



The nitrogen cycle is the biological process that recycles organic waste in a body of water by converting ammonia into nitrates. Without it, the ecosystem in your pond would quickly become uninhabitable. Ensuring this cycle is optimized requires understanding the relationship between ammonia and pH.

Ammonia

Ammonia is the byproduct of debris and waste decomposition and is highly toxic to koi. Even small concentrations can cause tissue damage and bacterial or parasitic infections. Ammonia damages the gills, skin, and slime coat of fish. Symptoms of ammonia poisoning include skin and gill irritation, fin clamping, lethargy, or gasping at the pond's surface. It's best to keep ammonia levels as close to 0 as possible.

pH

The pH scale measures free hydrogen levels in water and ranges from 1 to 14. Seven is neutral pH, where water is neither acidic nor alkaline. As the scale goes down, water becomes more acidic, and as the scale goes up, water becomes more alkaline. Koi do best at levels between 7.0 and 7.5.

Ammonia and pH Interaction

Your pond water's pH plays a large role in ammonia toxicity. The lower the water's pH, the higher ammonia levels can rise without becoming toxic. As pH rises, ammonia becomes increasingly toxic at lower levels.

For example, if your pond's pH falls between 7.0 and 7.5, your koi

can tolerate ammonia levels up to 1.0 ppm. At an 8.0 pH, the same ammonia level becomes harmful, and at a pH of 9.0, it becomes lethal. Therefore, it is crucial to test pH and ammonia levels to prevent an adverse interaction.

Stabilizing pH and Ammonia

Maintaining good water quality can stabilize your pond's pH and minimize ammonia levels. The pond's biological and mechanical filtration systems are a key component of this. Biological filtration creates an environment where beneficial bacteria thrive. Mechanical filtration removes waste and debris.

Regular water changes are necessary to facilitate both systems. The size and volume of your pond will determine how often you should replace water and how much. We recommend water changes of 10% to 25% every one or two weeks.

Ammonia and Shipping

Do not mix pond water with the water from your shipping bag when introducing new koi to your pond. Koi release waste into the bag, and ammonia levels rise. Adding your pond water will increase the water's pH and, therefore, toxicity. A better way to acclimate new fish is to float the bag in your pond for about 20 to 30 minutes before releasing them.