

Nitrite Season

Nitrite season will soon be here. When night time air temperatures cool in the fall, this affects bacterial activity, which breaks down total ammonia nitrogen (TAN) in ponds. Under aerobic conditions, total ammonia nitrogen (TAN = NH_3 the toxic ammonia gas and less toxic NH_4) is broken down by Nitrosomonas bacteria into Nitrite (NO_2). Nitrobacter further breaks down potentially toxic nitrite into nitrate (NO_3) which is far less toxic to fish. When fall cold fronts hit and limit the ability of nitrobacter to convert nitrite (NO_2) to nitrate (NO_3), problems with nitrite toxicity may occur. Nitrobacters do not take temperature shock well and nitrites tend to build up in pond water after a long summer of heavy feeding. Nitrite can interfere with oxygen transport in the blood causing fish to suffocate. Nitrite toxicity almost always occurs when dissolved oxygen levels are low (less than 3 mg/L).

In order to prevent nitrite toxicity, rock salt is added to ponds. Make sure the salt **Does Not** contain any toxic, anti-caking additives! Rock salt, sodium chloride (NaCl) consists of about 40% sodium (Na) and about 60% Chloride (Cl). Fish gills will preferentially pick up chloride ions as opposed to nitrite, and nitrite toxicity, or brown blood disease will be avoided. Ideally, the ratio of chloride to nitrite should be approximately 10:1 in pond water. Bulk rock salt is fairly inexpensive and can be added to ponds by the ton. Chloride concentrations of 60 mg/L should keep ponds out of nitrite trouble. Many ponds will already contain some low concentration of chloride (10 -30 mg/L). It would be difficult and expensive to add too much salt to a catfish pond as they live well in low salinities. See the following example:

Example: 5 acre pond x 5 feet average depth x 60 mg/L chloride x 4.5 (lbs of salt to add per acre to get 1 mg/L of chloride) = 6,750 lbs of salt to add, or 3 to 3.5 tons.

If you suspect a pond of fish is suffering from nitrite toxicity look for the following: You will see listless, oxygen starved fish near the surface of the water or in the aerator wash. Check for low dissolved oxygen and turn on aeration! Check fish gills or cut the tail off of a fish and look for a chocolate brown color in the blood. Check nitrite and chloride concentrations in the pond water. Add rock salt if needed. It will take a day or so two for salt to dissolve.

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