

# pH and Ammonia – What You Might Not Know

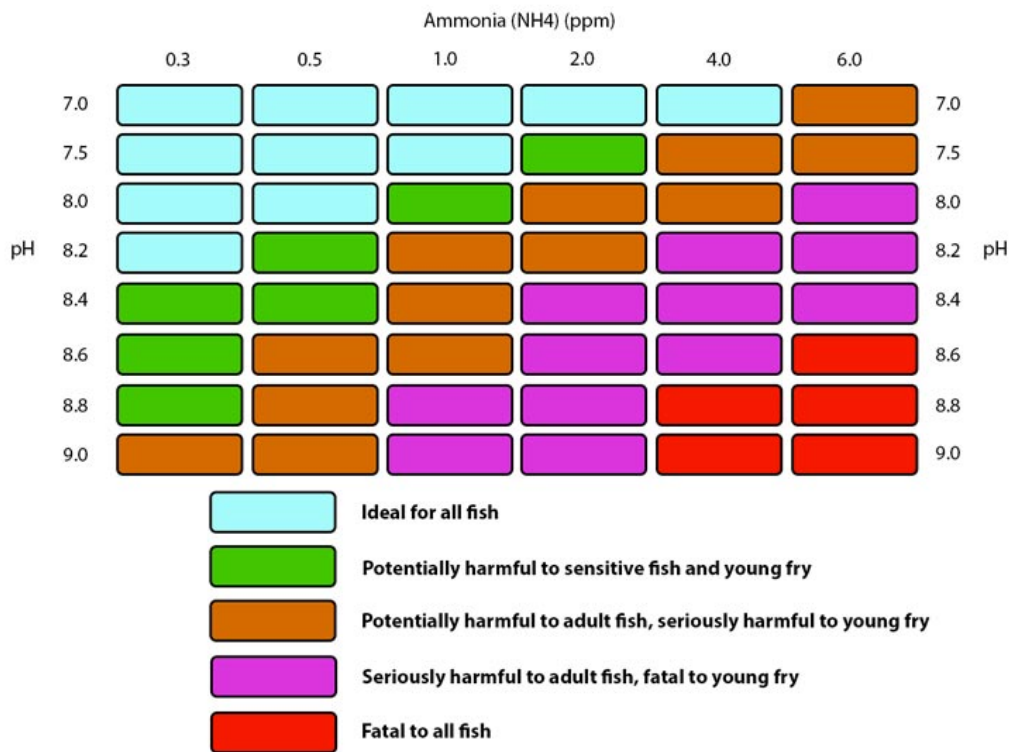
Everyone knows that pH and ammonia levels are vitally important to the health of your koi and goldfish. But did you know that measuring pH and ammonia tells only a portion of the story?

Commercial ammonia test kits measure total ammonia. But it's the un-ionized portion of the total ammonia that is toxic to your fish. And the amount of un-ionized ammonia changes drastically as the pH changes.

Take a look at the chart below for further explanation.



**Toxicity of Ammonia as related to pH Level (at 77 degrees F)**



As you can see, an ammonia level of 1.0 ppm is harmless to fish at a pH of 7.0. However, at a pH level of 9.0, that same 1.0 ppm of ammonia is potentially fatal. Put another way, a given amount of total ammonia is approximately 10 times more toxic at pH 8.0 than it is at pH 7.0.



So what does this mean for your koi? Well, it is always best to keep your pH somewhere in the range of 7.0 to 7.5, and to keep your ammonia as close to 0 as possible. However, when your ammonia starts to rise (due to over feeding, added stock, or for any other reason) be aware that a spike in pH could turn that small amount of ammonia into a potentially fatal killer.

In the short term, elevated ammonia levels can be mitigated through water changes. For a long term solution, consider adding additional filtration to your system.

## An Aside On Ammonia and Shipping Water

You may see some dealers and hobbyists in the koi industry recommending that, upon arrival of a new shipment of a fish, pond water should be added into the shipping bag in order to acclimate the new arrivals to any difference in temperature. **We do not recommend adding pond water to your shipping bag. We strongly discourage this practice.**

But why? It all has to do with the ammonia and pH relationship.

While fish are packaged in a shipping bag, they release waste into the water, and ammonia levels rise. The fish's respiration inside the bag lowers the pH, rendering the ammonia less harmful than if the pH were higher. By adding higher pH water (your pond water) into the shipping bag, you run the risk of increasing the toxicity of the present ammonia and in turn harming your fish.

For temperature acclimation, we recommend floating the sealed shipping bag in your pond for approximately 20-30 minutes before releasing the fish. This is assuming that the fish appear lively and unstressed. Fish that appear stressed or lethargic in the shipping bag should be released into the pond as soon as possible.

