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# The art of keeping marine aquarium

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Bringing a small section of the marine environment to your home sounds like a difficult task. But it is being done by more and more by the average aquarist, who wants to try this difficult task. Tremendous progress has been made in the keeping of the marine fish over the past decade. Much knowledge has been acquired and many new products have entered market to facilitate the keeping of marine fish. In many ways, a freshwater aquarium and a marine aquarium, are very similar. But the care required by a marine aquarium is more complicated than that demanded by freshwater tank. Pollution and diseases are likely to occur much more quickly and lethally in a marine aquarium than in a freshwater aquarium. Because of these reasons, a successful freshwater aquarist sometime find it difficult to keep a marine aquarium.

The procedure described for starting a marine aquarium is one that has been used successfully in the institute's marine aquarium facility and also by many successful individual aquarists. There are many additions and modifications may be made to the ecosystem recommended; however use of biological filter is a must for a successful marine aquarium keeping.

### Aquarium tank

Choosing correct size, shape and its construction is important for a successful aquarium keeping. Marine aquarium tanks should have a size of more than of 100 litres. Small tanks are vulnerable to overcrowding very easily. Tanks should be constructed entirely of glass. Tanks with metal frames are unsuitable because the frame will rust and life of the tank

will be shortened. All glass tanks consist of five pieces of glass and are held together with a silicon sealant. Low height tanks with more surface area is more preferable than high tanks with less surface area. For a marine aquarium, lid to cover the top of the tank is needed. This will reduce the evaporation from the tank which eventually increases the salinity of the water. Also in this lid we can fix the lights to illuminate tanks.

### Location

Do not set up the aquarium in front of a window in direct sunlight or heavy growth of algae will occur. The room should be of nearly constant temperature. It should also be a room frequented by people otherwise the fish will develop a sensitivity to any movement outside the tank and will hide when you come nearer. Tanks should be placed in a perfectly levelled stand with thermocole sheet spread over it in order to give a cushioning effect to the tanks. Also the stand should be strong enough to hold the tank with water, sand, and other accessories.

### Water

The life of an animal is largely dependent on the quality of the environment in which it lives. Collect seawater from the offshore area having good tidal flushing and no pollution. Before using freshly collected seawater store it in a dark place for 2 - 3 weeks. Remove water carefully so that sediments are not disturbed. Also filter the seawater before use, in order to remove plankton, particulate matter and small parasites.

## Filtration

Harmful and potentially harmful substances may gradually accumulate in aquarium water, eventually poison the animals. Only filtration can keep this from happening. A successful aquarist uses three filtration processes like, biological, mechanical and chemical, among which the first is very important.

## Biological filtration

A good biological filter is the heart of a successful marine aquarium. It is the removal of unwanted substance primarily of ammonia from the water by bacteria. Ammonia comes from decaying organic matter like uneaten food and it is one of the primary excretory products of marine organisms. Biological filtration is solely the work of the bacteria attached to the surface of the gravel. The gravel and the subgravel filter together constitute the filter bed. Bacteria grows in these gravel and as the water ages their number increases until the gravel teems with them. Then only does your aquarium truly function well.

## Setting up of a biological filter

A subgravel filter consists of a perforated plastic plate that covers the tank bottom from wall to wall with gravel spread over it to required height. There is a space between the filter and tank bottom. The water will pass through the sand and get collected at the space below the filter. The filtered water from the bottom of the filter is returned to the surface of the tank through air lifts built on to the bottom of the tank. Coral sand is usually used as the filter medium. Filter medium should be of a minimum 4 inch thickness. Three to four rows of interconnected perforated PVC pipes can also be used for the collection of filtered water instead of perforated plastic sheet. These pipes are kept at the bottom of the tank and coral sand is spread over it to a thickness of 4 ". Two pipes were connected vertically to these pipes in order to bring the filtered water to the surface by air lifting.

Air lifting is done by placing an aeration stone connected to an air pump inside the vertical pipe. Stone should be placed at the bottom of the pipe otherwise air lifting may not be efficient. Air pump should have enough capacity to lift the water from the bottom of the tank.

## Conditioning of filter bed

The first two weeks are critical for a new aquarium. During this time, the amount of ammonia is likely to rise because not enough nitrifying bacteria have established themselves in the gravel to convert it. Once the bacteria population has stabilised with a steady point on food in the form of ammonia and organic matter, the aquarium is conditioned.

Since it takes 2 to 4 weeks to condition a new filter bed it is desirable to speed up the conditioning process. The best way is to take some gravel from an already conditioned filter and add it to a new filter. Bacteria in the conditioned filter will rapidly spread viable bacteria throughout the new filter bed. The conditioning process can be cut into half by using this method. There are other method which are not so fast as the previous one. Introduce hardy inexpensive fishes like tilapia or groupers into the tank. Rear them for atleast for two weeks, feeding them regularly the required food. After two weeks remove these animals and add a slightly small quantity of fishes you intend to keep. Another method is to add few animals at a time. In a small aquarium add one at a time, a week apart. This give the filter beds ample time to adjust to each new increase in ammonia. In general it is observed that when the total ammonia level fallen less than 0.1 ppm, a new aquarium can be considered as safe for animals.

## Water quality parameters

Periodical checking of water quality is critical to a successful marine aquarium keeping.

**Ammonia :** Acceptable range is less than 0.01 ppm un ionised ammonia ( $\text{NH}_3$ ). Both ionised and unionised ammonia is present in the water, but the unionised form is lethal to the fishes. Percentage of unionised ammonia varies with temperature and pH of the water. If you are determining the total ammonia, the value should be converted to unionised ammonia. With same temperature, the percentage of unionised ammonia will be higher in high pH than in low pH.

**Nitrite:** Less than 0.1 ppm as nitrite ion is acceptable. Although nitrite ion is not so toxic to fishes its checking will help you to monitor the efficiency of the filter bed.

**Nitrate:** Less than 20 ppm as nitrate ion.

**Dissolved oxygen:** Not less than 1.0 ppm below saturation at any given temperature, with 5.0 ppm being the absolute lowest limit.

**pH:** The acceptable range is 7.5 to 8.3

**Salinity:** Salinity ranges between 28 to 32 ppm.

## Maintenance

The loose brown dirt lying on the gravel, the detritus, although not harmful should be removed. The easiest way to remove it is to siphon it out during partial water exchange. Algae attached to the glass are not so harmful to the animals. In fact it serves as an excellent food for some of the invertebrates and fishes. Algae can be removed from the glass tanks with a sponge on a stick. Algae on the tank decorations and gravel should be left alone unless it becomes excessive, in which case take it out and scrub them with a stiff bristle brush and tap water. Then shake them dry and put them back. Gravel can be gently stirred to, loosen surface algae. The material can then be removed with a fine mesh net, siphon etc.

## Water changes

About 10 % of the tank water should be changed every two weeks or a monthly exchange of 25 % is enough. The replacement water should be of same temperature and salinity of the tank water. Partial water exchange lowers the nitrate level, replenishes depleted trace metals and it is a convenient means of accumulated detritus and algae.

## Selection of healthy animals

One secret to being a successful marine aquarist is picking healthy animals right from the start.

**Colour :** The colours of a healthy fish are bright and clear.

**Skin condition:** The skin should be clear. The skin should be free of any blemishes. There should be no discoloured or whitish patches over the body or the eyes.

**Breathing and swimming:** These should be normal. Any difference in breathing and swimming could be a sign of disease.

**General behaviour:** Fish should have normal patterns of feeding, resting and defending its territory. A fish showing signs of not being able to hold a territory is not a good fish.

**Starvation:** Starved fishes can easily be spotted by examining the area of the back just above the backbone. If the flesh is compressed, as if someone picked up the fish and pinched in between the fingers, then it is suffering from starvation. These fishes should be avoided.

## Acclimation

Acclimation of the new animals to the new environment should be accomplished smoothly and with minimum stress. This could be done by keeping the bag with the fish in the tank for sufficient time to make the temperature same. Also an air stone can be placed inside the

bag in order to keep the oxygen level. In every 15 min. add little of the tank water to the bag. This will gradually get the fish used to difference in chemical content.

### **Selection of fishes for aquarium**

The coral reef fishes are the epitome of the aquarium keeping, but many fishes like the butterfly fishes and angel fishes are difficult to maintain. These fishes are suitable only to experienced aquarist. As a beginner your selection must be basically oriented towards the hardier species. For beginner's Pomacentrids damsel fishes, humbugs, clown fishes are more suitable. Some small groupers, which are quite hardy and colourful, are also recommended for beginners. Beginners might also choose from a variety of triggerfishes and filefishes, batfishes, lionfishes and gobies. When you get more experienced with the hardier fishes you might try some of the wrasses, tangs or even butterfly fishes.

While introducing fishes into tanks compatibility of fishes should be considered. A large carnivorous fish along with small fishes or fishes which fight with each other till death should be avoided.

### **Feeding**

Although most fishes you might keep can adapt to some extent to diets different from those they were used to in their natural habitat, it is best to try and come as close as possible to their natural habitat. This keeps them healthier, more active, in better colour and growing normally. In the market a wide variety of aquarium feeds like frozen crustaceans (crab, shrimp, planktonic crustaceans) fishes squids are available. Another important feed is brine shrimp. It can be given in both live and frozen form. Many brands of flake foods of high nutritional value are available. Along with these foods live shrimps, crabs and other small crustaceans, clams can also be given to fishes.

Feed your fishes atleast twice a day. Feed small portions a little at a time and make sure that fishes are eating the feed. Also make sure that every fish gets its own share. Feed the fishes till it loses its interest in feeding. After feeding, remove all the uneaten food from the bottom of the tank. Food given to fishes should of the proper size. The size of the mouth is usually a good indicator of the size of food needed. Marine aquarium animals may be maintained in good condition for years on a combination of prepared food, raw seafood and adult brine shrimp. It is a best practice to offer a variety of feeds daily.

### **Diseases**

Diseases caused by bacteria and protozoans are common in the marine aquaria. Loss of appetite, loss of coordination, hemorrhage of the skin weight loss, loss of tissues in the fin edges etc. are some of the signs of diseases.

Now a days many antibacterials and other chemicals are readily available in the market. If a parasite is observed in fish, a freshwater bath will be sufficient to remove it. If infection is too severe, a formalin bath will cure it. In case of a bacterial infection characterised by ragged fins and reddened areas at the base of the fins, clouded eyes etc., use of broad spectrum antibiotics like Chloromycin, Gentamycin are found effective. Fungal infections can be controlled by using formalin, hydrogen peroxide etc.

Most fish that are infected must be separated from the rest of the stock in treatment aquaria. Before treating an infected fish, read the instructions for using the medicine and give the correct recommended dose.



## Decorations

Decorations are done to a marine aquarium not only to make the tank attractive, but also to make fishes feel at home. So it is important to make the tank as natural as possible. If you are keeping coral - reef fishes in the tank, every effort should be made to provide corals in the aquarium tanks. When the right combination of fishes and decorations is used the end result is a stunning rendition of nature. Dead corals, stones, drift wood and fibre glass decorations are the common things used in the marine aquarium for decorations. While adding these things to the tanks, it should be cleaned and washed thoroughly.

The objects you add to your aquarium

should be pertinent to the theme of the exhibit and pleasing to look at, but they must also be chemically safe and attractive. When approached thoughtfully, decorating the aquarium can be a means of creative expression.

The success of keeping a marine aquarium is measured by the time its inhabitants are kept alive, their health and sparkling clarity of water, but also by the number of breeding being reported. Breeding in your tank shows that you are providing the fishes a condition similar to its natural environment. In the institute's aquarium we were able to breed and produce juveniles of clown fishes, and sea horses. Also we were successful in making other fishes like *Abudefduf* spp. and other damsels mature in the aquaria tanks.

## Diagram of Biological filter

