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on the front of the document!**

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## The Ten Thingies of Koi

- I've been active in this hobby as a doctor for Koi since 1992 or so. That's more than fifteen years.
- I've learned at least ten things that REALLY move someone ahead in Koi care.
- If I was advising someone as if for the last time before leaving them on their own with their pond, it would be as follows.

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thing you can do for your  
Koi is give them clean fast  
water replacement

# 2009

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## The MOST Important Thing

- Water replacement
- The constant replacement of water is less volatile than archaic "drain down" changes.
- Constant **replenishment** of minerals and buffers
- Ramping up replacement is easy and permits dissolution of parasitic problems, and dissolution of medicines applied, toxins and background pollution.

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## Constant Water Replacement

- Concept: Change 1% to 4% of your water every DAY
- No drain down – refill
- No dechlor
- Pressure regulator to ¼ inch irrigation lines to rated emitters to each tank retrofitted with wasteline to yard.
- 2000 gallon pond = 50ml per minute or three LITERS per hour!

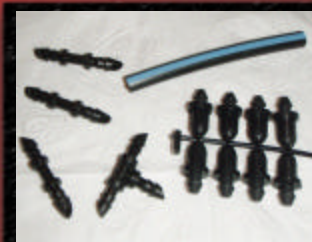
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## Basics – Gear and Simplicity



- \$50 gets ANYONE a system
- Home Depot ask for Drip Irrigation
- What happens to rainwater overflow in your pond?
- Need ¼ inch lines, tees, barbs and elbows.
- Goof plugs HA HA HA

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## The Materials



- 1/4" Drip Irrigation Line
- Brass fittings to the hose bib
- Unions, elbows, tees in quarter-inch
- Finally, the DRIP EMITTERS
- Available in 1/2 , 1 & 2 gph
- 2000 gallon pond  $\approx$  1 gallon an hour = 24 gallons per day = 240 gallons over 10 days  $\approx$  @ 7-10% per week.

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## The Link Up



- Some simple brass fittings from Home Cheapo
- Hose to 1/4 " barb
- 1/4 inch drip irrigation line, buy the best they got.
- You might have to heat a fitting in hot water to make it snug
- I use a Tee at the bib

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## At the Waterline



- No pressure regulator needed.
- Check your emitters. For higher flows, use more emitters.
- Measure their output if unsure.
- They're so cheap, replace them if the diaphragm gets gummy.

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## Considerations

- The water has to go somewhere
- Chlorine is not a problem because you have
  - Less than 0.05% "new" chlorinated water in any given hour.
  - Or, a total of 1.2% PER DAY

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## The Second Most Important

- **Quarantine**
- 90% of Koi Herpes Virus outbreaks included “no quarantine” in the history.
- Smaller facilities easier to treat than large ones.
- Larger quarantines are more successful than smaller ones.

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## The Third Crucial Advice

- **Respect “the MOJO”.**
- **Philodina**, rotifers, mollusks, crustaceans, copepods, nematodes, algae and plants.
- Veggie filters or bogs, anything with mojo that can be perfused.
- Ignore the mojo, but be a master of water quality if you do.

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## The Fourth Commandment

- **Learn to use a microscope**
- Eliminates guesswork and allows **NO TREATMENT!** (that must be a misprint)
- Or treatment, with **specificity!**

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## The Fifth Recommendation

- **Don't Crowd**
- Jack Gratzek: “Spread ‘em out.”
- Space is crucial to riverine fish.
- Don't waste space on junkers.
- **1-4 inches of fish per ten gallons**

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## The Sixth Most Important

- **Don't Overfeed**
- Feed two marine protein-based foods and a variety twice a day.
- All they will clean up in only **5 minutes**.

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## The Seventh Fundamental

- **Buy healthy fish from reputable source.**
- Word of mouth is invaluable for this.
- Fish IN good water, and WITHOUT parasites can STILL have traumatic / shipping related "diseases"
- **There's such a thing as a "bad batch" but not for reputable vendors because of their practices.**

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## The Eighth Guidepost

- **Heat the Pond (if practicable)**
- Eliminates "winter" and most of the stress-diseases of Spring.
- Having heat available allows a LOT more successful treatments.

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## The Ninth Suggestion

- **Trust Information that Simplifies**
- Beware the knowitall. A true expert has the best questions, not all the answers.
- Club experts may be practicing 'wizardry'.
- Others may just not know.
- Quite a few experts don't have fish and some, never have

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## The Tenth Tenet

- When you're "done" you will use formalin for 90% of your medication needs.
- Salt, potassium, Praziquantel are all "safe" meds for hobbyists.
- Used correctly Formalin is the sharpest and most devastating solution to parasite problems.

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