

Small Marine Aquariums

Don't let a limited amount of space or money keep you from setting up a small saltwater aquarium.

By Jay Hemdal

Certain basic principles are regarded as undisputed facts by most people involved in the marine aquarium hobby. These "facts" are imparted to beginning saltwater aquarists so consistently by dealers and experienced hobbyists that it seems unthinkable to doubt them. For example, the statement, "Marine aquariums must be larger than 30 gallons," or some variation of it, is so entrenched in the hobby that it has become common knowledge even among freshwater hobbyists who have never owned a saltwater tank.

Rarely is such an assertion challenged or the basic premise behind the stated principle examined. In this case, it should be noted that over 30 years ago the late Robert Straughan was writing books in which he related to hobbyists his success with small marine aquariums.

Has anything changed in the hobby that would make keeping small marine tanks more difficult? Absolutely not. In fact, improved filtration systems, better quality synthetic sea salts and increased knowledge about the needs of marine animals have worked together to make keeping small marine aquariums even easier to maintain than before.

Why then, has the small saltwater tank seemingly fallen out of favor? One possible reason is economic. Dealers are likely to realize higher profits on larger aquariums, both from the initial setups and from the subsequent stocking of increased numbers of animals in these tanks. On balance, however, this is not a significant factor, because most dealers are more interested in serving the needs of their customers, who may want or need large aquariums.

A more likely reason is the fact that stocking densities for saltwater aquariums are much lower than for freshwater. Marine hobbyists tend to compensate for this by purchasing larger aquariums that will hold more animals. Dealers recommend larger tanks in an attempt to help aquarists avoid the problem of overstocking, which is much more likely with a smaller aquarium. After all, there are so many different species of fish and invertebrates to choose from!

Perhaps the most compelling reason why large aquariums are so strongly recommended is that it seems as though a large tank should be inherently more stable than a small one in terms of water chemistry. This provides the specimens with a more secure environment in which to live. In fact, however, stability is not necessarily a result of size, as I will explain below.

What exactly is a small marine aquarium? Most public aquariums consider anything less than 100 gallons to be small. For the home aquarist, the term usually describes a tank smaller than 30 gallons. I will take this one step further and define a small tank as anything less than 20 gallons. Although an arbitrary distinction, it is made for good reasons.

Economics and space limitations, while not of concern to everyone, can dictate whether a large aquarium is even a possibility. If you are restricted in terms of money or space, a small saltwater tank may be your best, perhaps only, approach. Small marine tanks are also excellent for the often overlooked function of a quarantine or isolation facility. Problems in large display tanks can often be solved by isolation of sick or particularly aggressive specimens in another tank.

There are, admittedly, potential problems associated with small aquariums. On the other hand, the equipment to do the job is certainly available. One can construct a "clone" of a large marine aquarium that is as small as 5½ gallons by using tanks, hoods, fluorescent lights and filters that are easily obtainable. What then, are the problems when establishing a miniature marine aquarium?

Common wisdom suggests that detrimental environmental changes will occur more rapidly and with much more severity in small saltwater tanks. The assumption is simple: Because these smaller tanks contain less water, toxic organic wastes, such as ammonia and nitrite, will accumulate at a faster rate. This is true, however, only if the weight of the animals per gallon of water (and per unit filtration efficiency) in a small tank exceeds the ratio found in a larger tank. If the ratio of animal weight (more correctly, biomass) per gallon of tank capacity is identical for both size tanks, then the build-up of toxic substances will occur at the same rates and in the same proportions. That is, 1/10th gram of ammonia in a 10-gallon tank is the same as 1 gram of ammonia in a 100-gallon tank.

The key to this is to stock the small tank to the same density as a larger tank on a unit to unit basis. The crux of the problem is that many aquarists tend to add "just one more fish," resulting in an overcrowded aquarium. In a 100-gallon tank set up so that it has a capacity for 20 small fish, the addition of one extra fish results in only a 5-percent overload. The same fish added to a 10-gallon tank already housing three fish results in a tank that is 30 percent overcrowded! Quite a difference.

Another argument against small marine tanks is that parasites will have an easier time locating and infesting fish because the parasite is in closer proximity to a potential host in a smaller tank. This is no more true than the issue of water quality, and for the same reason. Because the capacity of the aquarium is governed by its size, it stands to reason that a smaller tank must hold proportionally fewer animals. The parasite is thus faced with the same ratio of animal mass to tank volume as it would be in a larger tank.

Examples Of Small Marine Aquariums

This is a list of small saltwater tanks that I have seen run successfully for long periods of time. The very small setups of 2 and 3 gallons will require all of your aquarist skills, and may be best left until you have been able to do well with a 10- or 15-gallon tank.

2-gallon drum-shaped fish bowl 1 hermit crab	1 Condylactus anemone	1 banded coral shrimp	1 snail
3-gallon aquarium designed to fit window ledge small Actinia anemones	2 starfish	Caulerpa algae assorted small live rock	3 small hermit crabs 2
3-gallon hexagon tank Caulerpa algae	1 damselfish	1 scarlet cleaner shrimp	1 Condylactus anemone
10-gallon display tank in public aquarium 1 colony of star polyps Caulerpa algae	2 large feather dusters assorted live rocks	2 flame scallops 2 small sea cucumbers	3 gobies 2 shrimpfish 1 basslet
10-gallon aquarium	1 flashlight fish	1 deep sea hermit crab	
15-gallon aquarium 1 blue gudgeon goby	1 pelagic blenny Caulerpa algae	1 yellowtail angelfish	1 small niger triggerfish

The fact is, if the capacity of any tank is exceeded, there is a greater chance of a parasite finding a host and a much greater likelihood of the water quality deteriorating. There are actually only three genuine concerns when keeping a small marine tank, any of which can pose a potential risk to the animals being kept: temperature, salinity and poisoning.

Water temperatures are less stable in a small aquarium. Given two tanks of widely differing capacities, such as a 10-gallon tank and a 100-gallon tank, if the heater in each one should cease to function, the temperature in the small tank would drop much faster than in the large tank. This is perhaps a minor point, because the tank temperature can drop only to the room temperature, and this is not fatal to most organisms unless the temperature remains low for a substantial amount of time.

Evaporation can be more of a problem in a small tank. Even when tanks have relatively close-fitting glass covers, there is some evaporation of water, which increases the salinity of the aquarium water. In a small tank, particularly in warm weather, especially if the tank lights are on, the amount of evaporation can be significant. If the tank is left unattended for several days or more, the salinity could increase to the point where the fish and invertebrates are under physical stress, possibly resulting in disease and even death.

Temperature and salinity should not be a problem if the tank is monitored every day or two. This, in fact, may be the only real drawback to a small marine tank. If you travel a lot and do not have someone to monitor the tank, a saltwater tank of reduced size may not be for you.

Poisoning, while not a common problem with good aquarium maintenance techniques, can be devastating in a small tank.

For example, if you have a small amount of soap residue on your hand when you reach into a 100-gallon tank, there is not likely to be a problem. Should this occur with a 10-gallon tank, however, the concentration of toxins would be 10 times greater. Unlike organic substances, in which proportionally identical tanks have the same rates of accumulation in the water regardless of size, the addition of a toxin from outside the tank will have a much greater effect on a smaller aquarium.

The main problem for an aquarist maintaining a small tank is determining the proper number of animals to house in the tank. A rule of thumb, such as "1 inch of fish per gallon of water," is too general. It doesn't take into account an elongated fish, such as an eel, or an invertebrate, such as an anemone. Over time, an experienced marine hobbyist will gain an innate understanding of tank capacities, but this can be an expensive process if learned by trial and error.

There are other sources of information. A dealer can sometimes be relied upon for this information. If you know an advanced saltwater hobbyist, you can ask her or him for advice. The sidebar to the right lists some of the small aquariums I have observed operating successfully on a long-term basis and can be used as a guide. When adding any specimen to a tank, you must first determine what size the animal can be expected to reach. Thus, a 2-inch panther grouper would do fine in a 10-gallon tank, but only for a few months, after which it will have grown too large for the tank. Do not count on the small size of the tank to "stunt" the growth of a fish. This rarely works and is never a good practice.

My own experience with small marine tanks started almost 30 years ago. It was a 15-gallon aquarium that I paid for using money earned from a paper route. If the dealer I purchased the tank from had told me that small marine aquariums were impossible to care for, I would have missed many interesting marine hobby experiences over the years, simply because I could not afford a larger tank.

I would hate to think that some potential marine aquarists are either delayed from setting up their first tank or abandon the idea altogether due to the well-intentioned but misguided information given them concerning the minimum size of a marine aquarium. A small saltwater tank can be a relatively inexpensive way to find out if this is a hobby you want to be involved with. Instead of placing too much emphasis on the size of the aquarium, concentrate on developing your skills as an aquarist. In the end, you will be a successful hobbyist regardless of the size of the tank.