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## September, 2022

# By the Pond

Good Evening Members,

With summer nearly drawing to a close, I'm sure we can all appreciate (and our fish!) the arrival of cooler weather and some of our club's most anticipated events! Thanks again to those who volunteered for our upcoming 2022 Atlanta Koi & Goldfish Show - your support means a great deal! I would also like to thank the hosts of our August 2022 meeting, Rhonda Eubanks and Kevin McDonough, for opening their home to us and our guest speaker, Vicki Vaughan, for such an amazing topic!

For this month's meeting, Randy's Perennials and Water Gardens will host us, while our very own Melanie Onushko will be our speaker! Her topic will be "Do It Yourself Ponds and Quarantine Tanks"! Details for the meeting are as follows:

# When: Sunday, September 11th @ 3 PM Where: Randy's Perennials and Water Gardens - 523 W Crogan St, Lawrenceville, GA 30046

We have been asked to inform members to bring your own chairs for this meeting.

Looking forward to seeing you all there!

Marlon Tiller Vice President

Augusts' meeting at Kevin and Rhonda's pond Many thanks to Kevin McDonough and Rhonda Eubanks for sharing their pond with us on August 13th. After a scrumptious feast of Chicken sandwiches, we all seated to listen to a presentation by Vicki Vaughn. Thanks to Vicki for stepping up to provide our informative session.. Even their Koi ate (by hand), thanks to Kevin.













## Pond Design and Installation by Carl Forss- The Koi Store

This article will explain the design and filtration for a very sophisticated koi pond and separate goldfish pond for one of our clients in Virginia Beach. The house is located on a 5 acre peninsula on Chesapeake Bay. It is a beautiful setting and the majority of the property is dedicated as a wildlife retreat. There are wildflowers and beehives with several watering stations for bees and birds.

Let's start with the koi pond. It is 8 feet deep, gunite with plaster and tile around the top. It has 8 skimmers, 4 Rhino 2 bottom drains, 4 midlevel jets to spin the water, an autofill with a dosatron dechlorinator, a 3 inch 800 watt Viper UV, a 25 cubic foot prop washed bead filter, a Profidrum 6560 rotating drum filter, custom made Koi Store natural gas heater, a 250 gallon K3 bioreactor, a 3x6x4 foot custom gunite vortex. 2 low space bioreactors, custom built oyster bed filter, and is monitored by an IQTek water test system. It is 30,000 gallons.

The separate goldfish pond is 6000 gallons and is filtered by 2 - 4.4 Aquadyne bead filters. It has a custom Koi Store heater, 2 Rhino bottom drains, autofill with Dosatron dechlorinator, 2 Emperor Aquatic UV, also monitored by anIQTek system. The goldfish pond is inhabited by 150 high end tomasabas from Japan. Kaneco is the breeder. Both systems are finished off with water jetted coping. The molds were made from cardboard and a computer guided water jet cut them to exact specifications. The edges were flamed to match the natural top.

Because it is on Chesapeake Bay (which is an otter factory) both ponds are protected by a specially designed otter proof fence. The fish are well taken care of. The owner even flew one fish down for The





Continued on next page

Koi Store to coordinate the removal of a tumor with The UGA College of Veterinary Medicine Small Animal Teaching Hospital. The surgery was successful and after recoup at The Koi Store was sent home via Delta Dash. Both ponds are aesthetically pleasing and easy to take care of. The IQTek monitoring systems alert the caretakers of potential problems. The ponds are both equipped with automatic feeders. They soon will be graced by Bespoken lanterns from Marc Adams. I only wish I knew someone that could build me such a beautiful pond, sigh.

Vicki Vaughan The Koi Store



### Sandra Moreland's Pond

Sandra is a member of our Atlanta Koi Club. In this month's issue of Georgia Magazine, her pond was featured. Here is a copy of her presentation. Congratulations, Sandra!!!



Sandra Moreland's love for kol was instantaneous. When a friend with a pond offered to give her some of the colorful fish in 2019, Moreland accepted, but knew she needed a mentor.



Left: There are more than 100 varieties of koi. This yellow-and-white variety is known as a lemon hariwake. Right: This variety is the butterfly kujaku, known for its graceful, flowing fins.

"Our property has a quarter-acte natural pond that we learned was perfect for kol, but other than that, I needed someone to help me learn how to raise them," says Moreland, who lives on Lake Lanter in Cumming, "Not only did I get a mentor, I ended up with many of them through the Atlanta Kol Club. They were very willing to share their knowledge and expertise."

Koi originally were bred in early 19th-century lapan, and since then these large, vibrani fish have captured the hearts of people all over the world. Their rainbow of colors—golden yellow, orange, rist, while and black—fascinate collectors, who can spend anywhere from \$10 to thousands for individual fish.

"Each kol is special, with its own personality, color patterns and shapes of their fins," Moreland says. "I can tell each of them apart. They all have names, and when they hear me walking across the dock to the pond, many of them are walting for me at the edge."

She's quick to explain that the promise of food is not always the draw for the kot. "They're very social fish and iend io bond with their owners," she says. "Even in the whier when they stop calling, they still come to see me when I visit. I enjoy the quiet, meditative time, watching them swim and explore the pond."

This year, Moreland losi many of her original 41 kot to what security cameras revealed were otters faiding her pond.

"I was eventually lell with only five," she says. "I was heartbroken. But then, for some unknown reason, the killing stopped. The oliers had moved on, and so far they haven't been back."

Moreland turned to the club to help restock her pond. Many of the fish came from members who had overstocked ponds; others either had been rescued or had outgrown their habitais. She also attended the club's April auction.

"At the auction, I was able to purchase some beautiful, mature koi that were within my budget," she says. "I now have 30 in varying sizes and colors. I still miss my original koi, but I love these newer ones just as much."



Members of the Atlanta Koi Club help with the annual auction by catelully transferring the fish into holding tanks.



Every koi has distinctive patterns and markings that make it easier to recognize individual fish.



#### Why kol?

"For us, kot kicht—this is how we affectionately refer to each other, and it means 'kot crazy'—Is a combination of things," says Johns Creek resident Angle Jones, treasurer of the 270-member Atlanta Kot Club. "Some love the tranquility a pond brings to their gardens, because there is nothing like the sound of a waterfall to wash away stress. Others enjoy hand-feeding their fish.

"Some like raising high-quality show lish. Still others like to linker with the technical aspects of maintaining a pond. But for most of us it is a little bit of all of the above."

Chase Tomkosky, the club's official kol rescuer, has retrieved kol from residential ponds that were abandoned when homes have been sold and from collectors who have grown too old to continue to care for the fish. He also has taken in kol when a collector has died and his or her family members don't want the responsibility. He cautions people considering kol as a hobby.

#### Fun facts about kol

- Koi are thought to bring good luck, partly because of the belief that water represents prosperity and wealth.
- Kol average 24 to 36 inches long and can weigh as much as 35 pounds.
- They can live more than 50 years, but typically their life span is between 30 and 40 years.
- During the winter, they go into a kind of hibernation called topor, when their metabolism slows and they eat less.
- The record sale was \$1.8 million for a single fish that won the Grand Championship at the 2017 All Japan Koi Show.
- For more information about caring for kol, visit bit.ly/koicare.

"Do extensive research about keeping kui and learn as much as you can about water quality," says Tomkosky, who has owned kol for many years. "Caring for kui is a big commitment; they can live for several decades, and keeping them healthy requires constant monitoring for water quality and diseases."

Talk with other people who own kol before making a big investment, and ask questions about the day-to-day and long-term responsibilities.

#### Sharing the Joy of keeping kot

"A good place to start is by reaching out to our club, either by attending an event like our October show or by visiting our website, *atlantakoiclub.org*, which lists monthly meeting times and locations, then coming to a meeting," Tomkosky says. "We enjoy sharing our experiences with others."

As for taking the plunge, club president Diane Gangrande recommends first learning what's involved in preparing your kol habitat.

"Before putiting a shovel in the ground, join a local kol club and learn about proper pond construction," she says. "There are different ways to build a pond, and the kol keeper's goals, expectations and budget should be taken into account. Whether a person is a do-li-yourseller or going to pay to have a pond installed, the least expensive pond you can build is the pond you only build once, so knowledge is paramount. Keeping kot is not a one-size-fils-all hobby."

Pamela A. Keene is a freelance writer and Master Gardener living in Howery Branch.

#### For more information

Atlanta Kol Club 27th Annual Kol & Goldfish Show, Oct. 8-9, Gwinnett County Fairgrounds, Lawrencoville. Kol and goldfish competition, kol auction, pond supplies and equipment. bit.ly/gwinkoishow.

# ON BECOMING A CERTIFIED KOI KEEPER

By Dr. Mary Alice Heuschel PhD, CKK Inland Empire Water Garden & Koi Society, Spokane Washington

The journey to becoming a Certified Koi Keeper (CKK) is indeed challenging and exhilarating. The opportunity to transform from a curious, fascinated, and charmed koi owner to an informed, skilled hobbyist is what awaits you.

My story begins and ends this way.

I was a new homeowner inheriting a large pond and added various koi through a local business, hiring a pond company to clean and take care of the pond. It was a delightful first experience, but a tragic mix of the wrong chemicals killed the beautiful koi and I set out to better understand what happened. The pond was drained, cleaned and I was determined to "go natural" when ready to start over.

I searched the internet and found out about a local koi club, Inland Empire Water Garden and Koi Society in Spokane, Washington. I reached out to the club's president, John Seifert and he invited me to the next meeting. My husband and I were welcomed with open arms and instantly connected with a group of networked koi hobbyist. Over time, I learned a lot from talking with various experienced members and learned about the Koi Organisation (no – not misspelled; reflects British spelling) International. Whether you are a beginner, informed koi enthusiast or a skilled fish expert, I can't say enough about this website as a trusted resource regarding anything and everything you want to know about koi! www.koiorganisationinternational.org

Once I felt I knew and understood "the basics" of taking care of a pond myself, including the natural bacteria, filtration systems and water quality, I re-started the pond. 25 koi of various colors and sizes were provided by the original pond cleaning company.

John and his wife Linda became good friends and helped/coached me on various components of my pond. John then told me about CKK and encouraged me to consider the program, offering me a club (PNKCA) sponsorship. The rest is history.

I earned my CKK through diligent hard work, incredible support of the instructors throughout the entire program, and consistent mentorship, regular check-ins on my progress, and encouragement from John. This is a KEY component - when you are considering doing this – get yourself a mentor! The program took me a year to complete. Working full time and taking care of a pond requiring quite a bit of work on the weekends, I had to dedicate and prioritize time to work on each module. Everything is on-line, self-paced and information is well laid out for progressive learning. Following the recommended sequence of the modules is important (components of the learning builds on successful previous module completion). Every module instructor is there to support you – I often had questions needing clarification on scientific sections of the modules and without exception, was always able to communicate on-line and get the help I needed. You don't do this alone!

The knowledge and confidence I have gained by becoming a CKK, not only allowed me to ensure my koi were happy, healthy and would thrive, I am able to help other pond owners and "give back" to the hobby. I now have 61 named, spectacularly beautiful koi. Each one truly has its own personality and is trained to eat from my hand, which allows me to check on their health /skin condition daily.

Consider becoming a Certified Koi Keeper.

You will gain exponential learning and your koi will thank you

#### **Pond Design** (Part-2 continued from Augusts Newsletter, contributed by Michael Anderson)

Skimmers can either be gravity fed or pressure piped. 'Gravity-fed' means plumbing the skimmer to the prefilter and 'pressure piped' means plumbing to the pump intake. Gravity-fed tends to keep the detritus in the pre-filter and doesn't allow it to be emulsified by the pump impeller.

Over flow pipes are almost what the name implies, instead of the pond overflowing into the yard and possibly the Koi being washed out, the overflow pipe collects all water above a preset level and delivers it to a predetermined place therefore keeping the pond from overflowing. A 3" overflow pipe usually is adequate for most any size pond and can sometimes be plumbed to a lawn drain.

All of the aforementioned plumbing must be assembled and joined properly to create a pond system that functions properly.

First, bottom drains should be spread out so that their effective areas overlap each other such that the entire bottom will deliver detritus to at least one of the bottom drains.

Next, the waterfalls, streams, jets, skimmers, water returns and prevailing winds should work in concert to create the 'toilet bowl effect' with the currents working to make the pond self cleaning thus promoting good water quality and exercise for the koi.

Normally bigger is better in a koi pond but one must be careful in choosing bottom drainpipe sizes. An oversized bottom drainpipe can become a settling chamber if the flow is too slow. That means detritus build up in the pipe and reduced water quality. So again it is important to determine the volume of water that must be moved thru a given length of pipe and then refer to the quick reverence chart for proper sizing. What we have not yet discussed in this part are ponds that have submersible pumps, in pond bioconverters and pressurized bioconverters and pre-filters.

Submersible pumps usually are used on very small ponds, 500 gallons or less and have very basic plumbing, a tube from the pump to the waterfall or fountainhead and a tube from the intake to an in-pond bioconverter/filter. The alternatives might be a tube from the exhaust port to an out-of-pond bioconverter/filter, then to back to the pond. Usually a 3/4" flexible tube is used. These small ponds frequently have no skimmers, bottom drains, jets or overflow plumbing. The reason to use a submersible pump would be for a very small pond as submersibles are notoriously inefficient, meaning low flow rates, usually 1000 gallons per hour or less and very high energy draws.

In-pond bioconverter/filters reduce the amount of plumbing but are difficult to maintain and clean. Plus they reduce the swimming water for the fish.

Pressurized bioconverters and pressurized pre-filters usually require pumps with specific pressure requirements that are identified by their manufacturers. Since these specifics vary by manufacturer, we will not discuss the plumbing for them but the rest of the plumbing as previously discussed would apply. The special pump requirements for these pressurized systems will be discussed further in Part 11.

A rule of thumb for gravity fed pipes is that for 'normal' flow you would need  $\frac{1}{2}$ " of vertical drop per lineal (horizontal) foot of pipe. A simple example would be an upflow barrel bioconverter that returns the water to the pond by gravity thru 30 feet of piping. In this instance, the bioconverter water surface would need to be at least 15" higher than the outlet static head, i.e., 30 ft X  $\frac{1}{2}$ "/ft = 15". This rule relates to the change in head pressure at the two ends of the pipe. If both are under water, then the change is essentially the difference in height between the water surfaces of the source and destination vessels. Also remember that 1) gravity fed pipes will generally always have to be larger than pressurized plumbing; 2) shorter pipes mean less friction loss; 3) the less abrupt the direction change (fittings - i.e., 90's, 45's, etc) the less the pressure loss; and, lastly and critical to pump selection is 4) the less height to which you need to raise the water, the less energy will be required.

**Part 4. Aeration** - not too controversial but frequently overlooked to varying degrees. Waterfalls are the most frequently used form of aeration and can be very effective or inefficient depending on how they are designed.

First we must understand some basics of gas (air) exchange with regard to water. Contact time is critical, the longer the better. Water oxygenation levels are increased only when the water is in contact with oxygen or air. So the surface of the pond is a significant gas exchange area because the water surface is in contact with the air all the time. The effectiveness of the water/air interface can be increased by water movement at the interface, i.e., jets, venturis, waterfalls, fountains, air stones, etc. Another example of contact time is when you use air stones, if they are put on the bottom of the pond, the air bubbles rising to the surface are in contact with water for much longer time than if they are only 6" under the surface. There are theories that conclude that most of the gas transfer happens as the bubble is forming. (A series of related articles on the subject can be found in the "Odds and Ends" section [by Joe Cuny] of Koi USA, Jan/Feb '99 thru Nov/Dec '99.) An added benefit to deep air stones is that as the bubbles rise to the surface, they draw bottom water toward the surface in addition to adding surface movement. Now a surprise to some people is that the finer the air bubbles, the greater the gas transferred. This is because the smaller bubbles have a greater surface area for a given volume of gas. The smaller bubbles also rise slower than larger bubbles, that increases the contact time.

Now we will give you some examples of efficient and inefficient waterfalls as they pertain to increasing the oxygen content in the water.

A very efficient waterfall: 2 feet high, 20 feet long with pebbles and rocks in the raceway and many small cascades along the entire path.

A very inefficient waterfall: a 20-foot high fall with only one drop, that is directly into the pond.

These two examples may at first seem puzzling because the 20 foot high fall can be quite spectacular and the water crashes into the pond. But if you consider that only the water in contact with the air will gain oxygen and for only the time it takes to fall, you can see that the contact time is very small in the high fall and much greater in the longer, smaller drop falls. Additionally, the 20 foot long cascading falls continue to churn the water thus mixing the oxygen into it. For any given height of falls, two drops are better than one; three are better than two, etc.

Jets can aerate or not. Bottoms jets that are not directed nearly straight up create currents but very little if any aeration. Bottom jets directed straight up can both bring bottom water to the surface and create surface rippling. Both these affects add to the aeration of the water. Such an arrangement is more common in smaller ponds and is usually achieved by directing the discharge of a submersible pump upward. Jets near or above the surface can create surface movement that in turn, increases aeration.

Venturis enhance gas exchange (aeration) by two means: adding bubbles to the water and causing surface currents. For given water and airflows, the deeper in the pond the venturis are placed, the greater the aeration effect. However, the deeper they are placed, the greater the power required to drive them such that a suction of air is created. Also there is an increased risk of supersaturation of gas in the water though the author has never seen a case of supersaturation in any pond.

Water movements in pre-filters, through foam fractionators and all water returns to the pond are opportunities to increase the oxygen in the water. Almost everything we value in the system works better at the higher levels of oxygen (an exception being anaerobic nitrate conversion). Aeration is more important during the summer, in warm climates and during the night and early morning hours.

As the water temperature rises, its ability to hold oxygen decreases. During non-daylight hours all algae and other submerged plants absorb oxygen and give off CO2 thus competing with the fish for oxygen (the additional CO2 combines with water to form carbonic acid which tends to lower the pH). The converse is true during the daylight hours. The algae and other plants give off O2 and absorb CO2. Overcast days reduce the rate of photosynthesis and thus retard this normal process. Oxygen levels in the pond are the lowest in the very early part of the day.

Lethargic koi in warm water can often be 'brought to life' by the addition of a few well-placed air stones. Supersaturating pond water with gas is so rare that this author has never seen it in over 30 years in the hobby. Reported symptoms are bulging eyes and erratic swimming.

**Part 5.** Water changes Water changes are generally a 'good thing' and 5% to 10% per day is not considered too much if the incoming water parameters are satisfactory. Minimum recommended water changes would be in the order of 10% per week. Proper conditioning of the water may be necessary, e.g., the addition of a dechlorinator and possibly an ammonia binder if the source water contains chloramines.

**Part 6.** Electrical Watch out! Any electrical equipment associated with ponds should have a GFCI (ground fault circuit interrupter), usually in the fuse or circuit breaker box or incorporated into the receptacle. The GFCI measures the current flowing to and from it (thru the equipment). If the currents don't match, the GFCI automatically breaks the circuit. An easy way to tell if a circuit is protected by a GFCI is to look for a test button. If there isn't one, the device is not a GFCI. The operation of these devices should be tested regularly (monthly is recommended) to confirm proper functioning. To test the device, press the 'test' button. If the circuit does not break (disconnect), the device is defective and should be replaced immediately.

The purpose of the GFCI is to prevent electrocution and/or fire. Since they are mechanical devices and require some time (albeit small) to work, they don't prevent electrocution in all cases but will certainly do so in many and help make the situation better in most. GFCIs in the breaker box are usually better than in receptacles as there they monitor the entire circuit as opposed to only one branch of it.

Most building codes require the use of GFCI devices around water but many people don't use them due to lack of knowledge or the increased cost or both.

All exterior electrical equipment should be grounded which means at least the use of three-pronged-plug type wiring. All hard wiring (wiring w/o a plug on one end) should be in conduit and boxes and fixtures especially made for outdoor use should be utilized. Most, if not all, cities have building codes that specify how electrical installations need to be made.

Wiring is similar to plumbing in that the longer the run, the larger the pipe or wire needs to be. To continue the fluid flow analogy, voltage in electrical circuitry is analogous to pressure in a fluid circuit and electrical amperes (amps) are equivalent to fluid flow.

There are two types of voltages and wiring used in homes, 110 volt and 220 volt. The normal house voltage and wiring is for 110 volts. Some applications requiring high power, like stoves, ovens and electric clothes dryers, may use 220 volt circuits. The 220 volt wiring can carry twice the power for a given wire size. This is not an attempt to make students into electricians rather to give an understanding of the basics. Wire sizes are specified with numbers. Number 12 wire is common in household electrical circuits. A #10

wire is larger (the smaller the number, the larger the wire.). Long wire runs and heavy amp draws require larger wire. Wiring that is undersized for the load can overheat and cause electrocution, equipment failure, fire or all three. Building codes are very specific as to the length of the run and the allowable loads. When approaching an unfamiliar pond and before touching the water, check to see if the fish are swimming erratically or if any have bent backs. If either of these situations exists, ask the owner to shut off the electricity to all pond devices. If the fish change their behavior when the power is shut off, there may be an electrical short applying voltage to the water. If this is suspected, do not proceed but rather have the owner contact a licensed electrician immediately.

With energy costs on the rise, minimizing the cost of operating a pond is certainly of concern **Part 7 - Pre-filters** Pre-filters are a virtual necessity on all but the smallest ponds. The advantage and function of a pre-filter is that they remove solid material prior to entering the pump and bio-converter. Keeping the bio-converter clean keeps it performing better longer.

A bioconverter that has mostly or only to process the dissolved gasses (that is. ammonia, nitrites) and not also filter all the solids is far more efficient and has a greater capacity to perform the functions for which it was intended and for a longer time. That said, we will not discuss bioconversion any further here as this part is about pre-filters.

Many pre-filter design philosophies exist, but this part will address only those few types that I have found to be the most frequently used and, in my opinion, are the most effective. All of these are gravity fed but vary in design.

The first is a vortex system that is basically a barrel with a coned bottom and a drainpipe in the center (bottom) of the cone that allows for removing the settled solids. Water from the pond (usually from its bottom drains) is typically fed into the vortex at a tangent to the barrel's circumference somewhere in the middle third of its height .

The larger the pipe size entering this vortex settling chamber, the slower the water spins resulting in less turbulence which in turn facilitates solid settling. The water is sometimes picked up for transport to the pump from the top third of the barrel and near the outside of the barrel. This allows the pump to pick up the water with few sinking solids and delivers this water to the bioconverters. Some pump pickups are at the very top of the water in the center, even further reducing the sinking solids that are picked up (see Figure 15). Some people add a screen to the water pickup. That reduces the transfer of suspended (particularly buoyant) solids, but necessitates periodic cleaning of the screen. This is a settling chamber where gravity works to remove the non-buoyant solids.

To improve the solids removal, you can place a row of brushes that bisect the barrel approximately half way around from the inflow (see Figure 16). These brushes will trap many of the suspended solids that won't settle to the bottom before being picked up in the outlet. Once you add brushes or screens or any other materials inside this vortex barrel, it becomes a prefilter, not just a settling chamber. Additionally the brushes, screens, and so forth are diffusers and help to slow down the current in the chamber.

(To be continued in next month's issue)

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