

Berlin Method Reef Aquarium

The Berlin Method reef aquarium is easier than you may think.

By Scott W. Michael

Q. After reading the article by Mike Paletta, on the Berlin system of reefkeeping, I am convinced I want to convert my system to the Berlin Method. The tank is only about six months old, so the amount of live rock in it isn't extensive.

I currently have a 75-gallon tank that is filtered with a large wet-dry system that can handle up to 300 gallons. I have a protein skimmer in the sump of the filter and an outside power filter with Chemi-Pure and occasionally Phosguard. There is a small powerhead on the bottom of the aquarium for additional water movement. I have removed all the substrate, and lighting consists of two 48-inch, 40-watt 50/50 tubes and two 24-inch, 20-watt actinic tubes.

I'm thinking of replacing the skimmer with one 36-inch unit, and adding a new lighting system using three very high output (VHO) fluorescent tubes, eventually going to metal halides. I have several questions about water changes, fish populations and the live rock load. What kinds of live rock should I use and how much should I purchase? And, what types of invertebrates should I include?

A. From the letters I received it is apparent that Mike's article prompted many readers to consider trying this reefkeeping method, although many of you apparently believe it's more complicated than it is. If you are considering converting your existing aquarium or setting up a new aquarium using the Berlin method there are a few key principles you should understand.

Although not exclusive to the Berlin method, the following are the key elements necessary for successfully maintaining your reef aquarium — good livestock selection, live rock, effective protein skimming, proper lighting, rigorous mechanical filter maintenance and trace element replenishment. I highly recommend that you introduce a 1-inch-deep layer of live sand on the aquarium bottom.

First, let's discuss good livestock selection. It is important to decide what types of cnidarians (e.g., anemones, corals, false corals and so on) will be the focal point of your aquarium. The cnidarians that we are concerned about can be divided into two groups based on their aquarium care: the soft corals — mushroom anemones and zoanthids — and the hard corals.

It's best to stick with one group or the other and not try to keep a collection of both. This is particularly true if you want to have long-term success with small-polyped hard corals. Problems tend to arise because of competition for growing space between soft and hard corals. Soft corals have evolved an arsenal of chemicals that they use to retard the growth or even destroy hard corals that grow around them.

In nature there are large stands of soft corals, with relatively few hard coral species growing in close proximity. This is due, in part, to the effective chemical warfare that soft corals wage. A closed system that houses a forest of these animals, will become a chemical soup and can deleteriously affect hard corals growing in the same aquarium. To a limited degree, activated carbon and protein skimming are able to keep these chemicals in check.

Mushroom anemones, especially the knobby varieties, can also interfere with your attempts to keep hard corals. They have potent nematocysts (stinging cells) that sting animals they are close to, and also produce chemicals that irritate neighboring hard corals.

For the neophyte reefkeeper I would recommend keeping soft corals and mushroom anemones. These animals will grow and multiply if your water quality is good and there's adequate lighting, and ample current, in the case of soft corals. Also, more fish can be kept in a soft coral aquarium than a hard coral tank because soft corals can withstand higher levels of dissolved organics and nitrogenous wastes.

Some hardier, large-polyped hard coral varieties, such as the open brain (*Trachyphyllia geoffroyi*), tooth (*Lobophyllia* spp.), bubble (*Plerogyra sinuosa*), fox (*Nemenezophyllia turbida*) and elegance (*Catalaphyllia jardinei*) corals, can be successfully housed with soft corals. Although these species are not immune to soft coral chemicals they are not usually as adversely affected.

However, some people are having incredible success with small-polyped stony corals, such as *Acropora* spp., *Pocillopora*

spp. and *Montipora* spp., they are best left to the more advanced hobbyist.

Another important component of the successful Berlin system is the live rock. The surface, pores, nooks and crannies of the live rock are a growing substrate for nitrifying bacteria. Therefore, the live rock is a great biological filter, particularly if enough is placed in an aquarium.

In order to provide enough rock for biological filtration I would recommend that you have at least half of the aquarium volume taken up by live rock. Unfortunately, there is no exact formula when it comes to knowing how much rock you should add per gallon of water. The density of the rock can vary from one region to another. For example, much of the rock being exported from the Marshall Islands, Fiji and Indonesia (Indo-Pacific rock) tends to be lighter than the rock from the Gulf Coast of Florida and the Florida Keys. And the density can vary between pieces from the same area as well.

The amount of rock you use will also depend on what kind of habitat or look you are trying to create. For example, I like a more open look, with large areas of the aquarium bottom uncovered by rock so that gobies and other benthic fishes, as well as plate corals, have plenty of room to move in. No matter what look you prefer, it is very important that you stack the rock so that there is enough space between pieces to allow adequate water circulation and the movement of detritus to areas where it can be removed by external means. By configuring your reef in this way you will also provide more usable hiding places for your fish.

Depending on the density of the rock you select and the type of reef formation you want to create, you can probably count on using from 1 to 2 pounds of rock per gallon. This will form a reef that will rise about two-thirds up the back of the aquarium.

The industry breaks live rock down into two categories. One of these, referred to as base rock, typically has few encrusting animals, at least when initially placed in the aquarium, and is usually not that interesting to look at. Some of the more desirable base rock will have coralline algae encrusting the surface. The base rock is the foundation of the reef structure, upon which the more creature-infested pieces of rock and live corals are placed.

The second category of rock usually has more obvious signs of life, which may include plants, sponges, tunicates, bryozoans and Christmas tree and feather duster worms. This rock is often referred to simply as live rock (as opposed to base rock) or reef rock. This rock is more likely to cause problems if it is introduced into an aquarium that is already established.

If you are buying a significant quantity of uncured rock for an aquarium that already contains livestock, you need to cure it in a separate container first, preferably one with some form of biological filtration. This way, if some of the rock is a little bad, the nitrifying bacteria present in the tank will prevent the rock from becoming worse.

You can set up a separate aquarium to be used for curing new pieces of rock, or move an external filter with conditioned filter media (e.g., a canister filter with carbon or plastic biomedica that has been running on the aquarium for several weeks) from your display tank to the container in which you will cure your rock. There should be water pumps to provide adequate water flow.

Observe the rock for about two weeks before moving it into your display aquarium. Remove any dead organisms from the rock by siphoning them out of the container with flexible tubing, brushing off the rocks with a toothbrush or using tweezers to pick them off. If there is a lot of dead material, place a small amount of water from the holding container into a bucket and agitate the rock in this water. Then discard the water.

When the rock is ready for the display aquarium it will not have any white film, black spots of rotting material or a strong odor. Live rock will always have a slight aroma when removed from the water, but it should not be strong.

To avoid all this hassle I find it easier to buy rock that has been in my local pet store for a week or more. Being able to select rock out of a retailer's holding tank allows you to get the shapes and sizes you want, plus you don't have to worry about a rock killing all your aquarium inhabitants.

Next month we will continue our discussion on the key elements of a Berlin system reef tank. Stay tuned!