The First 30 days

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No time is more exciting yet also potentially more frustrating than the first 30 days of setting your aquarium. Since many of you might be hoping for a new aquarium under the Christmas tree this holiday season, or will be asked by neighbors to help set-up the tank they just surprised their children with for Christmas, I thought it would be a good time to review what is going to occur in the aquarium environment during the first month.

I'll assume that you have the tank and necessary filtration system which means it contains the three basic filter components: mechanical, chemical and biological filtration. Instead, I will discuss the biological and chemical processes which will occur after setting up the tank.

First, don't buy fish on the same day you set-up the tank. Setting up an aquarium will enviably take longer than you think and the fish will just be left setting in the bag needlessly. So set-up the tank one day and get the fish the next.

When first set-up the aquarium is a clean environment but it is not sterile. The gravel, decorations, even the tap water contain bacteria that may or may become part of the consortium of bacteria which reside in your aquarium. In fact, a rather common problem in newly set-up aquaria is cloudy water for the first few days. The cloudiness looks like a whitish-gray hue in the water, much like a very weak milky solution. This situation is usually not harmful to fish but it doesn't look good. The cause is a bloom of what are termed heterotrophic bacteria. There are many different ways to classify bacteria and one of the ways is by the source of carbon for the bacteria. If the carbon source for a bacterium is carbon dioxide then that bacterium is classified as autotrophic, if the carbon source is a complex, or organic, form of carbon then the bacteria are termed heterotrophic. Don't let the jargon intimidate you. It just one way microbiologists classify bacteria. For instance, another way to classify bacteria is by whether or not they require oxygen.

In a newly set-up aquarium, there can be a wide range of organic materials which heterotrophic bacteria can use for growth. This includes body oils that got in the water from your hands, residues of chemicals used to make the filtration system, and dirt that is part of the gravel and decorations. So to reduce the chances of a bloom, you should

rinse all the materials that will be in contact with the aquarium water with lots of tap water before putting them in or on the aquarium.

Another potential source of material that can promote a bacterial bloom are various commercial water conditioners. Normally, use of these is no problem but many times people are lazy and instead of measuring in the correct amount of the conditioner they just squirt a bunch in the tank. This 'extra' amount of some conditioners can become a source for the bacteria. So don't overdose on the water conditioners.

If a bloom does occur, do a 25% water chance each day for the first 2 or 3 days and the bloom will quickly disappear. Even if you do nothing the bloom will usually disappear within a week and rarely will your fish suffer any bad consequences.

Some people mistakenly assume that the bacterial bloom is the result of the nitrifying bacteria but this is wrong. Nitrifying bacteria grow much too slowly to cause a bloom and cloud the aquarium water.

The second most common problem during start-up is high ammonia. When an aquarium is first set-up there is an insufficient number of the nitrifying bacteria to take care of the ammonia excreted by the fish. This is why it is recommended that you initially buy only a few fish. As stated earlier the nitrifying bacteria are slow growing so it takes them several days to start converting appreciable amounts of ammonia to nitrite. Research in my laboratory, for instance, shows that in a 10-gallon aquarium stocked with 10 adult-sized tiger barbs the ammonia will continue to rise for 7 days before starting to decrease. Usually it is not until 11 or 12 days after set-up that the ammonia concentration drops below 0.1 mg/L. In this same series of the tests the ammonia level reached nearly 3 mg/L. Thus one needs to be prepared to do water changes for the first two weeks of a newly set-up aquarium. To reduce the maximum amount of ammonia don't overfeed the tank. Start with a few fish and feed only twice a day. I suggest about 5 fish per 10 gallons depending upon the size of the fish. Change about 15% of the water every 3 days for the first 2 weeks and you'll probably have no problems.

While this may sound like a lot of work and a hassle, it is much easier than trying to train a new puppy or keep a new kitten from tearing your curtains to shreds!

The next problem that will occur is one that I believe gets little attention in the hobby but is probably responsible for more fish deaths than ammonia toxicity. This problem is high nitrite concentrations. Once the bacteria that convert ammonia to nitrite (called ammonia-oxidizers) start working the nitrite concentration in the water will start to increase rapidly. Unfortunately, the bacteria that convert nitrite to nitrate (the nitrite-

oxidizers) are even slower growing than the ammonia-oxidizers. In our research, we saw the nitrite concentration in the same newly set-up aquaria, as described above, reach concentrations of nearly 10 mg/L. Furthermore, the nitrite levels stayed high for several weeks. Usually the nitrite concentration does not drop before 0.1 mg/L until 25 to 30 days after the aquarium is first set-up.

The easiest way to determine if your aquarium has a nitrite problem is to use a nitrite test kit. Nitrite is easily measured and the results are quick. Nitrite kills fish by impeding the circulation of oxygen from the gills to the rest of the fish - basically the fish suffocate to death. The malady is called brown gill disease because the gills of the fish will be brown instead of the normal red color.

Nitrite toxicity is a real problem in newly set-up aquaria. However, the personnel at many stores will often only recommend that the new aquarium owner purchase an ammonia kit to measure and determine when ammonia has peaked and disappeared. The store clerks rarely mention nitrite and its lethal effects on fish. Thus, as a new aquarium owner you are measuring ammonia a few weeks after setting up the aquarium and getting a zero value. This means that it is ok to add some more fish - right? So additional fish are added but fish start to die and the problem (high nitrite) is often not detected. If fish are dying in your aquarium 10 to 30 days after it was set-up, the chances are very good that the reason is high nitrite not high ammonia.

The fix for high nitrite is easy - change the water. 25% every 2 or 3 days for the first three weeks or so should be enough.

Can the problems I described here be avoided? The technical answer is no, a newly set-up aquarium has to go through what is termed the break-in period or cycling where sufficient numbers of nitrifying bacteria become established. But in reality the problem can be lessened and the work load (meaning the amount and frequency of water changes) reduced if you will have patience and restrain yourself from adding too many fish to quickly to a newly set-up aquarium. Add small fish that don't require a lot of feed. Don't feed more than twice a day and only what the fish will immediately consume. If there is food on the tank bottom you are feeding too much - remove the uneaten feed and reduce the amount you are putting in the aquarium.

The final issue to discuss is when to clean the filter - after all it has only been 30 days, does the filter really need to be cleaned? The answer is that it never hurts to clean your aquarium filter, especially the mechanical component. Cleaning can be a simple as rinsing it under some tap water for a few seconds to get rid of the grunge

trapped on it. If you have only a few fish and have not been overfeeding then a quick check of the filter and rinse of the mechanical pad is probably all that is needed.

Now you can go back to the fish store and get some more fish. Make sure to ask questions about fish compatibility - after all that small Jack Dempsey will grow fast and the guppies you have in the same tank will not be there after a few months!

Setting up a new aquarium doesn't have to be time consuming, hard or frustrating - a little planning, patience and a few water changes will make the first 30 days do by quickly and uneventfully. Remember if in doubt - change some of the water, it won't hurt and mostly likely will fix the problem. Get passed the first 30 days and you'll find that an aquarium is an easy, beautiful addition to your house or office. To keep it that way, change 25% of the water once a month and clean your filter once a month. Do this and pretty soon you'll find yourself back at the fish store checking out another tank even bigger than your first one. Enjoy!

2007 Editorial addition – This article was originally written before DrTim's One and Only nitrifying bacteria was developed. Nowadays, many of the problems caused by the high ammonia and nitrite concentrations associated with newly set-up aquaria can be avoided by using this specially developed mixture of nitrifying bacteria.

