

Nitrogen Cycle

Starting a new tank and the nitrogen cycle.

By David A. Lass

The best way to set up a tropical fish aquarium is to stock it heavily with aquatic plants, and then add some algae-eating shrimp. Take readings for ammonia, nitrite and nitrate every day, and put in a pinch of flake food once a day for a week. Then start adding some fish, starting out with small, peaceful and hardy folks like zebra danios. As the aquarium matures, the nitrogen cycle will get going. You should get some test strips so you can test every day or two for ammonia, nitrite and nitrate.

The nitrogen cycle is the single most important thing to understand about how we are able to keep tropical fish in glass cages. A good way to visualize the start-up of the nitrogen cycle is to think of the McDonald's golden "m" arch, but with three arches, each one of which overlaps the next one.

The first arch is ammonia. As the few tropical fish and shrimp in the aquarium give off waste (ammonia), the arch for ammonia starts going up. When the ammonia arch is near its top, the middle arch will start -- this is nitrite. Over time you will notice that ammonia starts coming down as nitrite goes up. Both ammonia and nitrite are very poisonous to tropical fish and invertebrates, ammonia being the worst, and especially if the pH is above 7.0. Soon the middle arch (nitrite) peaks, and the third arch starts on its way up -- this is nitrate. Nitrate is not that harmful to tropical fish, and it can be removed from the water by having lots of fast growing aquatic plants in the aquarium, and doing a regular water change of 25 percent once a week.

When an aquarium has "cycled" that means that the various beneficial bacteria that work the magic of the nitrogen cycle — that change ammonia into nitrite, and then nitrite into nitrate — have grown to the proper quantities needed for the aquarium. When the aquarium has cycled you can safely add some more fish — a few at a time. A mature aquarium will be able to keep the nitrogen cycle going since the good bacteria will increase in numbers as you add more tropical fish.