

FAQ: LIGHTING  
(author unknown)

All plants have a cycle in which during the light hours they use CO2 and release Oxygen through a process called photosynthesis. During the dark hours the opposite occurs and the plants use Oxygen and release CO2 in a process referred to as respiration. In most aquarium plants the period of photosynthesis in nature is between 10 and 12 hours which should be duplicated as closely as possible in the aquarium to allow a balance between the two processes.

In nature some plants are located in large open ponds and receive a large quantity of light, others are located in triple canopy jungles and receive low quantities of light. Each variety of plant has its own light requirements and for best aquarium results these requirements should be met as much as possible. In this FAQ we will divide the plants into groupings that require low light, low to moderate light, moderate to bright light, and bright light. There are also bog plants that are often sold as aquarium plants which we shall not cover in this FAQ except to mention here that their lighting requirements are usually greater than even the bright grouping.

Fluorescent lighting is the most economical means of establishing a broad spectrum of light in an adequate quantity for the survival of aquatic plants. It is recommended that broad spectrum tubes be used to produce the proper lighting similar to the varieties sold in plant stores and aquarium stores, rather than the standard cool white bulbs available at hardware stores. People have had good luck with almost any of the "full spectrum" or plant specific bulbs (Vita-Lite, GE Chroma 50 and 75, Phillips Agro-Lite, UltraLume and Advantage X). The more expensive "three phosphor" bulbs like Triton and Penn-Plax Ultra-TriLux seem to have a more realistic color rendition. You can combine different types of bulbs to achieve the same results but the tri-phosphor bulbs are generally much brighter than less expensive types. Note that fluorescent bulbs age and will lose intensity over time. It is recommended that bulbs be changed every 6-12 months (try to have the bulbs on a rotating schedule, i.e., a new bulb every 3 months rather than 2 new bulbs every 6 months).

When calculating the amount of lighting you will need there is a general of thumb. First multiply the surface area of the aquarium by the distance from the light source to the top of the gravel. Then depending on the type of plants you desire multiply this by one of the factors given below.

- Low light plants 0.08
- Low to Moderate light plants 0.12
- Moderate to Bright light plants 0.18
- Bright light plants 0.27

This will give you the ideal watt hours of fluorescent lighting that you need. Divide this number by 11 and you now have the approximate total wattage of lights you need. Unfortunately this number may not be equal to what is available in bulbs so find the combination of wattage that will most closely match this requirement and adjust the available time to match the watt hour calculation.

Example : required watt hours is 1440, divided by 11, is 131 watts of power. since the closest is 3, 40 watt tubes we divide 1440, by the 120 watt total and we find we need 12 hours of lighting at this level.

Warning : A common mistake is to deviate greatly from the 11 hours of light to compensate for low or high wattage. If the light time exceeds 16 hours more wattage should be added to reduce this time, Or if the light time is less than 8 hours less wattage must be used to allow adequate time for photosynthesis.

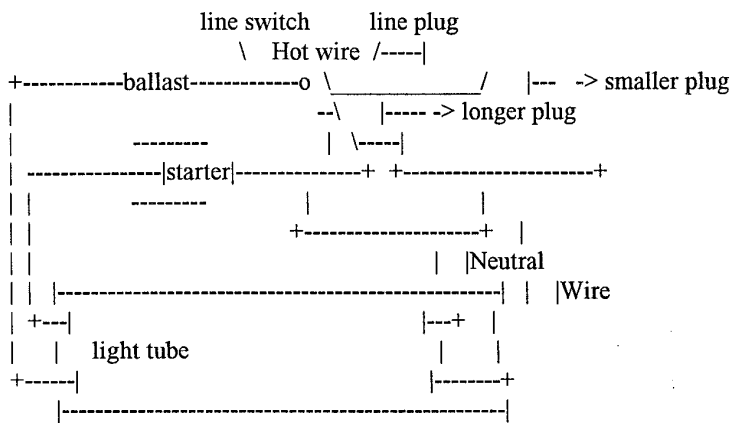
When selecting plants also keep in mind that large center plants will shade the smaller plants under them and that higher light requiring plants should not be selected for small filler plants.

Converting a fluorescent fixture to auto-start

Many older or cheaper fluorescent fixtures require you to hold down a pushbutton for a few seconds to turn it on, thus preventing you from plugging it into a timer. You can convert such a fixture into an auto-starting model by clipping two wires and buying two new parts. You need a starter, a little gray can-like thing found in any hardware store. Make sure to buy the correct one for your size bulb; they say which is right on the package. You also need to buy a socket for the starter, or find some way to attach the wires directly to the two terminals on the starter. The sockets can sometimes be hard-to-find, but big hardware stores might have them, and mail-order fish suppliers (MOPS, for instance) can sell you both parts as a kit.

Refer to the diagram below (contributed by Hardjono Harjadi):

*[check with an electrician before trying to follow this!!!...Editor]*



The two leads you want to connect to the starter are connected to the pushbutton; usually they're red. Clip them at the pushbutton and attach to the starter socket. That's all!