

Q2 – AGGRESSIVE QUARANTINE PROTOCOL

By Noel L. Shaw
October 2007

INTRODUCTION -

Recently transported fish benefit from a quiet recuperation period to de-stress, adapt to a new environment (pH, water quality, temperature, and local viral and bacterial flora), and to be observed for signs of disease or ill health. An effective Q-Tank will be clean, quiet, well bio-filtered, and large enough to comfortably house new fish of the anticipated size and number, yet small enough to allow their capture for examination or treatment. New fish, allowed a variable quarantine period (originally "forty days of isolation") to adapt, de-stress, and regain their immune function, ideally will show no sign of parasites or infections, and may then be gradually adapted to the main pond.

If you have the means and the patience: buy and quarantine new fish singly, for weeks or months; slowly perform gradual water infusions from the main pond to equalize the chemistry and introduce native viral, bacterial, and parasitic flora to the new fish; introduce test fish from the main pond to the Q-tank for further compatibility testing; allow the water to naturally range through temperatures known to trigger various infectious disease (such as SVC, KHV, Aeromonas); and you may not need the following information.

.... OR NOT!

Few koi keepers have such patience and facilities. We may purchase several new fish at one time. Being a new fish junkie, I have weathered several rough seasons. In the last several years, I've introduced many new fish into my collection; all have suffered and survived this protocol, and I haven't had a major parasitic or bacterial outbreak since. It has worked for others as well. Time and repetitive testing will tell.

New fish, of varying origins, mixed in breeders', vendors', auction, and even quarantine tanks, arguably have been exposed to every conceivable pathogen and parasite, including KHV. **ALL new fish, domestic and Japanese, are "high risk"**. They WILL be swapping germs with your existing fish. They may be carrying "bugs" (infectious organisms) themselves, or, run down or stressed from transport, they may be susceptible to the routine low levels of parasites and bacteria found even in your healthy pond.

These piscine kamikazes are waiting for the right combination of factors to elicit a parasite or disease outbreak in your pond, affecting themselves or other fish. They are out to devastate your collection.

This aggressive protocol, gleaned from suggestions from a number of sources, is intended for new fish that "appear" healthy. It is decidedly harsher than simple isolation, but offers an option to the loss of fish, time, energy, and money caused by a major pathogen outbreak caused by adding new fish. It may represent some version of future reality.

This protocol is not intended for novices. Consider it, however, if you would be devastated by the loss of a financially or emotionally valuable collection. New fish that appear sick need to be diagnosed and treated on an individual basis. Please read this entire protocol carefully. If there are parts that are unclear to you, review and research further until you feel you can accept full responsibility. After all, these are YOUR fish! Ultimately, it is your call, as fish owner: "wait and see" or "aggressive prevention". While this protocol is far from a "guarantee", it's the closest thing we've got.

Suggestions: read Dr. Nick St. Erne's book "*Advanced Koi Care*". Read Dr. Eric Johnson's book "*Koi Health and Disease*". Check out www.koivet.com, and the AKCA's Koi Health Advisor program information online (www.akca.org), including the Health and Lab sections by Sandra Yosha, D.V.M.

BASIC Q-TANK (QT) SETUP

• **WATER** - free of chlorine, pH buffered (a MUST in a plastic system - consider hardened Plaster of Paris lumps to act as pH stabilizers / buffers, or weekly additions of baking soda - 1 Tablespoon per 100 gallons). 20% dechlorinated water change weekly.

NEVER transfer bag water into a dip or a QT facility.

• **CIRCULATION / AERATION** – airstones and good water turnover – no excessive water currents.

• **BIOCONVERTER (BC)** - established, fully cycled, functional biofilter. A couple of resident QT fish at all times will keep the BC alive. My 300 gal QT can double as a long term care facility. A 2400 gph submersible pump feeds a 55 gal upflow barrel filter with multiple layers of Japanese matting for clarity, and a 6 tray shower bioconverter.

Also see "[Rapid starting](#)" biofilters , [Making a home made sponge filter](#), and other links through Dr. Eric Johnson's web site.

• **WATER QUALITY** - Ammonia, nitrites, pH, and TA (total alkalinity) should be checked frequently – daily at first.

• **TEMPERATURE – 70-76° F** - It is highly desirable to also have a means of rapidly heating the entire water contents to 87-88° F, to combat KHV if it appears. QT and filters may need to be insulated (or even kept inside) in cold climates. QT water should initially be at ambient temperatures when introducing new fish to avoid temperature shocking. Prepare chemical dips fresh with water from the QT to avoid temp shocks.

• **COVER** – Shading and netting keeps fish in and sun and predators out.

• **CHEMISTRY** - salt level of .1 - .2% (one to two parts per thousand - .8 to 1.5 lbs of salt per 100 gallons)

- Dimilin or Trichlorfon .25 ppm (one gram (1/2 tsp) per thousand gallons, to eliminate crustacean parasites - optional)
- Maintain circulation and oxygenation at all times. Restore salt levels after water changes. Do NOT release Trichlorfon treated water into any waterway (it is hard on natural crustacean populations).

◆ If fish are transport stressed, (from a lengthy flight or other bagged travel), RE-bag fish with fresh QT water and pure O2. Float the rebagged fish in the quarantine tank for a few hours, and then introduce to the QT for 24-48 hrs before commencing further treatment. http://koivet.com/html/articles/articles_details.php?article_id=223&name=Newest%20Articles)

◆ ◆ *During the following **STRONG** treatments, don't forget that any fish that starts to "roll over" or exhibit other signs of stress should immediately be removed to fresh water, either to the QT, or by a major water change. These chemical treatments can be dangerous! Use fresh chemistry! Monitor your fish carefully!*

WEEK ONE

DAY ONE – ARRIVAL DAY

- INSPECTION
- SALT & FORMALIN / MG DIP (protozoan parasites, flukes, fungi, bacteria)

◆ INSPECT

Before unbagging fish, prepare two tubs (perhaps show tubs), capable of holding your largest new fish. Add a measured amount of fresh QT water to each tub. Tub one will be a salt / formalin dip. Tub two will be a rinse dip. **CALCULATE YOUR CHEMISTRY CAREFULLY, AND MONITOR FISH THROUGHOUT THIS PROCEDURE!!**

Inspect each fish carefully, first in the bag, and then while in the dips. Examine both sides, and look top and bottom. Look at the mouth and each fin. Look for ulcers, fin damage or rot, macroscopic parasites, fungal spots, red streaks in fins or tail, etc. Scrape and scope for parasites, and closely examine any obvious lesions.

◆ SALT & FORMALIN DIP - 10X "NORMAL" STRENGTH SOLUTION - 250 PPM FORMALIN

A) SALT - To dip tub #1, add one pound (about two cups) of UN-IODIZED salt (SODIUM CHLORIDE water softener crystals) per 5 gallons water. This yields about 2.5% salt. Stir / agitate until salt is completely dissolved. **FISH UNDER 6", USE HALF THE SALT.**
B) FORMALIN / MALACHITE GREEN (F/MG): To the well dissolved salt solution in dip tub #1, add enough "Pro-Form C" or "RID-ICH" to achieve a dose rate of **250 ppm**. **THIS IS TEN TIMES THE STRENGTH THAT YOU FIGURED FOR THE MAIN POND.** Use one teaspoon (5 ml) of "PRO-FORM C" or "RID-ICH" per five gallons of dip water.

• With OTHER F/MG PRODUCTS, read label and calculate two or three times, to achieve an accurate 10X dosing formula.

Unbag fish, one at a time, into the salt / F/MG dip, which helps them to shed any parasites. **NEVER** transfer water with the fish, either from a bag or from a dip. Leave in dip for 5 full minutes. After salt / formalin dip, transfer each fish to a rinse dip for a few minutes. After rinse dip, transfer to the established quarantine tank.

• **Most koi do NOT like the strong salt solution. They may zip around frantically, shaking their heads. Move them to the rinse dip if they BEGIN to roll or show other signs of losing control (even if before the maximum time). FISH UNDER 6", USE HALF THE SALT. The half salt (1.25%) solution is much milder and does not usually cause this reaction, but is not as effective at stripping parasites.**

- Be cautious with formalin as water temps approach 80° - oxygen content is already low.
- Remove fish to fresh water dip at once if fish appear too stressed.

DAY TWO - REST

- Begin slowly raising QT into the 70-76°F range, 2-3°F per day.

There is strong evidence that ANY naïve koi exposed to KHV WILL develop the disease at water temps of 66-70°F. There is some evidence that rapid heating avoids the temperature trigger, and/or inactivates virus whether or not it has become active. Studies are underway to determine if heating does, in fact, fully eliminate KHV. Koi that have been exposed to known KHV positive fish should be kept separate as carriers or destroyed until further research proves or disproves their ability to activate again or infect other fish from a state of latency. Evidence suggests that at some early point in your Quarantine cycle, fish exposed to KHV would show clinical signs. If rapid preventive heating is shown to be effective in eliminating KHV, it will be added to this protocol as a preventive strategy. Otherwise, we will keep the fish at warm temps over the next few weeks to attempt to trigger anything else they might be carrying.

◆ IF KHV APPEARS - KHV TANK WARMUP to 87-90° F

- KHV "activates" in the upper 60° F ranges (*Typical KHV Symptoms*: • Head down swimming ; • Lethargy and weakness ; • Sunken eyes ; • Gill Lesions. • Sandpaper skin • White stringy slime on the skin • Eventual dark discoloration in certain surviving fish • Body sores)
- If KHV infection suspected:
- Warm up tank **ASAP!** to 87°-90° F as fast as possible (1-2 days) to de-activate and "neutralize" KHV. Keep at >87° F for at least four days. Gradually cool down. http://koivet.com/html/articles/articles_details.php?article_id=197&category=17&name=Diseases

DAY THREE - ANTIBIOTICS – INJECT OR DIP AS NEEDED (for observed or suspected bacterial infections)

- Any fish with bloody streaked fins, ulcers, fin rot, or other signs of bacterial infection may be injected with Baytril, NuFlor, Azactam, Amakacin, etc., or a blend, per established dosage rates in Dr. Nick St. Erne's book "**Advanced Koi Care**". You need a veterinary prescription to obtain the injectables.
- Or give fish a 5 minute bath in **Tri-Cide Neo** or similar antibiotic dip per product instructions. Use enough in a plastic koi bag to give fish "breathing room"; on very small fish in a net or anesthetized fish, spray NeoCide, using ½ teaspoon (2g) in 12 oz distilled water.
- Depending on the medication and the fish condition, you'll probably need to treat two or three times. Delay proceeding with the rest of this protocol until any specific infections appear to be healing.

◆ If there do not appear to be any specific bacterial infections, you may choose to accelerate the formalin series into the first week. If ulcers or bacterial infections are present, treat them first, then treat for parasites.

DAY FOUR – REST

- ◆ FEEDING – Begin feeding, very sparingly at first. Watch fish to ensure all are eating.

DAY FIVE - ◆ ANTIBIOTICS - SECOND ANTIBIOTIC DIP AS NEEDED

- Repeat treatment with NeoCide dips as needed.

DAY SIX -- REST

DAY SEVEN ◆ ANTIBIOTICS - THIRD ANTIBIOTIC DIP AS NEEDED

WEEK TWO

- ◆ **FORMALIN SERIES - 25 PPM FORMALIN** (bioconverter safe) wipes out most remaining parasites
 - **With ProForm C or RID-ICH:** DOSE WHOLE QT at **25 ppm = 17 ml** (3 1/2 teaspoons) per 100 gal of QT water
 - Repeat every other day for a total of three whole QT treatments. 30% water change two days after third treatment.
 - **Be cautious with formalin as water temps approach 80° - oxygen content is already low.**

WEEK THREE & FOUR – WEEK AT THE BEACH

- Begin weeks 3 & 4 by gently pulling up fish, one at a time, for a relatively close-up examination. Hopefully, fish are all eating well, swimming normally, have no sores on body or fins, and you have no clinical signs of parasitic, bacterial, or KHV infection. If all look well, keep fish in QT facility for weeks 3 & 4. No specific treatment, but maintain WQ parameters and water changes and monitor all new fish carefully for unusual lesions or behaviors.
- keep temps in 70-76° F range.
- maintain aeration and oxygenation!! Check water quality frequently.
- watch for, diagnose, and treat any bacterial or parasitic breaks as they may occur during this entire time frame

WEEK FIVE AND SIX – FINAL APPROACH

- Now that the new fish have been “stripped” of parasites, and “cured” of bacterial or viral infections, we will plop them into the main pond, with fish and water that are healthily (stealthily?) carrying their own (hopefully minimal) load of parasites and bacteria. Right? Some advocate placing an expendable test fish from the main pond into the QT, to allow the fish to “swap germs”. Can’t hurt, but others in the pond may be asymptotically carrying something that the test fish isn’t. Sooner or later, parasites or bacteria from asymptomatic carriers in the main pond will come across a virgin host and disease outbreaks WILL occur.
- Let’s clean up the main pond as well. Hopefully, the pond is already free of sludge, excessive debris, dead fish, etc., and the bioconverters are reasonably fresh.
- A secondary potassium permanganate (preferred) **OR** formalin (F/MG) series in the QT and the main pond **simultaneously** will knock down the background levels of bacteria, flukes, protozoan parasites, and fungi, allowing all the fish a better chance. If you can bypass your BCs in the main pond and the QT, and still flow lots of water, use Potassium Permanganate (PP). Otherwise use F/MG (25 ppm formalin), and keep the pond and BC online. We will treat the main pond as well as the quarantine tank.

◆ POTASSIUM PERMANGANATE TREATMENT - QT AND MAIN POND – FILTER BYPASS REQUIRED

- If elevated, allow salt levels to fall to .1% with water changes. If heated, allow water in QT to cool to near 70° F.
 - bypass bioconverter, maintain aeration and circulation
 - pre-dissolve permanganate crystals in hot water (1 gram of PP per 100 gallons of pond = 1 tsp per 600 gal = 2.6-4 ppm) and disperse
 - after several hours, when pond water viewed in a white cup appears tan, NOT pink, resume BC flow and filtration. If BC has been off line for more than 4 hours, backwash or flush it to waste before flowing it back into pond.
 - high levels of organics in system (bog, dirty filter or sump) will use up PP strength faster – if tan in < 1 hour, add second ½ dose
 - **IMMEDIATE** peroxide and 25% water change to neutralize PP treatment if water turns milky chocolate color or fish appear stressed
 - neutralize Permanganate with standard 3% Hydrogen Peroxide, 1 cup (250 ml) per 1000 gallons
- **Repeat** the whole PP treatment on days four, eight, and twelve. Time to “tan water” becomes longer with each treatment.
 - 25% water change before first treatment, and after second and fourth treatments (dechlorinate new water)

◆ ALTERNATE FORMALIN TREATMENT – QT AND MAIN POND - 25 ppm - NO FILTER BYPASS NEEDED

- **With PRO-FORM C or RID ICH:** **25 ppm** formalin = 17 ml (3 ½ teaspoons) Pro-Form C or RID-ICH per 100 gal water. That’s 170 ml (2/3 cup) per 1000 gallons, or 425 ml (1 2/3 cups) per 2500 gallons.

FORMALIN / MG DOSAGE TREATMENT SCHEDULE

- < 60° F ; repeat every 5th day for 4 total treatments
- 60-65 ° F, repeat every third day for 4 total treatments
- 65 ° F and above, repeat every other day for 4 total treatments
- 20-30 % water change after second and fourth treatments (dechlorinate new water)

WEEK SEVEN & EIGHT

◆ COOL DOWN QUARANTINE TANK

- If main pond temp is much cooler than QT, cool QT **SLOWLY** (2-3°F per day) to equalize temps before new fish release
- If desired, leave fish in quarantine tank at 70 - 76° until main pond warms up to mid 60° F temps. If overwintering in QT, repeat four part potassium permanganate - OR – four part formalin series in spring (both QT and pond) before releasing fish into main pond.)

◆ WATCH AND WAIT

- diagnose and treat any bacterial or parasitic breaks as they may occur during this entire time frame

◆ INTRODUCE NEW FISH TO MAIN POND

- Bag new fish, float in main pond 30-60 minutes to help equalize water temps
- **SERIOUSLY** consider netting over pond or floating small Styrofoam squares - watch for jumpers (new fish “freaking out” in new pond)
- enjoy new fish – watch ALL fish and be aware of any unusual behaviors or lesions in ANY fish.

Questions? Comments? I welcome both. Noel L Shaw; Koi Health Advisor:

koidoc@noelshawdc.com

Suggested reading and research:

- Nick St. Erne, DVM “**Advanced Koi Care**”
- Eric Johnson DVM “**Koi Health and Disease**”
(www.koivet.com)

Local koi product resources:

Rancho Del Koi – 886-8797 (feed, consulting, equip)
Desert Pet Center – 745-5158 (Rid-Ich & other pond chemistry)
Mountain View Koi – Sierra Vista – 520 378-3710 (koi, equip, pond chemistry)