



NM ZNA NEWSLETTER

Winter 2012-2013



The Winter Pond

It is that time of year again – “to heat or not to heat, to bring in or not bring in- that is the question!

Carp are hardy temperate water fish. But the Nishikigoi, the inbred cousins, possess only a fraction of that resistance to a harsh environment. As a result, we find that the carp in its natural habitat has a survival range that pretty much matches its optimal range. But koi, with only part of this genetic blessing are asked to survive in conditions that their “can’t kill ‘em with a bulldozer” cousin carp would find challenging.

There are many things in a backyard pond that are challenging to koi and wild carp. For one, the fish are unable to move out of the area of challenge the way wild stock can in their natural environment. For another, nature will freshen water and even provide mud (warm decay zones) and deep washouts below the banks of moving water. And perhaps most important of all a wild carp has grown from the egg in its native waters

and acclimates and adapts from day one to a rhythmic cycle of seasons.

So do we even need to do water changes if the fish are not eating? The short answer is yes. The reason being water is still in a closed system and still being effected by things



in and outside the pond. More importantly, koi are at their greatest vulnerability when they are in this limbo condition known as stasis.

If you accept that in a closed system things are still happening that impact the water then you need some water changes to support the potentially vulnerable koi. Inside

the pond, algae still dies off for a time and fish still must pass very weak urine into the water column as a mandatory requirement of freshwater fish function. Gases still build in the pond. Water changes then have to be artful. Less in total amount compared to other times of the year in both volume and frequency. The pH of pond water and tap water should still be checked for relative uniformity. Water changes themselves can be planned weekly with sump/vortex dumps and as we get to the depth of winter, in less frequent cycles depending on precipitation and other factors. But try not to go more than 4-6 weeks without at least a sump/vortex dump.

To summarize, if you are keeping fish above 46 degrees F then you need to treat the pond as ‘alive’ and keep maintenance up. And water changes are the core of all maintenance activities.

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Financial Report

Mike Pfeffer

January 1, 2011 account balance	\$2,543.00
January 1, 2012 account balance	\$4,960.97
Current Balance	\$3,773.22
Upcoming Bills	
Carmel Japanese Garden Society (proceeds at the door)	\$215.75
Web Hosting	\$130.00
Deposit to Carmel	\$100.00

**NM ZNA Members
Visit Japan**



Koi shopping



Culture



Sculpture



Bull Fight





Effects of Pollutants on the Koi's Liver

By: Dave Hulse

There are several ways in which the fish health specialist can monitor liver function during exposure to pollutants. The blood can be analyzed for substances normally produced by the liver. If the concentration falls below known baseline concentrations, then liver damage can be hypothesized. The blood can also be tested for enzymes of liver origin. During exposure to pollutants the liver cells become damaged and their enzymes can leak into the blood. Thus if a high concentration of a liver enzyme such as Sorbitol Dehydrogenase (SdH) or Glutamic Pyruvic Transaminase (GPT) is detected in the blood, again liver damage is likely. For example copper causes major upsets to liver function in all fish. Minute quantities can cause detectable changes. A 32 to 39 millionths of a gram per liter of copper caused a rise in enzymes of liver origin in the blood.

Finally the fish health specialist can directly assay liver function by testing the time taken for the liver to clear a specific, detectable substance, usually a dye. A healthy fish will show a standard time frame whereas a sick fish should theoretically take a lot longer.

There are many metals and organic compounds that can cause profound liver damage which can be measured as describe above. The reason the liver can suffer so badly is that it is the primary detoxification organ. Breaking the toxin down, storing it internally in the liver tissue, or somehow excreting it usually through the bile. If the level of pollutants rises too high then the liver cells themselves become damaged by the very toxins they are trying to remove.

Analysis of liver concentrations of toxic metals such as zinc, cadmium, and mercury is an important technique in studying the levels of pollutants in marine and freshwater environments.

Thus it can be seen that the koi liver performs a range of vital physiological process. When liver function becomes disturbed the delicate balance of the internal environment of the fish is soon upset. One feature of the liver is detoxification of pollutants in the water. If these pollutants cannot be broken down into non-toxic by-products, then the liver must prevent them doing harm some other way. This can include storing the toxic pollutant inside the liver, leading to damage to the liver tissue itself and ultimately upset the fish's internal environment.

Effects of Pollutants on the Koi's Heart

By: Dave Hulse

The beating of a heart can be measured as the minute electrical impulses spread through the heart muscle. By placing tiny electrodes into the underside of the fish the frequency of the impulses can be measured giving an electrocardiogram.

Electrocardiogram work has shown the primary response to acute doses of most pollutants such as ammonia or copper is a rise in heart rate (tachycardia). This is due to the stress response, the fish can detect adverse water quality and attempts to swim away to safety as rapidly as

possible.

A number of pollutants can bring about bradycardia (slowing of the heart rate) but the most notable example is environmental hypoxia (low oxygen concentration). Initially this seems a paradox. When the level of oxygen is low surely the heart should work faster to carry the available oxygen to the tissues. This is not the case for two main reasons. Firstly, the elevated heart rate raises the demand for oxygen thus increasing the oxygen deficit. Secondly, the amount of time the blood spends at the gills is raised due to the reduced heart rate (or pumping speed). Blood

normally spends about one second in the lamellum, if this time is increased then the blood can uptake more oxygen from the deficient environment.

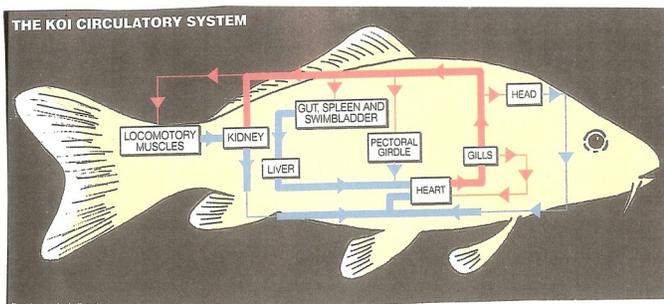
So to summarize this up, the cardiovascular system is intimately linked with the process of gaseous exchange. The fish can increase or decrease the cardiac output as required in response to pollutants or adverse water quality parameters.



normally spends about

Dave Hulse

Dave is a consultant to Tetra, the global leader in the aquatics industry. He is also an experienced biological sciences lecturer having taught at both Reaseheath and Sparsholt Colleges. More recently Dave has taken up a teaching position at Keele University in Staffordshire. Whilst he's knowledgeable about a wide range of subjects in the biological sciences he is happiest when dealing with topics centered on fish and their diseases!

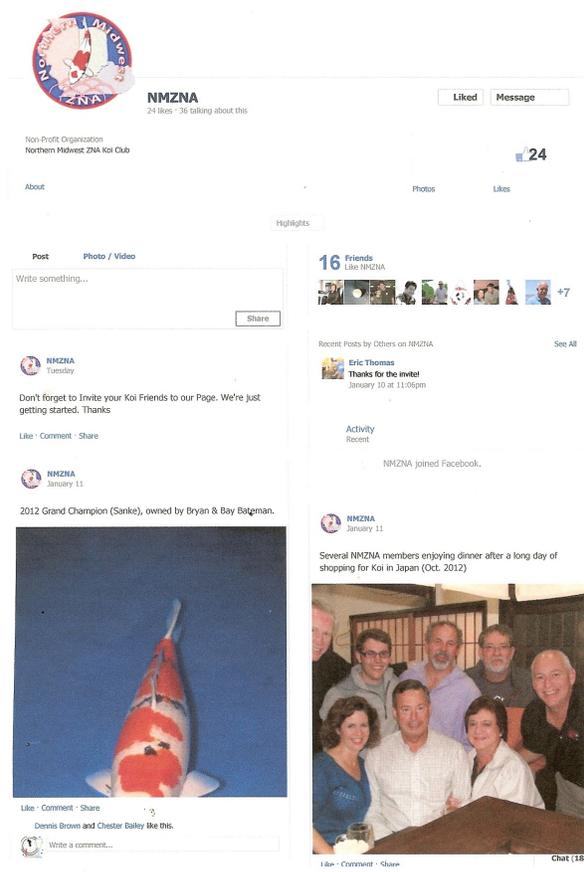


**We are on Facebook
Check us out!**

Troy Head has set up a page for NM ZNA on Facebook. This is a great way for the club to spread the news to the world of our activities, especially our upcoming koi show. Please check out our page and be sure to "Like" us on Facebook.



www.nmzna.net



Save the Dates



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|-----------------------|--|
| February 1-3, 2013 | Dick Thomas to Japan to take ZNA judging exam
44 th All Japan Combined Nishikigoi Show |
| February 23-24, 2013 | Koi Club of San Diego Koi Show
koiclubsandiego.org |
| March 8-10, 2013 | Central Florida Koi Show
cfks.org |
| March, 2013 | NM ZNA Spring Meeting..TBA Officer elections |
| May 17-19, 2013 | MGKS Koi & Goldfish Show
middlegakoisociety.com |
| May 24-26, 2013 | Louisville Koi & Goldfish Show
check them out on Facebook |
| May 31-June2, 2013 | Tri State ZNA Koi Show
check them out on Facebook |
| June 7-8, 2013 | NM ZNA Koi Show |

