

## How to set up and maintain a planted aquarium

Keeping an aquarium is an immensely enjoyable and rewarding hobby for both adults and children alike. This leaflet aims to help you consider what is important when setting up and maintaining a planted aquarium and to ensure that your fishes' welfare needs are met and your plants will thrive.

As a general rule you should, within reason, buy an aquarium as big as possible. Ideally, it should be able to accommodate your chosen fish once they are fully grown. Otherwise, you must be prepared to buy bigger set ups as your fish grow. In addition, water chemistry is typically more stable in larger volumes of water which will help control levels of algae. Plants will need overhead lighting so they can photosynthesise. This should be on a timer to provide at least 6-8 hours of light a day, up to a maximum of 10-12 hours if the levels are ramped up and down at either end – this is more easily achieved with modern dimmable LED lights.

Aquarium sizes range from nano tanks (minimum 10L) through to large custom-built aquariums of much bigger capacities. As larger aquariums contain more water, they will be more stable and less susceptible to fluctuations in temperature, pH etc than small aquariums.

### Positioning your aquarium

Once your set up is ready, position your aquarium so it is:

- ▶ Out of direct sunlight and away from sources of heat or draughts.
- ▶ On a flat level surface or stand (which can take the weight of a full tank indefinitely).
- ▶ Away from loud noises, vibrations and sudden movements.

### Planting your aquarium

Once your aquarium is positioned properly, it can be planted. The first thing to do is to place in your substrate in the aquarium. A high-quality soil or gravel designed for planted tanks is useful as it will provide nutrients directly to the plant roots as they grow. This can be banked up in to create higher areas for planting. Some aquarium substrates will require rinsing before use, whereas others can be added straight into the aquarium – always ask your OATA retailer for advice on this.

The next step is to add the hardscape, such as wood, stone or ornaments that you are planning to use in your planted aquarium. This should be placed so that it is pleasing to the eye but with space around it for plants. It is worth taking your time with this and moving your hardscape around until you are happy with the result. It is far easier to do this now than shifting it around once it is planted!



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Once you are happy with the hardscape, it is best to add about 5cm of water above the substrate to make planting easier. Your plants should be prepared by removing any mineral wool around them. They can then be gently teased apart to expose individual plants which are placed directly into the substrate – planting tweezers will make this easier. The placing of your plants and final appearance of your aquascape is up to you, but generally you want shorter plants in the foreground with taller species towards the back. This will create a sense of depth and allow open space near the front for your fish to swim. Some species will grow best attached to hardscape, such as *Bucephelandra* sp, *Anubias* sp or species of moss. These can be tied on or super glued into place. Some shops will sell hardscape with plants already established on them. Although your plants will grow and fill space, it is always worth planting heavily when you first set up your aquarium – this will help prevent algae becoming established and outcompeting your plants in the early stages.

After your plants are placed into the aquarium, it can be filled with water and dechlorinated using a dechlorinator. To avoid damaging your plants it is best to fill your aquarium gently, using a colander to disperse water flow. Some substrates will leach nutrients or cloud the water when they are first exposed to water, so it may be worth draining and refilling the aquarium with fresh water an hour after you first filled it: your OATA retailer can advise on this. Once your aquarium is filled, you can install your equipment (filter, heater and lights) and switch them on.

You can also consider the use of supplementary carbon dioxide (CO<sub>2</sub>) which is often used to increase the growth rate of plants. This can be in many forms but is available in pressurised canisters, liquid or sugar-based cultures. All systems should be installed according to the manufacturer's instructions and maintained appropriately. CO<sub>2</sub> does not need to be incorporated into planted set-ups: in fact, many "no-carbon", "low tech" set-ups still achieve high levels of growth, but some plant species will struggle to grow without it. More CO<sub>2</sub> does not necessarily mean more growth, and dosage rate should be carefully monitored to prevent overgrowth of algae, ensure that fish have adequate oxygen supply, and to prevent dramatic pH fluctuation. Your OATA retailer can provide guidance on choosing and correct usage of CO<sub>2</sub> systems.

## Maturing your aquarium filter

Once your equipment has been switched on, it is advisable to leave the aquarium for between 24 to 48 hours to settle. This ensures that the correct temperature is reached (if it is a tropical set up) and that the equipment is working correctly. You will need test kits to regularly measure the water quality and ensure it is suitable for fish: these should test for ammonia, nitrite, nitrate and pH.

Your aquarium filter then needs to 'mature'. Waste products from your fish and any uneaten food contribute to ammonia (NH<sub>3</sub>) levels, which together with nitrites (NO<sub>2</sub><sup>-</sup>) are highly toxic to fish. However, there are bacteria (known as nitrifiers)



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which can quickly break down ammonia and nitrite to much less toxic nitrates (NO<sub>3</sub><sup>-</sup>). These beneficial bacteria will not be present in a new aquarium filter, so the process of maturing your filter involves growing a population of these bacteria in the filter media. There are two common methods of doing this: 'Fish-in' and 'Fish-less' cycling.

The 'Fish-in' method involves adding a small number of 'hardy' fish to the aquarium. Note that this method should only be used with great care and under guidance from your OATA retailer, to safeguard the welfare of your fish. Your OATA retailer will be able to advise on what fish are most appropriate for your aquarium depending on how mature your aquarium is, and the water chemistry of your aquarium.

The 'Fish-less' method involves adding a calculated dose of ammonia to your aquarium over several weeks. You will need to use an online ammonia calculator to work out how much ammonia needs to be added each day (based on the water volume of your aquarium and results from your water quality tests). There are also proprietary bacterial cultures available, which when used as per the manufacturer's instructions, can help to 'kick start' the maturing of your filter.

Whichever method you use, ammonia and nitrite levels should initially successively rise and then fall, while nitrate (the end product of filtration) levels will usually continue to rise slowly. It is important if you have added fish, that the levels of these waste products do NOT rise above the guidelines given below. Regular partial water changes will be required (up to 50% weekly) as will regular water testing to monitor for any changes in water quality and to take action as necessary. Once the levels of ammonia and nitrite have dropped to zero and stay at zero continually, your aquarium filter is mature and stocking can continue slowly. Bear in mind, that each time you add more fish or increase feeding, a 'mini' maturation process will be required for your filter to allow for the numbers of beneficial bacteria in your filter to build up to deal with the extra amounts of waste produced.

	<b>Planted home aquaria</b>
Ammonia (NH <sub>3</sub> )	Zero mg per litre
Nitrite (NO <sub>2</sub> <sup>-</sup> )	Zero mg per litre
Nitrate (NO <sub>3</sub> <sup>-</sup> )	Not to exceed 20 mg per litre above normal tap water levels. Note: Nitrate levels in tap water can vary widely between different areas. Do seek advice from your local OATA retailer on safe nitrate levels for the fish you keep.

Plants will utilise some of the waste products produced by fish as fertiliser. However, this does not mean that a filter is not required or that you will not have to do water changes.



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## Adding your fish

Before adding any fish, seek advice from your OATA retailer in choosing the type of aquarium you would like to keep and the species you are interested in. OATA has a range of free care sheets which cover the majority of commercially available species. Some fish species need to be kept in shoals whilst other species are territorial and/or aggressive and will not live together peacefully. Different species may also prefer different water types, flow rates etc, and will have a preferred temperature range.

Only increase the number of fish you have in your aquarium slowly as the population of beneficial bacteria (established when maturing your aquarium filter) need to increase every time more fish are added and feeding increases. Overstocking or stocking your aquarium too quickly can result in 'new tank syndrome'. This occurs when there are not enough nitrifying bacteria to cope with the increased waste load, leading to unhealthy levels of ammonia and nitrite and often fish may die.

Healthy fish have clear bright eyes, undamaged fins, intact scales, no ulcerations or bumps, appropriate swimming behaviour and steady breathing. Do not purchase a seemingly healthy fish if sickly fish are present in the tank with it. Some diseases can be easily carried without fish showing any clinical signs. If in doubt, ask your OATA retailer for advice as they will have in-depth knowledge and experience.

## Stocking and aquarium set up

It is not possible to say exactly how many fish your aquarium can hold. The differences in body size, species requirements, water parameters and compatibility of fish available are vast. Stocking your planted aquarium lightly will help to reduce the nutrients in the water which will reduce algal problems. Ask your OATA retailer for advice on stocking densities for your planted aquarium and the species you would like to keep.

Aim to create a suitable environment for your chosen fish. Remember that decoration and plants take up space but are recommended additions as enrichment for your fish. Live plants help to remove nitrate, and ornaments can provide less boisterous and reclusive fish with a safe retreat.

Diet and feeding requirements vary between species. Some feed at the surface, others will be found throughout the water column, while others will spend most time at the bottom of the aquarium. Some will also have specific dietary needs e.g. algae eaters, and will need specific foods to thrive. Be sure to have suitable food to cater for all of your fishes' needs. It is also important to ask your OATA retailer if the fish species you are interested in will consume plants.



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Do not expect to fill your tank with as many fish as your OATA retailer. They are able to stock tanks more heavily than home aquariums due to their management expertise and advanced filtration systems.

## Transporting and releasing your fish

First check that your new fish are compatible with those that you may already own and that the water quality in your aquarium is suitable i.e. levels of ammonia and nitrite are zero. Your OATA retailer will usually sell your fish to you in a plastic bag. Try not to keep them in this for too long. Once purchased, take your new fish home as quickly as possible as fish are easily stressed by bright lights, extreme temperatures, noise and movement.

Once home, your fish will need to acclimatise to their new environment and there are two common methods to do this known as the 'floating bag' method and the 'drip acclimatisation' method. Switch off aquarium lights and take the bag containing your new fish out of its outer wrappings carefully, avoiding exposure to bright light.

If using the floating bag method, float the bag in the water of your tank for at least 30 minutes to ensure the temperature in the bag is the same as the aquarium water. Whilst the bag is floating, slowly introduce small amounts of aquarium water into the bag containing the fish over the course of 30 to 40 minutes. Some more sensitive species might require a longer period of mixing, but your OATA retailer should be able to advise you.

If using the drip acclimatisation method, proprietary kits are available whereby water from your aquarium is 'drip fed' into a container holding your new fish and their transport water, until water conditions are the same as those in your tank. This method is ideal if you are introducing a particularly sensitive species, or if your water chemistry in your aquarium is likely to differ greatly from where the fish have come from.

Depending on which method you use, it can take between one to several hours, particularly for more specialised species such as discus. Once complete, carefully release the fish into your aquarium and dispose of the bag and any excess water. Monitor your new fish carefully for the first week, paying particular attention to water quality. If in any doubt, contact your OATA retailer for advice.

## Maintenance

Your fish and plants are totally reliant on you to keep them healthy, so your aquarium will require regular maintenance. In addition, to maintain an aesthetically pleasing scape a good maintenance regime is essential. Most tasks are relatively quick and simple:

- ▶ Check the water quality regularly (**at least once a week**) to prevent the build-up of harmful wastes such as ammonia and nitrites. You may wish to

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test more frequently such as when setting up your aquarium and when adding fish. Also take care to regularly check that the water is at the correct temperature.

- ▶ Partial water changes (up to 50% every week) will help remove excess waste chemicals, stimulate plant growth and prevent algae build up. Before adding new tap water, make sure it's at the correct temperature and is treated to make it safe for your fish. Frequency and size of water changes may vary according to what species you keep, the aquarium size, the number of fish you have and other factors. If in doubt, seek advice from your OATA retailer.
- ▶ Plants will need to be trimmed regularly as they grow to prevent fast growing species outcompeting slow growing ones, and to encourage new growth. This should be performed as and when necessary.
- ▶ Some plants will benefit from regular dosing of fertilisers. The dosing schedule will largely depend on your individual set up and may take some trial and error to establish. Fertilisers should never be overdosed, and dosages should be increased slowly. Fertilisers should be dosed after a water change so that they are not removed whilst siphoning the aquarium.
- ▶ Keep a regular check on the health of your plants. Removing old leaves will promote new growth. Some plants may show signs of nutrient deficiency in their leaves, (e.g. yellow spots etc) and certain fertilisers may help improve or avoid this problem. If in doubt, take a photo and seek advice from your OATA retailer.
- ▶ Check filters for blockages and fish waste build-up. Never rinse them under a tap since this will wash away and kill the beneficial bacteria but instead, use some of the waste water from a routine water change to clean filters.
- ▶ CO<sub>2</sub> systems will need regular maintenance such as cylinder changes or starting new bacterial cultures. Always maintain your system according to the manufacturer's instructions.

**Remember to never siphon water from your aquarium by mouth. Cover any open cuts before putting your hands into an aquarium and always wash your hands immediately afterwards.**

## Shopping List

Planted aquaria can be used to keep either cold water species such as white cloud mountain minnows, or tropical species (which must be kept in heated water) such as tetras. The type of set up that you choose, namely coldwater or tropical, will determine what equipment you need to purchase.

As a general checklist, a freshwater aquarium should include:

- ▶ Glass or acrylic aquarium with secure lid
- ▶ Suitable stand
- ▶ Suitable substrate e.g. specialised planting soil
- ▶ Filtration
- ▶ Air pump
- ▶ Lighting
- ▶ Siphon cleaning device



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- Bucket (for water changes)
- Ornaments
- Plants
- Heater (for tropical tanks)
- Water conditioner/dechlorinator
- Thermometer
- Water testing kits (for ammonia, nitrite, nitrate and pH as a minimum)
- Food (suited to your chosen fish)

The below are not essential but will be useful:

- Planting tweezers
- Trimming scissors
- Fertilisers

**Water test kits will help you maintain good water quality for your fish so their purchase should be considered a necessity.** Many OATA retailers will offer free water testing services and can provide advice on how to test your aquarium water at home.

### Five Welfare Needs Checklist:

The Animal Welfare Act 2006 states that all pet owners have a legal duty of care to their pets. Anyone who is cruel to an animal or is found not to be providing the five animal welfare needs, as listed below, can be prosecuted.

- A **suitable environment** e.g. appropriately sized tank (with water heater if tropical set up) within a suitable location in your home.
- A **suitable diet** which meets the needs of your chosen fish.
- **Behaviour** - Fish are able to exhibit their normal behaviour e.g. hiding places for timid fish, enough room for fish to swim freely.
- **Companionship** - Ensure you know whether your chosen fish need to be kept with, or apart from, other fish.
- **Health** - Protected from pain, injury, suffering & disease e.g. you are aware of the daily, weekly and monthly maintenance that your aquarium will need.

- **Water quality test kits are a necessity not an optional extra**
- **You must be prepared to look after your fish properly for the duration of their life and provide an aquarium which can accommodate your fish when fully grown**



\*Never release your aquarium animals or plants into the wild  
It is illegal and for most fish species this will lead to an untimely and possibly lingering death. Any animals or plants that do survive might be harmful to our native countryside. Take care to properly dispose of any soiled substrate (e.g. sand or gravel) or decorations so that non-native organisms do not enter natural watercourses.

Visit [ornamentalfish.org](http://ornamentalfish.org) to find a full range of how to guides and species-specific care sheets to help you look after your fish successfully.



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