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Broodstock Health

Dr. Erik Johnson

- By Dr. Erik Johnson
- Fish Health Veterinarian
- Author: Koi Health & Disease 2006 Reload
- Author: Fancy Goldfish

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Brood Stock Health By Dr. Erik Johnson

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Controlled Crosses

- Controlling crosses has become paramount
- Some folks still cage their brood stock in ponds
- Many accumulate the brood stock and control the spawn with temperature shock / injection of CPE (Carp Pituitary Extract) or other...
- So there may be a "wait" with fish mixing.

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Risks of Accumulation

- Mingles fish from various ponds
- Risks disease transmission
- Enables parasitic proliferation
- Taxes O₂ Carrying capacity of facilities
- "All Your Eggs In One Basket" Phenomena.

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Condensing Pathogens

- Costia, Trichodina, Chilodonella, and other parasites of the body and especially gill can be massively fatal to Koi
- Not when spread out through a pond.
- When condensed, it's like (for the parasite) fishing in a barrel.

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Capture Stress

- Large fish demand more oxygen
- Yet they are challenged to absorb enough.
- Gravity is the most stressful thing a female fish confronts in her life.
- Chasing a fat guy.
- Cardiac rupture or other forms of stroke are possible.

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Handling / Nets

- Fish are not made for bearing their own weight. They are engineered for weightlessness in water.
- Rough handling opens the integument
- Carrying broodstock in nets can break backs or luxate the caudal lobe of the airbladder.
- Carry in a sock net ONLY or bin in water

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Temperature Issues

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- Very low temperatures (40-50°F) are ideal for fish handling because O₂ levels are typically high
- Warmer water is dangerous because it carries less oxygen.
- Stressing fish in warm water, or a power failure – can kill the fish.

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Oxygen Issues

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- Oxygen should be near saturation
- Oxygen levels 8-11 are great
- Oxygen levels 5-8 are tolerated
- Oxygen levels 3-5 usually cause piping, especially when the fish are alone.
- Oxygen levels below 3-4 are fatal to fish

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Power Failures

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- In the warmth of Spring if power fails oxygen levels in crowded tanks will plummet
- Facilities should have an instant-on backup that:
 - Discovers power failure
 - Discovers air flow failure
 - Immediately compensates O₂ flow or power failure depending on what's needed.

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CO₂ Issues

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- When Oxygen levels are high, CO₂ levels must be low, RIGHT?
- WRONG – CO₂ and Oxygen can exist independently and CO₂ levels can harm fish if they are not degassed.
- CO₂ ---→ Carbonic Acid (Lowers pH)
- Water must be agitated and buffered.

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Nitrogen Issues

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- “The Cycle” is the formation of Ammonia by fish / decay of anything.
- Ammonia reduced by Nitrosomonas to Nitrite.
- Nitrite reduced by Nitrobacteria to Nitrate.
- Nitrate used by plants or weakens fish.

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Ammonia

Dr. Erik Johnson

- Produced by the gills to the tune of 75%
- The Kidney only produces 25%
- (You work the opposite way)
- Ammonia is more toxic at a higher pH
- Can be controlled by “BINDERS” which bind for about 48-72 hours.
- Can be controlled by flow through water replacement.

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When NOT to Worry

- Don't worry about:
 - One or two bruises or ulcers on one or two fish.
 - When fish body language is good and they continue to eat and shoal.
 - Fin lesions
- DO Worry about:
 - Gill lesions, bad body language, fishy smelling water, unexplained clouding.

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Parasitic Issues

- Condensing fish populations make parasite spread easier.
- Populations transmit and grow exponentially.
- Early or pre-emptive diagnosis is best, prophylaxis is okay.

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Preventing Parasite Issues

- Biopsy all groups of fish (Three fish three times or nine fish one time but not one fish nine times!)
- Treat all parasites found.
- Shotgun treatments take unnecessary risk.
- "Nip it in the bud" with the Costia treatment regimen. (Next)

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Stopping Parasite Issues

- All brood fish come from ponds in to adequately large holding facility.
- This holding facility provides 24 hours of safe, well aerated rest. Possibly feeding antibiotic medicated food.
- Treat to 50ppm with Formalin-37% which is: Two-milliliters per each ten gallons of vat water. Aerate vigorously.
- At 120 minutes, move all fish to second vat. Clean out of vat one.

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Formalin

- There are two or three "Formalins" out there.
 - Formalin 37% hard to find (Vets, pros)
 - ProForm C™ which is 23% Formalin (Weak)
 - Paracide F - ?% Formalin.
 - Only "leave in" 25ppm formalin IF YOU HAVE TO in very large facilities.
 - Otherwise, dose 50ppm with water change at 120 minutes.

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Salt

- Salt is touted as a cure-all
- 0.3 % is 3 pounds per 100 gallons water.
- 0.6% is 6 pounds per 100 gallons water
- Kills floating plants. Spares most rooted plants.
- Should be no trace minerals in it. Iodized is fine. Leave in at 0.3% in non-Formalin treated water

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Viral Issues

- Spring Viremia of Carp
- Carp Pox
- Koi Herpes Virus
- The one to worry about is Koi Herpes Virus. This kills 90% of exposed fish and under 2% of infected fish that survive will carry virus in the tissues for several months after infection and survival.

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SVC – Spring Viremia

- A rhabdovirus that kills 10% of the fish it infects by making them vulnerable to Aeromonas or other bacterial pathogens.
- Low mortality with HIGH morbidity in studies by Ken Wolf, USFWS.
- Reportable Disease – Meaning if detected – your pond / farm will be closed and quarantined, for a very long time.
- Testing for this has been downgraded as a priority for APHIS and other regulatory agencies.

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Koi Herpes Virus

- Infectious in warm water, with a narrow window of 70-80° F
- Too cold (< 70°F) – Virus resides inactive.
- Too warm (83-86°F) – Clinical signs resolve.
- Shows up 4-7 days after infection depending on temperatures
- Skin, gills and kidneys basically peel and die.
- 90% of infected fish are dead by Day 14

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Prevention / Diagnosis

- Don't have, own, or keep KHV infected fish
- Keep KHV infected fish off your farm or lot
- Don't do breeder exchange programs with any UNTESTED fish.
- Testing is done with SEROLOGY on blood of any fish that proposes to come onto your lot. Fish are bled and samples sent to UGA
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Control KHV

- During infection – you can stop losses and restore fish health by:
 - Diagnose any parasitic or bacterial co-infections.
 - Treat and parasitic or bacterial co-infections.
 - Heat fish water to 86°F at a rate of one degree Fahrenheit per hour until 86°F is reached.
- Research may be underway that suggests the fish may be cured by heat – so don't kill survivors. Simply store them in landlocked ponds offsite until we know.

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Last Considerations

- Broodstock are big fish which are highly resistant to a lot of things that might kill smaller younger fish.
- Split fins and ulcers, and luxated caudal airbladder lobes are common and may not need treatment.
- The most expensive broodstock will jump out of the tank.
- The power will go out on the tanks if you leave town for a conference or delivery.

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