of lumens per watts consumed. For example, a 60 watt incandescent bulb produces fewer lumens than a 54 watt High Output T5 lamp, and you would not want to look directly into 60 watts of LED light! Lumens, PAR (photosynthetically active radiation) and PUR (photosynthetically usable radiation) are more meaningful measurements. Aqueon® OptiBright® LED, OptiBright® Plus LED and OptiBright® MAX LED, Planted Clip-On LEDs and Modular LEDs are all suitable for aquatic plants.

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Aquatic plants do best with 10 to 12 hours of light per day. Leaving the light on longer will not compensate for weak lighting. It's also important to create a consistent day/night cycle. If your aquarium light does not have a built-in timer, use a timer or digital power center to provide a consistent photoperiod. Replace High Output T5 and other fluorescent bulbs every 12 months to get the best light output. Finally, keep glass covers clean to allow maximum light penetration.

## Substrate for Aquatic Plants

Choosing the right substrate ensures proper root development and anchoring of rooted plants. Fine to medium grade gravel or coarse sand are best, and you can also mix different grades for texture and aesthetics. Avoid ultra-fine sand and coarse gravel, as fine sand compacts and doesn't "breathe", while coarse gravel inhibits proper root anchoring and may collect excessive amounts of organic debris. Install a 2" to 3" base and slope it higher towards the back of the aquarium. Terraces, hills and valleys also help create depth and dimension. Avoid dolomite, crushed coral, crushed oyster shells or other calcium carbonate-based substrates, as they will cause an undesirable rise in pH and alkalinity. Always rinse substrate before placing it in your aquarium.

## Nutrients for Aquatic Plants

Aquatic plants use nitrogen and phosphorous as well as potassium, iron, magnesium, manganese and other minerals to grow. Most of the nitrogen and phosphorus comes from fish food and waste, however, minerals must be added to the aquarium on a regular basis. Depending on plant species, nutrients are taken in through leaves, roots or both. Aqueon® Aquarium Plant Food provides proper liquid nutrition for most aquatic plant species. Dose weekly or add partial doses every few days to make sure your plants have a steady supply.

For plants that take in nutrients through the roots, some aquatic plant enthusiasts mix laterite, an iron rich clay, into the substrate when setting up their aquariums. Others use special aquatic plant substrates that contain embedded nutrients. Yet another method is to insert fertilizer tablets into the substrate near plant roots. Do not use plant tabs or fertilizer sticks intended for houseplants as they may not have the correct balance of nutrients for aquatic plants.

## CO2 for Aquatic Plants

Carbon is essential to healthy plant growth. Aquatic plants consume CO2 and produce oxygen during the day, while at night the process is reversed. Many dedicated plant enthusiasts add supplemental CO2 during the day to enhance plant size, color and growth. Beginning aquarists often ask if additional CO2 is necessary for successful plant growth. The short answer is no. Most aquatic plants don't require additional CO2 to grow, but their size, color and vibrancy are always better when it is added. Compare a planted aquarium that uses supplemental CO2 to one that does not to appreciate this.

Carbon can be supplied using liquid supplements as well as tablet and DIY yeast generators. All these methods are effective; however, the most reliable and convenient method of supplying CO2 is a pressurized injection system that is synchronized with the aquarium light. Since plant growth increases significantly with the use of CO2, it may be necessary to increase liquid nutrient dosing to keep up.

## Aquatic Plant Selection

Choosing the right plants for your aquarium will depend on lighting, aquarium height, the visual effect you want to create and to a certain extent, the type of fish you keep. Do research or ask your local aquarium expert for advice on choosing the best plants for your tank.

When laying out your plant scape, place tall or rapid growing plants in back, broadleaf and "showy" plants towards the center and low-profile plants in front. Many foreground species grow laterally, so make sure you leave enough room for them to spread out. Be careful not to plant shorter plants next to tall broadleaf species that may block light to them.

Add a few plants to accent your aquascape or use them as the main décor theme. Some hobbyists go to great length to create lush aquatic gardens and use fish as the accent! Live plants add beauty and balance to an aquarium and provide a healthier and more natural habitat for your fish.

