

THE SEAHORSE CHRONICLES

TEN STEPS TO SETTING UP A SUCCESSFUL SEAHORSE AQUARIUM — PART THREE

by BERNARD HARRIGAN

After you have finished reading Part II of this article, you understand:

- There are three methods of filtration — mechanical, biological, and chemical.
- Excess water movement is detrimental to seahorses.
- Using an assortment of filters can lead to better water quality.
- Air bubbles can be harmful to seahorses.
- You shouldn't skimp on biological filtration.
- A light fixture helps establish a length of day, and allows you and your seahorses to see.
- Seahorses do better with at least 12 hours of light.
- A timer on your light fixture provides a more even photo-period.
- Natural ocean water can be detrimental and toxic.
- Marine salt is more than just table salt.
- The easiest and safest way to make saltwater is to use a synthetic marine salt mix.
- Use RO ("reverse osmosis") water when you make saltwater.
- It may take up to two days for all the salt mix to completely dissolve.
- How to use a hydrometer to test the water's salinity.
- You might need to adjust the water's density if it's not in range.

Now that we have our tank filled with saltwater, we can move onto putting the pieces together that (if you'll excuse the play on words) "flow better once water is in place."

Step Seven - Stabilizing the Temperature

A seahorse's natural habitat has a normal temperature range. *Hippocampus reidi*, the Brazilian Seahorse, has a preferred temperature range of 75° to 80°F, and *Hippocampus abdominalis*, the Big-Belly Seahorse, has a preferred temperature range of 65° to 70°F. Unfortunately, the wide temperature range we keep in our homes doesn't match the narrow range that the seahorses need. In the summer, while we work in air-conditioned offices or homes, the temperature could reach over 95°F. In the winter at night, while we snuggle under the covers, we might let the temperature drift down to the 50s, so we can save money on the high cost of fuel.

In order to make sure the aquarium's water temperature doesn't drop too low or too fast (a quick drop of five degrees is more deadly than a slow descent that happens over a few days), we install heaters in our tanks. When we think of heaters we think of a glass tube containing an electrical heating element, a knob on top to adjust the temperature, and a little red light that lets you know when the heater is heating. These heaters have a built-in thermostat which sometimes sticks, thereby leaving the heater turned on and "parboiling" your fish. To avoid being burnt by a

bad heater, so to speak, install two smaller heaters rather than one big one. The chances of both heaters having their thermostats stick at the same time is slim. If one small heater goes bonkers, it won't fry your fish. In addition, two small heaters at opposite ends of the tank provide more uniform warmth.

The standard glass tube heater is still around, but new varieties and species of heaters have evolved. In some models, the glass tube has been replaced by reinforced plastic or a stainless steel cylinder. A low-water shutoff is an improvement which some heaters provide. Some heaters connect to the return line of your canister filter, or are built right into a filter, saving space in your aquarium.

Another variety is a heater and powerhead in one. A powerhead used with a heater will give you better heat distribution in the tank. They don't use a heating coil, but they use the same technology as the defroster on your car's windshield.

Summertime temperatures can rise to over 100°F, causing the temperature of our tanks to rise, too. This could kill your seahorses as easily as too low of a temperature. Temperate water seahorses are more susceptible than tropical varieties, but this could be lethal to any species.

To prevent your tank from overheating, there are a number of things you can do. A fan directed across the surface of the water cools by evaporation. The process that turns water into vapor removes heat. If the top of your tank is tightly sealed by a hood, you can install a small fan meant to cool computers.

A friend of mine used to leave his air conditioner on all summer, just to keep his seahorse tank from overheating. It did the trick, but you must really love your fish to go this route, as running the air conditioner all day gets to be very expensive.

A cheaper way in the long run is to buy a special refrigeration unit for your tank, called a chiller. They are not cheap. The least expensive one will cost you a couple of hundred dollars once you have it working. The high-end ones run into the thousands. But considering the electricity you'll save by cooling your tank, rather than cooling a whole room, the chiller will pay for itself in the long run.

Chillers work in one of two ways. One type has a compressor and evaporator coils, along with some type of gas coolant akin to what you would find in the workings of your refrigerator. These are the higher priced types. Another type uses a transformer to convert electric current directly into cooling power. These are the less expensive models. The ones that use a transformer are only for smaller aquariums.

So, what is the temperature of the water? To find that out, you need a thermometer. Thermometers come in many varieties: floating, standing, stainless steel, plastic strips that mount on

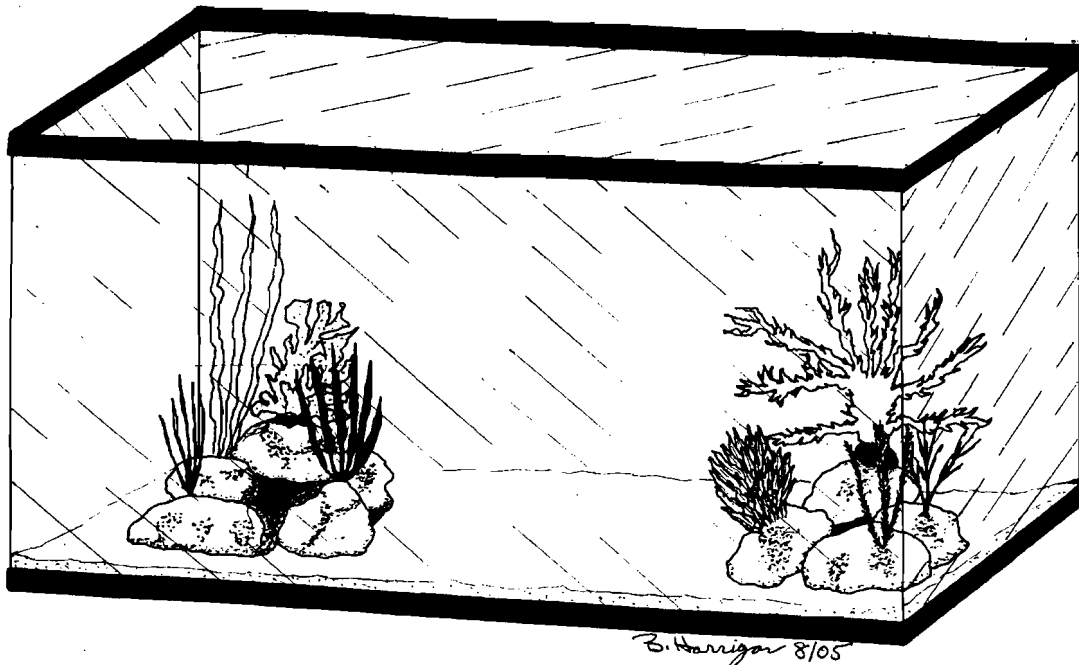
the outside glass of the tank and change colors as the temperature changes, electronic digital devices, and some that have a separate probe to sense the temperature. For a seahorse aquarium, a simple two dollar thermometer is all you really need; either the plastic strip type, or the standard glass variety that stands on the bottom of the tank.

Step Eight - Setting the Stage

Seahorses have evolved to use stealth, camouflage, and concealment in order to survive. For this reason, a bare tank would be not only alien to the seahorse, but would be a downright stressful environment. On the other hand, a tank which is too densely decorated would be hard to keep clean, and would make it difficult for the seahorses to hunt, interact, and eat.

An aquarium is an unnatural environment that we, as hobbyists, try to make as natural as possible. In the wild, seahorses can have a vast territory, and an aquarium is a minuscule fraction of that space. It is our job to take the best elements from their natural environment and represent them in the small confines of a fish tank. Just as a stage depicts the vast world of its actors, the tank is a stage for our seahorses. We are the set designers. Our stage must provide sanctuaries, but also a clear area for when the seahorses want to socialize.

Think of the tank as having three parts: stage left, stage right, and center stage. Stage left and right will have several small to medium-sized pieces of live rock (porous stone teeming with life). Hitching posts for the seahorses to wrap their tails around will be placed all through the live rock.



You could use artificial coral and plastic plants for hitching posts. There are plastic plants made to look like saltwater plants. Both artificial corals and plastic plants have a realism that has greatly improved over the years.

You could even use a replica of a sunken schooner, a castle ornament, or a Sponge Bob Squarepants aquarium figure. The seahorses won't discriminate. It's all a matter of your taste. What does matter is to make sure you have enough hitching posts. Put a couple towards the back of the live rock, and several towards the front. This gives your seahorses a curtain to hide behind when they want some privacy. Seahorses are basically solitary creatures which do not swim in "herds."

If artificial elements disturb your esthetic sensibility, you could use real seaweed or coral skeletons. Of the seaweeds, I think that *Caulerpa prolifera* is the best suited for a seahorse aquarium. However, *Caulerpa* has been known to die off en masse, polluting your tank and, again, killing your seahorses. If you are determined to use living coral, or any macroalgae, make sure you understand the needs of each of these living organisms before you add them to the tank. Does the tank have adequate lighting? Does the new addition need the same temperature range as the seahorses you plan on keeping? Can they survive without strong water movement? Some corals can sting and possibly kill your seahorses.

Your center stage is an open area. You'll see seahorses from the left and right come to the center to interact, socialize, dance, and maybe even mate. All you need is a substrate floor. Crushed coral or aragonite sand works well. These substrates buffer the water, which will stabilize the pH and calcium levels.

Step Nine - Seahorse Safety

Members of the genus *Hippocampus* are not known to be strong swimmers. They have a natural curiosity for small openings, and they have a habit of wrapping their tails around almost anything in the tank. These behaviors, which help them survive in the wild, become dangerous to them when combined with some of the equipment we need to maintain our aquariums. There are a number of things we can do in order to protect our seahorses.

Seahorses can sometimes become trapped on the suction end of a filter, protein skimmer, or any pump, for that matter. This can happen if they wrap their tails around an intake. They can also get their mouths stuck if they get too close while looking for shrimp. Their feeble swimming ability is no match for the suctioning capabilities of some of our equipment.

The first line of defense is to use filters, protein skimmers, etc., with the lowest GPH (gallons per hour) rating you can, without compromising the effectiveness of that piece of equipment. If the suction is still too strong, consider connecting it to a surface skimming unit. This extracts at the air/water interface, taking with it any waste that's known to migrate to the surface. This is extremely helpful to protein skimmers. You can also attach the intake to certain sponge or box filters. The idea here is to increase the surface area the water is exposed to. This weakens the suction without reducing the water flow to the equipment. It also serves as a prefilter.

I've heard accounts of seahorses wrapping their tails around heaters, and getting badly burned. (Although I've had seahorses do this, I've never had one get burned.) I'd be remiss if I didn't discuss this. In order to prevent this from happening, you could place the heater in an area where the seahorses can't get their tails around it. Another way is to place some type of guard around the heater so the seahorse won't be touching the hot glass. Some heaters even come with a guard that you can attach.

Step Ten - Testing Your Water, AND Your Patience

You have your tank filled, furnished, and filtering. So you are ready to put the seahorses in — NOT YET! Your tank hasn't been cycled. The "Nitrogen Cycle" is a dramatic biological process caused by a number of bacteria that rid the water of poisonous types of nitrogen. This is the same nitrogen cycle (only different bacteria) that occurs in freshwater, except these same nitrogen compounds will harm your saltwater fish a lot faster.

Ammonia (NH₃) and ammonium (NH₄) are the most poisonous, and will spike up first. Concentrations of .12 PPM (parts per million) or higher are considered deadly. Certain bacteria will feed off of these compounds and flourish, turning them into nitrite (NO₂). Nitrite concentrations of .08 PPM, or higher, are harmful. Other bacteria will then feed off of the nitrites, turning them into nitrates. Concentrations of 125 PPM, or higher, is a killer.

One of the reasons for adding live rock is that it contains all the different types of good bacteria that your tank needs to jump-start the nitrogen cycle. Plus, when you first put the live rock into your aquarium, some of the organisms on the rock will die off, causing ammonia and ammonium, thereby feeding the bacteria.

Always be sure any live rock you buy has been pre-cured. To cure rock, you rinse off the

majority of dead organisms in saltwater. Then, place it in a curing tank to let the rest of the dead organisms literally rot away. This could take over a month, and it's a smelly process. Rock is never completely cured until after it's been in your tank for a while.

The nitrogen cycle takes four to six weeks to complete. The only way to know how far along your tank is in the nitrogen cycle, and when it's finished, is to test the water. By testing the water daily you will see the ammonia elevate initially. By two weeks, it will have peaked, and then plummeted. Nitrites are the next to spike up, and again by two weeks it should have reached its peak, and then quickly dropped off. Nitrates are the last to rollercoaster.

The levels you are looking for are .009 PPM or less for ammonia, .09 PPM or less for nitrites, and 30 PPM or less for nitrates. If you want to keep coral in your tank, your readings should be much lower. To know how low depends on the type of corals you wish to keep.

At this point, you will need to perform other tests. The nitrogen cycle can cause a drop in the pH. Test your pH. You are looking for a reading between 8.1 to 8.3. If it's lower, bring it back up. The breaking down of organic compounds will also cause your phosphate levels

to rise. High phosphate levels will cause a breakout of unwanted algae. You are looking for a phosphate level of .19 or less.

Another important water parameter which needs to be tested is carbonate hardness. Carbonate hardness measures the amounts of calcium carbonate and magnesium carbonate that are suspended in the water. You are looking for a reading between 7 and 9 dkH. Lower than that, and your pH can become unstable.

Do not be in a rush to put seahorses in the aquarium until the nitrogen cycle is complete. Even after the cycle is complete, the addition of any living organism will spike the amount of ammonia in your tank until additional "good" bacteria has grown to handle the additional bio-load.

I wouldn't add anything more than a pair of seahorses at one time. After the new addition (it could be seahorses, or a dozen turbo snails, etc.), wait a month for the good bacteria to multiply before you add something else. This might be frustrating, but not as frustrating as having an ammonia spike kill your fish. Remember, ammonia, nitrites, and nitrates are all more toxic in a marine aquarium than in a freshwater aquarium.

By now, after reading this last of three articles in this series, you know the following:

- That you need to keep the temperature range of your tank the same as the temperature range in the native habitat of the species of seahorse you wish to keep.
- A quick change in temperature is deadly.
- Heaters keep your tanks from getting too cool.
- Fans keep your tank from getting too hot.
- Chillers can be used when fans are not enough.
- You don't need an expensive thermometer.
- You should lay out your tank in three sections.
- Have "live rock" and "hitching posts" on either end of the tank.
- Leave the center of the tank barren for socializing.
- Don't use a strong pump in your tank.
- Make sure your seahorse can't burn its tail on the heater.
- Let the nitrogen cycle run its course before adding the seahorses.
- Ammonia, nitrites, and nitrates are more toxic in saltwater than in freshwater.
- Test your water to make sure all parameters are in range.
- Add tank inhabitants a little at a time.
- Wait a month before adding a little more.

