Successful Marine Aquarium

Realistic information about setting up and maintaining a successful saltwater aquarium.

By Martin Moe, Jr.

Keeping a successful marine aquarium of any size or complexity is mostly knowledge, observation and maintenance. Sure, a big tank with expensive equipment allows an aquarist to keep a greater abundance of marine organisms, including many that require coral reef water quality and lighting almost like natural sunlight. On the other hand, a 20-gallon tank doesn't require too much maintenance, either, and as long as one knows the limitations of a small, simple marine aquarium, many species of marine fish and invertebrates can thrive and grow in a simple little aquarium far from the sea.

A simple, undergravel-filtered, marine aquarium setup can be made from construction materials obtained at hardware and building supply stores or from equipment designed for marine aquariums and sold in aquarium stores. A tank as small as 5 gallons, built and operated in the "traditional" marine method, can support a few saltwater organisms, and 30- to 75-gallon tanks set up the same way can support many more. These tanks will not be as low in maintenance or support as great a number and variety of organisms as a tank established with a high-capacity protein skimmer and high intensity lighting, but these simple setups still works very well as a low-cost introduction to the fascinating world of marine aquarium keeping.

The four topics in the first half of this article — tanks, water, biological filtration and chemical filtration — and the six in this half will help a developing marine aquarist understand the basics. A small, uncomplicated marine aquarium setup is an excellent way to learn the nuts and bolts of the hobby.

Secret Five: Water Management

A water change can be considered a type of filtration, because you are removing accumulated dissolved organic compounds, as well as adding trace elements that have been depleted. In a typical small aquarium, a 10- to 20-percent water change per month is about right. An aquarium with a heavy biological load may require more, and a light biological load may do well with less. Weekly water changes of 5 percent are even better because the smaller, more frequent changes create less stress on the fish and invertebrates.

The saltwater should be made up about a day before the actual change because this allows time for all elements in the salt to completely dissolve and "stabilize." Changing small amounts of water in small marine aquariums is not difficult and is one of the greatest "secrets" to a successful, small and simple marine aquarium.

Water movement in the aquarium is also of critical importance. A slow cycling of water around the aquarium and through the filter may keep everything alive, but carbon dioxide can easily accumulate to dangerous levels with such slow water movement, especially if algae growth is limited. Most oxygen/carbon dioxide exchange takes place at the surface of the water, so it is important to provide a strong turnover of tank water from bottom to top. An airstone or two placed in the tank will provide this turnover, as well as increase the turbulence of the tank water, which increases the rate of exchange of oxygen and carbon dioxide.

Secret Six: Temperature

There are two important considerations about temperature. First, a marine tank should always be within the range of 75 to 85 degrees Fahrenheit. Many tropical marine fish and invertebrates are stressed if temperatures go below or above this range, and many die if the temperature dips below 70 or above 90 degrees. Second, the temperature should not change with great rapidity. For example, suppose the aquarium heater ceases to work and you find the tank at 66 degrees Fahrenheit one morning. Many or all the fish may well survive if the temperature is increased to 75 or 80 degrees over a period of a couple of hours, but moving them immediately into 80-degree water may well cause immediate death.

Most marine aquariums, small and large, require a heater all or part of the year. Make it a point to be aware of how the heater is functioning. Keep a small thermometer in the tank and check it frequently. Watch the little light on the heater. Make sure it goes on and off when the room is cooler than the tank. If it stays on all the time, the heater may be broken or it may be too small for the tank. If it never comes on, it may be broken or set too low.

Now here's a tip that may make reading this whole article worthwhile. Make sure that the heater is unplugged when water changes are made or whenever the water level in the tank is lowered. If the glass tube on the heater is exposed to the air and the heater turns on, the glass tube may well overheat and crack, and expose the electric elements in the heater to saltwater. Trust me, you don't want this to happen. It can cause an electrifying experience.

Secret Seven: Lighting
Lighting is very important with a tropical marine aquarium. It is far more important to have proper lighting in a marine tank than in a freshwater tank. Freshwater fish often live in dark waters and shaded areas where light levels are low and variable, whereas marine tropical fish and invertebrates typically come from relatively shallow, clear tropical seas where sunlight is bright and intense all day long.

The best light for a marine aquarium, and essential for systems in which algae and coral are grown, is very bright and has strong peaks in the violet/blue and orange/red parts of the spectrum. An ordinary 2- or 4-foot shop light fixture with two daylight or full-spectrum fluorescent tubes provides enough light for most low-cost, traditional marine aquarium setups. Such a setup is not adequate for most corals and other photosynthetic animals, but is far better than the single small bulb provided with many light hoods designed for freshwater use.

Many marine fish can be kept under such low-light conditions, but chose the fish carefully. Pick fish that normally live in deep water or spend the day in caves or under ledges. These species require less intense lighting. Steer away from tangs and angelfish and other species that need the high light levels of the reef tops. Many crustaceans, shrimp and crabs also do well under low-light conditions.

Secret Eight: Animal Selection
Keeping a marine aquarium is far easier if one starts with strong, healthy specimens. Look for fish with clear eyes, a full round abdomen and clear, full fins. Avoid fish with sunken abdomens, missing scales, blotchy skin and ragged fins. Behavior should be alert and aware. There should be a strong interest in food and feeding, except if the fish has just fed. A slow-swimming fish with its head pointed up and little interest in its environment or in feeding seldom survives for long.

Crustaceans should have all their appendages, and their color should be clear and normal. Most crustaceans prefer the cover of reef structures. One that sits in the open and has little reaction to stimuli is to be avoided. A combination of fish and invertebrates in the same tank is more difficult to maintain than just fish or invertebrates, but once a combination tank is established, the result is very interesting. Be sure that there are plenty of hiding places for shrimp and crabs.

Secret Nine: Disease and Quarantine
After problems with "new tank syndrome" (high ammonia and nitrite levels) and the lack of proper water changes, parasite disease is the next greatest cause of defeat and distress among marine aquarists. Disease diagnosis and cure is a complex topic, and I refer you to my book, The Marine Aquarium Handbook: Beginner to Breeder, for more complete information. But I can provide a few tips here.

The most common and most destructive parasite that plagues marine aquariums is Amyloodinium ocellatum. This is a dinoflagellate parasite of marine fishes that reproduces rapidly and can easily complete its life cycle in a marine aquarium. Although there are many other types of bacterial and parasitic diseases that affect marine aquarium fish, this is the biggie. If most or many of your fish die over a period of several days to a week, the most probable cause is an infestation of this parasite.

A heavily infected fish will be covered with numerous very tiny white specks on the sides and fins. Lightly infected fish often scratch, rub or flick themselves against the substrate or reef structures in the tank. Heavily infected fish respire rapidly, lie on their sides on the bottom or hide in the reef structure and show no interest in feeding. If any of your fish have this parasite, the entire tank must be treated.

There are three basic life stages of this parasite. The first is a free-swimming, microscopic dinospore that lives for one to two days and must find a fish host or die. The second is a small cyst that lives for several days in the gills or on sides and fins of a fish. The third is a larger cyst that drops from the fish and completes development on the bottom of the tank

over a period of one to four weeks. A couple of hundred dinospores can be released from the resting cyst on the tank bottom, and they then infest other fish in the tank.

A copper level of 0.15 to 0.2 parts per million in the tank water will kill the dinospore, so continuously maintaining this level of copper in the tank water for three to five weeks will remove this parasite from the tank. Copper levels must be checked every day, especially during the first week of treatment, because some copper compounds precipitate quickly from the water in a tank that has never been treated with copper. A single copper treatment is often gone from the water in about 24 hours and the tank is then unprotected from the parasite.

The standard treatment if you have only a single marine tank is to give infected fish a 1-minute freshwater bath (make sure there is no chlorine in the freshwater and that water temperature in tank and bath are about the same). The immediate switch to freshwater causes the cysts to drop off the fish. The fish are then returned to the tank and the proper copper level is kept in the tank water for at least four weeks. The cysts that drop off the fish in the freshwater bath are still alive, so this water must not be added to the tank. Copper in the water also kills other invertebrates, especially corals and anemones, so these animals cannot be kept in a tank treated with copper.

An alternative method for removing these parasites from a tank is to keep the tank free of fish and at a high temperature (83 to 86 degrees Fahrenheit) for at least six weeks. The cysts on the bottom all hatch, the dinospores die without finding a host fish and the tank is then free of the Amyloodinium parasite.

A marine aquarist can avoid a great deal of weeping and wailing and gnashing of teeth through use of a quarantine system. This consists of a small, 10- to 20-gallon, fully functional marine tank. Newly acquired fish are given a freshwater bath and placed in the quarantine tank for several weeks. Here they are watched for disease and parasites, treated if necessary and are given a chance to acclimate to captivity and to the particular diet choices provided by the aquarist. After three to four weeks of disease-free acclimation, the fish is placed in the main display tank with at least some assurance that it is not carrying disease or parasites into the tank.

Secret Ten: Food and Feeding

If you intend to set up a low-cost marine aquarium and feed your fish nothing but an inexpensive flake food, I have two words of advice: forget it. A high-quality, marine fish flake food is good for fish and invertebrates, but even the best flake food should not be the only food. Most marine fish feed on a variety of organisms in nature, and many fish and invertebrates include various types of algae in their diet.

There are a number of different types of frozen foods available these days for marine fish and invertebrates. These are made from marine food sources that provide close to a natural diet for many marine animals. Also, it is very easy for a marine aquarist to get shrimp, oysters, fish, squid and other marine food organisms from the supermarket and make up a homemade food mix for marine fish. If marine algae are not available for inclusion in the food mix, use a little spinach or romaine lettuce to provide the necessary vegetable matter.

It's not difficult to put these ingredients into a blender and then freeze the mix in ice cube trays. There are many recipes available in a number of books and articles. Even if you don't make a mix from a variety of ingredients, freeze some raw, peeled shrimp and grate a spoonful or two for the fish every other day or so. The inclusion of this fresh food will greatly improve the quality of life of your fish and invertebrates.

Feed at the same time each day if possible. Do not overfeed. A few small feedings are much preferred over one large feeding. Pay attention to your fish during feeding times. Careful observation will tell you when they have had enough for one feeding, and then you will have a good idea of how much to feed at any one time.

Feeding more than they can eat only wastes food and pollutes the tank. Remove uneaten food from the aquarium whenever possible. A length of rigid air line tubing works well to remove small bits of uneaten food. Put your thumb over the end of the tube, extend the air-filled tube into the tank and place the end near the food particle. When you take your thumb off the other end, the food will be sucked up into the tube. Replace your thumb over the end of the tube and remove the tube containing a small amount of water and the food particles from the tank. (I know, I know, everybody knows how to do that, but just in case you didn't, you do now.)

Back to Page 1>>