How to set up and maintain a marine aquarium

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

As a general rule you should, within reason, buy an aquarium as large 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.

Aquarium sizes range from nano tanks 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 variations in temperature, pH etc than small aquariums.

Different types of marine aquaria can be established such as fish-only or reef tanks (which contain invertebrates such as corals). On the whole, a fish-only tank or a soft coral reef is a good starting point for a newcomer to marine aquariums. As you become more experienced, a fish-only tank can easily be turned into a reef tank provided species are compatible, although you will probably need to purchase additional equipment.

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.

Adding your saltwater

Reverse osmosis (RO) water has been filtered to remove impurities and is recommended for marine set-ups. It is essential if you wish to keep invertebrates, such as corals. RO water can usually be bought from OATA retailers either pre-salted to the correct level or as freshwater and will require mixing at home. If mixing at home, specialised aquarium salt (NOT table salt) will need to be dissolved into the fresh RO water according to manufacturer's instructions. Fast water flow from a powerhead and heat from your heater will help to speed up the dissolving process. On initial set up, this can be done inside the aquarium but water for future water changes will need to be mixed and heated in a sperate vessel. Once the salt has been added, the coral sand/gravel can be washed in RO water and added.

Maturing your aquarium filter

Once your aquarium has been filled, set up and the water is at the correct salinity and temperature, you can switch on the rest of your equipment. It is then advisable to leave the aquarium for between 24 to 48 hours to settle and for any salt to fully dissolve. It also ensures that the correct temperature is reached and that the equipment is working correctly, although if using a skimmer, you may not see any waste removal yet until you add livestock. Some manufacturers/retailers have different recommendations as to when to start skimming a new aquarium, please ask your OATA retailer for guidance. One of the most important pieces of equipment you will need is either a hydrometer or a refractometer which will help you to monitor the salinity of your aquarium. You will also need test kits to regularly measure the water quality to ensure it is suitable for fish. Initially, these should test for ammonia, nitrite, nitrate and pH and, if you plan on keeping corals, phosphate, dKH, calcium, and magnesium. Water should be tested to ensure that all parameters are correct before any livestock is added.

Your aquarium filter then needs to 'mature'. Waste products from your fish and any leftover uneaten food contribute to ammonia (NH_3) levels, which together with nitrites (NO_2^-) are highly toxic to fish. However, there are bacteria (known as nitrifiers) which can quickly break down ammonia and nitrite to the much less toxic nitrates (NO_3^-). 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 and 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 ammonia-based aquarium maturation product and follow the instructions included. There are also proprietary bacterial cultures available, which when used as per the manufacturer's instructions, can help to 'kick start' the maturation 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. 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 as will regular water testing to monitor for any changes and to take action as necessary. Frequency and volume of water changes will depend on stocking levels and other factors: ask your OATA retailer for advice. 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.

With marine aquariums there is also another method of maturing the system and that is through the use of live rock. This is rock which has been pre-matured and is in effect, a functioning biological filter capable of breaking down waste products in the aquarium. It is essential if you wish to keep corals and other invertebrates. You should aim for roughly one kilogram of rock per ten litres of aquarium water. Although the rock is matured, it does not mean the aquarium can be fully stocked immediately. Stock should still be built up over a number of weeks, with careful consideration given to the stocking order. It is recommended that hardier, more timid species are stocked first and more territorial species added later on. Your OATA retailer will be able to advise you on appropriate stocking. As live rock is becoming less available, artificial or dry rock can be used instead. Depending on the material used in its construction and it's source, it is likely that this will need some form of maturation or bacteria supplement. Ask your OATA retailer for more detailed advice.

Marine aquariums have slightly different parameters depending on whether they are fish-only or fish and invertebrates (a reef set up):

	Marine fish-only home aquaria parameters
Salinity	1.017 - 1.023 SG (23-30 ppt)
Temperature	24-27^{0}C
pH	8.0-8.2
Ammonia (NH_3)	Zero mg per litre
Nitrite (NO_2^-)	Zero mg per litre
Nitrate (NO_3^-)	Do not exceed 20mg per litre

	Marine and invertebrates home aquaria parameters*
Salinity	1.024 - 1.026 SG (32-35 ppt)
Temperature	24-26^{0}C
pH	8.0-8.2
Ammonia (NH_3)	Zero mg per litre
Nitrite (NO_2^-)	Zero mg per litre
Nitrate (NO_3^-)	5-10mg/l species depending
Carbonate hardness	8-12 (dKH)
Phosphate	0.04mg/l – 0.1mg/l species depending

*If keeping hard corals, further parameters such as calcium and magnesium should also be monitored. See our SPS and LPS care sheets for further information.

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. Many marine fish are also territorial and so this will reduce the number of fish you can keep. Ask your OATA retailer for advice on stocking densities for your chosen aquarium and species you would like to keep.

Aim to create a suitable environment for your chosen fish. Generally, live plants are not kept in marine aquaria, but some options are available for more specialist set-ups (e.g refugiums/mangroves). Rock work (ideally living rock of some description) will provide a natural refuge for fish and a site to place corals if required. It is also recommended to have a layer of substrate made up of fine coral sand. Some fish filter the sand to feed or sleep under it at night and it will also provide another area for beneficial microorganisms.

Lighting will vary drastically depending on the species you wish to keep. Fish-only aquariums won't need much light, however, ask your OATA retailer for advice if you are planning to keep any corals or other photosynthetic invertebrates. If you intend to keep corals, we strongly recommend you read the OATA guidance "Recommendations to marine reef aquarists on how to prevent palytoxin poisoning".

Many complete set-ups will come with adequate water flow. If you are putting together your own set-up, then ensure that there is enough flow in the tank to mimic the currents of the sea and that there are no 'dead spots' in the aquarium where there is poor water circulation. This is particularly important if you have live rock or corals.

Ultraviolet (UV) sterilisers can make useful additions to marine aquariums as they help reduce any pathogens in the water. Ask your OATA retailer for advice on how to install and use them.

In the wild, many fish swim upwards if they are startled by predators. Therefore, a lid, net or other cover is recommended for some species. Ask your OATA retailer for advice when purchasing species which may jump.

It is also important to be aware that some marine species are venomous and that appropriate care is taken with these species. See our "Venomous species" care sheet for further information.

Diet and feeding requirements vary between species. Some feed at the surface, others will be found throughout the water column, while others will sift through the gravel. 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. Some fish may also predate on shrimp or corals. Make sure you are aware of all dietary requirements before you purchase any species.

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.

Adding livestock

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 from the fish, leading to unhealthy levels of ammonia and nitrite, which may cause fish to become ill or 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. Many retailers will display fish feeding which is generally a sign of good health. If in doubt, ask your OATA retailer for advice as they will have in-depth knowledge and experience.

Transporting and releasing your fish

First check that your new fish are compatible with those that you 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 10 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 minutes. Some more sensitive species, such as invertebrates, will likely require a longer period of mixing, but your OATA retailer should be able

to advise you. As many retailers regularly use treatments in their systems, it is best to net the fish from the bag into the aquarium, ensuring that as little water as possible from the bag enters your aquarium. This is to protect invertebrates from potentially unsuitable chemicals.

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, such as invertebrates, or if the 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 and several hours, particularly for more specialised species. Ensure that during this process, the bucket is not overcrowded, and that water temperature does not reach unacceptable levels. Once complete, carefully release the fish or gently place the invertebrate into your aquarium and dispose of the bag and any excess water. Monitor your new livestock carefully for the first week, paying particular attention to water quality. If in any doubt, contact your OATA retailer for advice.

Where possible, it is recommended that new livestock is quarantined in a separate aquarium for a set period of time before it enters the main display. This ensures that the livestock is feeding appropriately and does not carry any disease. Quarantine tanks can be set up in different ways and each species will have unique requirements, so speak to your OATA retailer for specific advice on your species.

Maintenance

Your fish are totally reliant on you to keep them healthy, so your aquarium will require regular maintenance. 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, nitrites and nitrates and check that other parameters such as pH and salinity are stable. You may wish to test more frequently such as when setting up your aquarium and when adding fish. Check the water is at the correct temperature every day.
- Partial water changes (at least 10% every week) will help remove excess waste chemicals. 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.
- 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. If using a protein skimmer, the cup will need monitoring and cleaning when it is full. Any chemical media, such as phosphate resin, will also need to be changed regularly.
- Other equipment such as a UV steriliser will need regular maintenance, follow the manufacturer's advice.

Remember: 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.

What to watch out for

All fish will have slight variations in their behaviour or appearance, but keeping an eye on any changes in the following will help to identify any potential problems before they become a real health issue:

- swimming behaviour – hanging at the surface, sitting on the bottom or erratic swimming
- colour – turning a darker or paler colour than normal
- temperament – changes in level of aggression or hiding more than normal
- breathing – gill covers moving at a slower or faster rate than normal
- appearance – development of white spots or fluffy growths, loss of fins or scales
- condition – increase or decrease in body weight and condition
- feeding – reduced intake or lack of interest in food

If you are concerned about the health of any of your livestock, then test your water quality and contact your OATA retailer for further guidance.

Shopping List

As discussed, marine aquariums can be set up for different types of livestock. The type of set-up that you choose will determine all the equipment you need to purchase. As a general checklist a marine aquarium should include:

- Glass/acrylic aquarium with secure lid
- Suitable stand
- Suitable substrate e.g. coral sand
- Filtration
- Heater
- Air pump (if your filter suddenly fails)
- Lighting
- Siphon cleaning device
- Bucket (for water changes)
- Marine aquarium salt
- Bucket and powerhead (for mixing up salt)
- Hydrometer/refractometer
- Ornaments/rock work
- Thermometer
- Water testing kits (for ammonia, nitrite, nitrate and pH as a minimum)
- Food (suited to your chosen fish)

Additional useful equipment:

- Protein skimmer
- Circulation pumps
- Live rock
- UV steriliser
- Reverse osmosis unit
- Chemical filter media
- Calcium reactor/dosing pump

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 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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