Coburg AQUARIUM

Fact Sheet

Water Quality

Basic Water Quality for Freshwater Aquariums

Good water quality maintenance is essential for successful fish keeping. More than 90% of diseases in aquarium fish are caused by poor water quality and/or poor maintenance of aquariums. Bad water quality decreases a fish's immune system and increases susceptibility to diseases. Making sure the water is suitable for your fish is essential for healthy fish.

Different species of fish also require different water quality parameters: species from different geographic regions with differing vegetation and soil or rock have evolved and adapted to different ecosystems and the respective local water chemistry. These adaptations allow the fish to function properly, if kept outside these parameters, their body may not behave as normal and disease could result.

In the aquarium we need to manage water quality through filtration, water changes and other preventative maintenance. Water quality consists of many different parameters, many of which are not easily tested for but can have a major effect on fish health (e.g. heavy metals).

The more important parameters are as follows:

Temperature: Fish are cold blooded and need adequate temperatures to function properly. Temperatures outside their normal range make them more susceptible to disease. Check your aquarium water temperature regularly with a thermometer.

pH: A measure of the acid/alkali nature of the water. pH 7.0 is neutral, below 7 is acid, above 7 is alkaline. Incorrect pH will cause stress and disease in fish. Test with pH kit or a pH meter regularly and adjust as required (avoid large sudden changes of pH).

Ammonia: Ammonia is a waste product of fish and can quickly build to toxic levels. A biological filter is needed to keep Ammonia and Nitrite levels safe.

Nitrite: Nitrite is the intermediate stage of the break down of Ammonia to the less toxic Nitrate. Nitrite stops the uptake of Oxygen by fish and is a good sign of a failing biological filter.

Nitrate: Is the end product of the break down of Ammonia by the filter. While low levels are not harmful to fish, excess Nitrate over a long period of time can cause immune suppression and the growth of excessive unwanted algae. Removed by water changes and plants.

Oxygen: Not normally measured but is essential for aquatic life. Oxygen is provided by disrupting the water surface with air stones or pumps that create water movement, to maximise gas exchange in the aquarium. Fish 'breathing' or 'gulping' at the water surface is a sign of low oxygen. It is worth remembering that the bacteria responsible for the removal of Ammonia also require Oxygen to function!

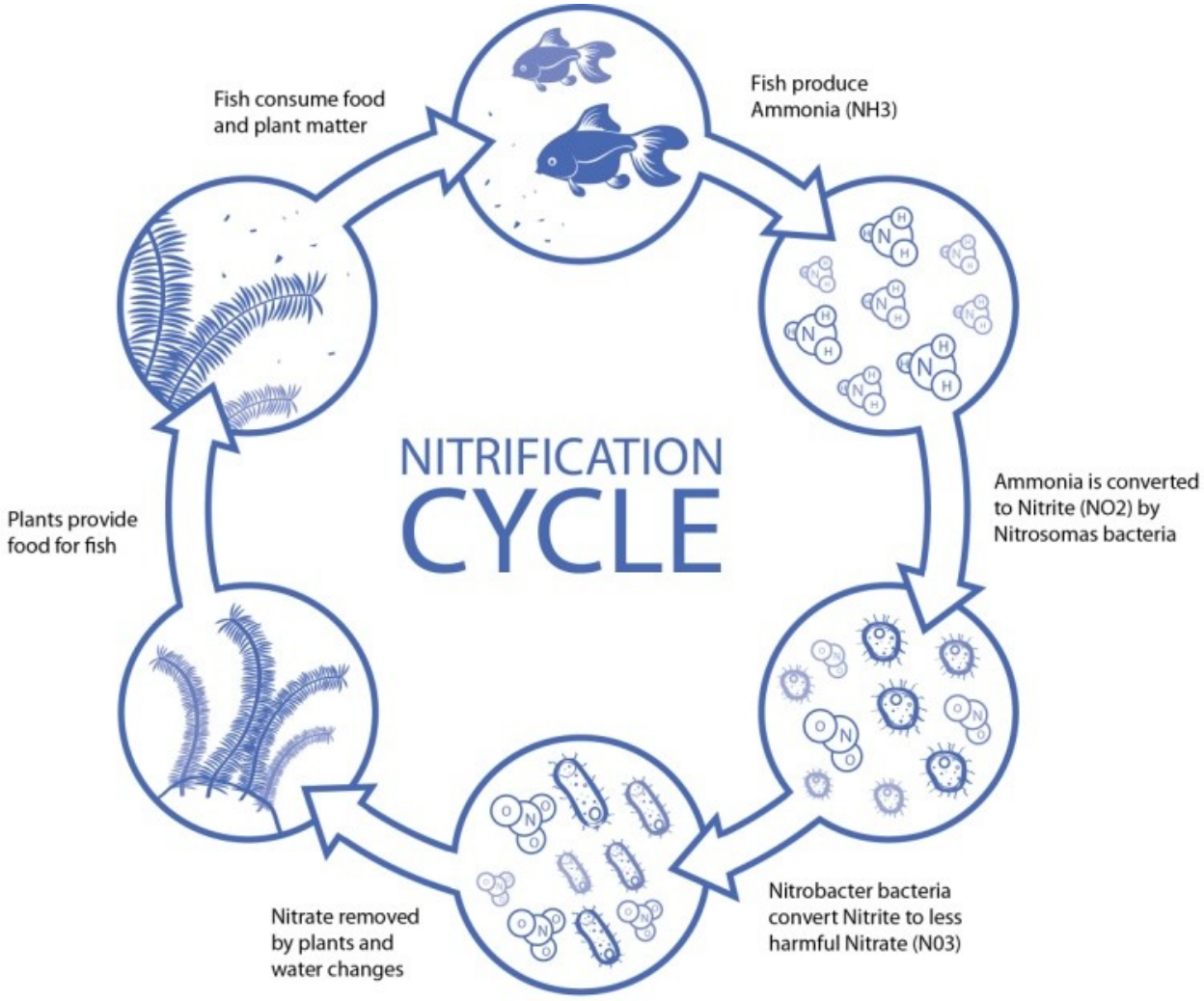
General Hardness: A measure of the amount of minerals such as Calcium and Magnesium in the water. Incorrect levels will affect the fish's ability to maintain correct water and salt balance in its body, leading to stress and disease. Test after a water change with a hardness test kit.

Alkalinity or Carbonate Hardness: A measure of the buffering capacity in water (the water's ability to maintain a pH). The higher the KH (carbonate hardness) the better water will maintain its pH and not suddenly drop to a low pH. Water with a high KH reading is also usually very alkaline as well.

The Nitrogen Cycle

Ammonia is the main waste product from fish or uneaten food that will ‘poison’ fish. Ammonia will damage gills and is a neurotoxin affecting the brain. Special bacteria called nitrifying bacteria are able to process this waste via a process called **Nitrification** or the **Nitrogen Cycle**. It is essential to establish Nitrification in an aquarium to prevent ammonia building up to toxic levels (Also called ‘Cycling’).

In a newly established aquarium it normally takes several weeks to establish this cycle, care must be taking during this time to prevent toxic levels of Ammonia and Nitrite which results in what is commonly called ‘New Tank Syndrome’.



New Tank Syndrome (NTS) is the generic term used to refer to Ammonia and Nitrite poisoning of fish during the initial set up phase (or 'cycling') of the aquarium which results in large fish losses. Losses may continue for 2-3 weeks if left unchecked. A variety of factors contribute to NTS, including but not limited to; Insufficient Nitrifying bacteria, adding too many fish, over feeding, lack of water testing.
To avoid NTS, try one of the following methods to establish a Nitrifying bacteria culture in your aquarium.

Cycling Method 1

This method allows the bacteria to establish in its new environment (Tap water quality varies from place to place and this can affect the performance of the bacteria) before adding fish, which usually results in less dramatic increases of Ammonia and Nitrite.

Step 1: Set up the aquarium equipment (filters, heaters etc) and ensure everything is working correctly.

Step 2: Add plants if desired, test and adjust pH and General Hardness to the appropriate levels.

Step 3: Add products such as Seachem Stability, Nutrafin Cycle or Sera Nitrovec for a minimum of 3 days, with the optimal time being 7 days.

Step 4: Introduce a small number of hardy fish (For example – 60Lt Aquarium add 10 Neons, or 5 Guppies, a 120Lt aquarium add 20 neons or 10 guppies).

Step 5: Perform daily tests of Ammonia and Nitrite while continuing to add one of the products listed above.

Feed fish only a small amount every second day, being careful not to overfeed. If Ammonia or Nitrite is detected, stop feeding immediately, perform a partial (up to 25%) water change and/or lower the pH to 6.6. Consider adding Seachem Prime or Amgaurd to help protect your fish against the toxic effects of Ammonia if the detectable levels are high.

Step 6: After 7 days, if no Ammonia or Nitrite has been detected, introduce another small batch of fish. Continue to monitor Ammonia and Nitrite and gradually increase the amount of feeding to once per day.
Perform a water change after 14 days of 25% and continue to add small numbers of fish weekly until you have reached the desired stocking density.

Cycling Method 2

For those who just can't wait to add fish, or for owners of unfiltered bowls, cycling with fish requires due diligence to avoid toxic levels of Ammonia and Nitrite. This method tends to result in Ammonia and Nitrite reaching higher levels faster and for longer periods. It is recommended for experienced aquarists only. This is essentially the same process as the first cycling method; however fish are added within the first 24-48 hours after set up. Ammonia and Nitrite need to be tested for twice daily, and it is highly recommended to introduce some beneficial bacteria to the tank at the same time.

The sooner the fish are added to the aquarium, the greater the risk there will not be a stable bacterial colony large enough to cope with the fish waste. Common effects are white cloudy water (either due to high levels of Ammonia and/or a bacterial bloom), and sudden death of fish.

Now that you have established a bacterial colony capable of supporting your fish load, its time to start water changing.

Dilution is the Solution to Pollution

Water Changes are required to reduce Nitrates, Phosphates and other chemicals, as well as removing organic debris such as uneaten food and faeces. If you have gravel in your tank, use a gravel siphon to remove organic debris, faeces and uneaten food - this will help reduce any harmful bacteria and improve water quality.

Replacement water for the aquarium should be treated with a water aging conditioner to remove chlorine, chloramines or toxic metals (often present in tap-water, and harmful to fish), as well as the appropriate mineral salt mix to alter the composition of the water to make it suitable for the fish (e.g. Tropical Water Crystals).

You should also consider the impact water changes can have on temperature in the aquarium – large water changes using cold water can drastically reduce the aquarium temperature, causing fish stress, breakouts of white spot disease or even the death of sensitive fish. Pre-heating water may be necessary to prevent this, especially in colder months.

The volume and frequency of water changes will vary with the number and size of fish: the more fish stocked, the more water changes are needed. A good rule of thumb is 20 – 30% of water at least once a fortnight, (more often for heavily stocked tanks, or for sensitive fish such as Discus.)

Water Changes are also used to help control sudden increases in Ammonia or Nitrite or removing excess medications or other chemicals.

TYPE OF FISH	pH	Temp (°C)	GH (ppm)	GH (DH)	Nitrite (ppm)	Ammonia (ppm)
BRACKISH	7.5 - 8.0	22 - 26	250 - 300	14 - 17	0	0
GOLDFISH	7.0 - 7.5	16 - 22	150	8 - 9	0	0
LIVEBEARERS	7.0 - 7.5	22 - 26	200 - 300	11 - 17	0	0
COMMON TROPICAL*	7.0	22 - 26	100 - 150	5 - 9	0	0
RIFT LAKE CICHLIDS	7.5 - 8.0	24 - 26	300 - 400	17 - 22	0	0
TETRAS	6.5 - 7.0	22 - 26	50 - 150	3 - 9	0	0
DISCUS	6.5 - 7.0	28 - 30	50 - 150	3 - 9	0	0

*This includes fish such as Barbs, Gouramis, and Catfish

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