Beneath the Surface

In this newsletter:
Aug. meeting info..........1
July meeting minutes…..2-6
Emergency aeration……7-8
Aeration Explained……9-20
Lincoln Park…………….21
Membership Form………..23

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August 17th: 6:30
Marlene and Steve Bartlett
3595 Monarch Ave. Marion
Pot Luck (Barletts will supply meat)
Please bring a side dish to share.
Bring a chair

A whole special edition on aeration!!
Are you putting your fish under stress?
EASTERN IOWA POND MINUTES
THURSDAY, JULY 20, 2017
ALLSUPS' POND @ 6:00 PM FOR SOCIAL HOUR
BEUTERS' POND @ 7:00 PM FOR MEETING
MEMBERS PRESENT: 13

PRESIDENT STEVE B. CALLED THE MEETING TO ORDER. Thank you to Jackie for hosting the Social Hour. We had a lovely time viewing her incredible ponds, fish and back yard! Thank you to the Beuters' for hosting our monthly meeting. Another wonderful time seeing their beautiful pond and surrounding landscape.

June minutes were approved. There was no Treasurer's Report. A reminder that if you have not paid your $10 yearly dues for 2017, please send those to Stephanie Geers.

Old Business. We discussed where we wanted to meet in August. Several options were brought up. August 5th at Herman Michael's Celebration of Life, August 12th at Kloubec's to join Chicago Pond group for the afternoon, dinner at Amanas and back to Kloubec's for drinks and bonfire, or have a regular Thursday night meeting on the 17th. After much discussion we felt the regular meeting would work best and the Bartlett's offered to host. They will BBQ something for the members. It will be a Pot Luck, so bring your favorite side dish! This will begin at 6:30.

Herman's Celebration of Life and the day at the Kloubec's is open to anyone who would like to attend those as well.

New Business. Steve B. began a great discussion on how we handle the hot weather with our ponds and especially how we should handle our fish needs if we lose electricity. Having a generator on hand is the ideal solution! Steve has corresponded with Rich @ “Healthy Pond” (Facebook site) for many good ideas. We had Rich (from Chicago) as a guest speaker once.
Check out Rich's Facebook page:
https://www.facebook.com/Healthy-Pond-791883794161477/

*Please see handout from Steve B. on tips to keep your fish healthy when there is a power outage or equipment failure in hot weather.

Another way to keep your water healthy for your fish is by using a Venturi. Tim N. has this system and here is a video he made showing it in use. It can be viewed at this link: https://www.youtube.com/watch?v=RjwSt7TpHI8

We had a lively discussion on what to do and some stories of “misadventures”!

Next, Jackie gave us some valuable information on aeration. Again, a great discussion by club members!

*Please see handout from Jackie on aeration in this newsletter.

Meeting was adjourned and Pat invited us into her home for a wonderful dessert and more fun conversation.

Next Meeting: August 17th, 6:30 at the Bartlett's.

Upcoming: September 21st, 6:30 at the Isard's

Notes submitted by L. Nolan, Secretary
The Allsup’s Pond.
The Bueter’s Pond
Our president, Steve Bartlett, talking to the group about what to do in times of power outrages. (And looking pretty flashy in that tropical shirt).
Discussion:

*Some tips for keeping your pond fish alive when the there is a power outage or an equipment failure in hot weather*

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<th>Temperature degrees (F)</th>
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- In general, warmer water holds less oxygen than cold water, so in extreme heat conditions as we are experiencing now fish would be at risk if there was a power outage or an equipment failure of your pond pump/s and/or aerators
- Oxygen levels between 7 and 9 ppm are best for koi
- Hypoxia – occurs when low oxygen levels usually fall below 5 ppm
- Surface diffusion is the key in warm or extremely hot weather

Possible solutions:
1. Use a generator for long term power outages in summer months
2. Portable oxygen system consisting of tank, tubing, oxygen diffuser, economy oxygen regulator-Pond Depot
3. Disrupt water surface with streams of water from a hose or mechanically to break the surface tension to create a gas exchange of oxygen and carbon dioxide
4. Pour water over the pond biological filter if it is not submerged every hour or two to keep water moving to help keep bacteria alive and from drying out
5. From a conversation today with Richard Heimberger “Healthy Pond”
• Check the temperature of your pond often especially in hot weather. Avoid pond temperatures exceeding 80 degrees. If this happens provide shade for your pond if at all possible
• Don’t feed your fish in very hot weather. This increases their metabolism using up more oxygen and increases waste in the water which uses oxygen to decompose
• Use an aerator pump that has an output of at least 45 liters/minute. Aerators don’t add oxygen to the water but the column of bubbles breaks the surface tension which degases your pond (ammonia, nitrite, nitrate, sulphur compounds and carbon dioxide) and allows for the exchange of gases between the pond surface and the atmosphere.
• Don’t use Algae fix when the pond temperatures exceed 80 degrees

A generator is the only way to provide for the critical life support for your fish in a power outage. Besides oxygen, your filter system must be running to clear the pond of contaminants.

He recommends a Honda generator as it is efficient and very quiet. They run on gasoline and 1 tank can provide power for 6-8 hours. Some generator run on LP gas and some can run on both.
Koi Pond Aeration: Why it’s so Important & How to Do It

I wrote this article as a guide to aeration and aerator pumps to stress just how important dissolved oxygen in your koi pond really is. If filtration is analogous to the filtering action of the kidneys then aeration is analogous to the lungs. Additionally, the success of your filter will depend on the overall oxygen level of your water. Filters will require oxygen to properly complete the nitrogen cycle in an efficient manner.

If you have pond fish, it may be that just a simple waterfall is not doing enough to aerate your water. Proper aeration is crucial to the beneficial bacteria of your filter media, to the aquatic plants growing in your pond and of course to your koi. Below I will explore some of the reasons why aeration is so important and some of the best methods to achieve sufficient dissolved oxygen levels.

What causes oxygen depletion? Looking at oxygen like a budget, oxygen depletion occurs when the overall oxygen production is less than what’s consumed in the pond. Too many fish, not enough aquatic plant life or a general lack of aeration can leave your pond oxygen starved.

Aside from the more clear-cut budget perspective there are also other less obvious factors. One of these factors is water temperature. Cold water holds more dissolved oxygen while warmer water holds less.
A good baseline to start with is winter time with a frozen pond. Under the ice, the pond water has the largest capacity to hold dissolved oxygen while the fish are at their metabolically slowest time. Slow metabolisms mean less oxygen used. A winter pond is a good time to not worry about oxygen levels in your pond. But then comes spring and summer.

With the warmer seasons come warmer water temperatures which result in faster koi metabolisms and a reduced ability of the water to hold dissolved oxygen. This is when pond owners need to start putting aeration on their radars. So besides warmer temps and higher metabolisms reducing dissolved oxygen, what else can cause oxygen reduction?

1) Decay and decomposition of organic matter like fish waste or leaves
2) Overcrowding of the pond with too many fish
3) Algae blooms/Eutrophication
Let’s explore each of these a little more. When aerobic bacteria (bacteria that use oxygen) assimilate (breakdown and process) organics on the bottom of the pond they too will use up oxygen. If you have a lot of decomposition going on you will see a reduction of dissolved oxygen.
Overcrowding is fairly common as pond owners often try to pack their pond full of fish (or after years of unplanned breeding they end up with a full pond). Lots of fish using up lots of oxygen will result in a reduction of dissolved oxygen as well.

Algae blooms can cause eutrophication. Eutrophication is when a body of water experiences a severe depletion of oxygen due to excessive nutrient loads and dense algal growth. But wait! Doesn’t algae, through the process of photosynthesis, actually add dissolved oxygen to the surrounding water?

Though that IS true, what the standard definitions of eutrophication often leave out is the subsequent die-off of all that algae and the resulting decomposition of this matter at the bottom of the pond. As I mentioned earlier, decomposition involves aerobic bacteria that, during the process of assimilation, *use up* dissolved oxygen. So you can see the potential for large scale depletion of dissolved oxygen when you have huge algae die-offs in a pond.

And when you couple that with warmer temperatures and overcrowding you get a perfect storm of circumstances for low dissolved oxygen to occur. When your koi pond doesn’t have enough oxygen, it can induce stress on your fish. This may result in the fish
being more vulnerable to things like parasites, disease as well as infections.

Fish Gills & How They Work

It's worth briefly reviewing the functioning of fish gills and some important aspects of the interaction between oxygen and water. Okay, I know you didn't sign up for a physiology lesson on how fish gills work but trust me, this is really cool. The gills are super thin bits of tissue (filaments) arranged on these half circle arcs that lay behind the cheek of a fish.

The blood in the filaments runs forward, toward the front of the fish while oxygenated water runs against it in the opposite direction (due to the fish moving forward through the water). As oxygen-poor blood runs forward against the oxygen-rich water the oxygen from the water jumps over to the gill filaments via diffusion.
Oxygen has a tendency to want to even its abundance out so it goes from an area of high oxygen concentration (water) to low (blood). It's sort of like when a house party gets too crowded and people start spilling out into the yard! Now you might be thinking that you would end up with both blood and water being partially oxygenated when it's all said and done but remember that they are both going opposite directions so the water just keeps unloading the oxygen and the gills just keep accepting oxygen like a conveyor belt (as the blood circulates).

As long as the fish keeps moving forward that's how this system (counter-current exchange) will work and that's why a fish being pulled though the water backwards can't get as much oxygen form the water. This counter-current system is so efficient that it can pull dissolved oxygen from the water 3 times faster than we can using our lungs in air AND gills achieve about 80-90% efficiency!
As a reference, a body of water can contain a dissolved oxygen (DO) reading anywhere from 0 mg/l to 18 mg/l. Fish, in general, need at minimum somewhere around 4-5 mg/l for survival. That number will be different for different species and will also change with increasing or decreasing temperatures. Koi will do best at 6mg/l or higher.

To get a better understanding of that change, consider that when your pond temperature goes from 50 degrees F to 68 degrees F, your fish’s metabolic rate will essentially double. That means it needs a lot more food and a lot more dissolved oxygen. Low oxygen levels have several adverse affects including lowered egg production, lethargy and it makes ammonia more toxic to your koi.
Natural Aeration

In nature, oxygenation of pond water happens primarily in two ways. The first one is via oxygenating plants; the other happens at the air/water interface. The idea is that air from the atmosphere will diffuse into the surface of the pond at the air/water interface. This is based on factors such as air pressure but here’s the issue. This form of aeration is largely restricted to the first few millimeters of surface water.

Pond plants, just like any other plant, will release oxygen into the surrounding water and absorb carbon dioxide. While this is a great natural system there is a limitation. When the sun is up the process of photosynthesis is taking place i.e. carbon dioxide is absorbed while oxygen is given off but when the sun goes down carbon dioxide is given off (as a byproduct of metabolism) while the production of oxygen stops. So the downside is that you can’t rely on plants to oxygenate your pond during the night, so a dedicated aeration system is great to have.
Types of Koi Pond Aeration

Artificial aeration methods can be put into two main categories:
1) Agitators
2) Diffusers

A common and aesthetically pleasing agitator style solution is the pond waterfall. The waterfall will indeed allow oxygen to enter the water and at the same time it will also generate waves, create water movement and thus spread oxygenated water. While the waterfall solution is a good one it may not necessarily be the best one.

It will depend on the particular pond but if your pond is deep enough you may not be getting enough mixing at the deepest depths. Floating pond fountains are another solution similar to the action waterfalls provide. However they too can have the same depth limitations that waterfalls do. They look dynamic and give the pond a spectacular appearance but the ability for oxygenated water to reach every depth of your pond’s water column is limited.
Diffusers are also a common method for oxygenation. Some examples of those systems are the aerator pump and diffuser stone, solar aeration systems, windmill aeration systems, venturi systems etc. This type of system is anything that forces air into the pond and many times that’s done with air forced through a porous material like an air stone. But how your pond really gets oxygenated may surprise you. When you have air stones at the bottom of the pond and air is forced through those stones the tiny bubbles rise to the surface. So far so good. As those small bubbles rise the teeny tiny surface area of the bubble interacts with the surrounding water and for the short time that it takes for the bubble to reach the surface, there is gas exchange between the water and bubble. That is one way your pond gets aerated but that’s not the main pathway. As the bubbles rise up through the water column they essentially drag water up with them and when you have a stream of air bubbles all shooting for the surface it creates a constant movement of water towards the surface. This is critical because it brings to the surface the water that is low in dissolved oxygen and when it hits the surface it experiences diffusion of dissolved oxygen from the surrounding atmosphere. This same water then gets pushed to the side by water coming up from underneath it and then gets dispersed throughout the pond - outward and downward. This flowing cycle is crucial for a healthy and oxygenated pond.
Flow is the goal, stagnation causes problems.

So why does the bubble size matter then if the goal is flow? Why not just have big ol’ bubbles rising up? It’s all about surface area to volume ratio. Without getting into Pi equations just realize that smaller bubbles have larger surface-area-to-volume ratios which allows those bubbles to “grab” more water as it rises to the top.

What are the best aeration systems for your koi pond?

There are a multitude of options when it comes to aeration solutions for koi ponds. The idea here is to find a good system that works well and which can provide the proper aeration your pond and fish need. All of the koi pond aeration systems come with their pros and cons, so it’s important to weigh those in light of your pond situation and your needs. The following is a list of many of those systems and little bit about how they work. The first list will cover the diffusion systems while the second list will cover the agitator style solutions.

Airstones

Aerator pumps with air stones are an excellent all around option for many koi ponds. They offer excellent upward water flow thanks to the bubbles they generate, and they do end up moving a lot of water towards the surface continuously.

Looking at the process closer, the bubbles exit the airstone and as they rise they grow larger due to reduced water pressure and as they move up while growing larger they create a nice steady flow. Besides water being brought to the surface it also brings things like harmful gases (methane, hydrogen sulfide) from the muck below, carbon dioxide and oxygen depleted water.
It also causes temperature evenness in the pond rather than areas of warm and cold (thermoclines). Like everything else in ponds, there will be some crud buildup over time and the stones will need to be unclogged but you can expect to get a lot of use between cleanings.

I’ve discussed airstones and now let’s move on to the pumps that actually get air through airstones and diffusers. There are many different types of aerator pumps out there.

Still reading... That’s maybe enough for this newsletter. Next month I’ll tell you about the different types of air pumps and air stones and how to choose the right one for your particular pond.
A water-borne parasite in the Lincoln Memorial Reflecting Pool has killed around 80 ducks since late May, according to the National Park Service. Snails that live in the pool caused “high levels of parasites,” the U.S. Geological Survey’s National Wildlife Health Center said. The contaminated water only posed a risk to humans if there was prolonged contact with the water, like swimming or wading. The parasite could cause an allergic reaction resulting in swimmer’s itch or a skin rash, the agency said. Chemical treatments won’t fix the problem, so the NPS has started draining the pool for cleaning. It takes two days to fully drain the pool before cleaning can begin. The NPS said it expects the iconic landmark and popular tourist destination to reopen June 19.
Our Facebook page is back up and running!!! Be sure to go find us at “Eastern Iowa Pond Society”.

“LIKE” us so you get all the notices!
“POST” your pictures of your pond!
“COMMENT” - we want to hear from you!!
“SHARE” EIPS with everyone you know!!
Promote the club so that other’s can find us!!

It will soon be Fall!
Don’t forget the Pond Club owns a Pond Vacuum. If you would like to use it for your cleanouts, simply make arrangements with Pam Moore to come and get it.
Eastern Iowa Pond Society, Inc.

Membership Application

To become a member of the Eastern Iowa Pond Society, Complete this form and mail along with your dues to:

Eastern Iowa Pond Society

% Stephanie Geers

3615 Honey Hill Dr. SE

Cedar Rapids, IA 52403

________________________________________________________________________

___ New Membership  ___ Renew Membership

Name: _______________________________________________________

Address: _____________________________________________________

Phone Number: ______________ E-mail Address: __________________

Dues are $10.00 per calendar year per family. Make checks payable to Eastern Iowa Pond Society, Inc. ALL newsletters can now be found on line at www. EIPS.org
Eastern Iowa Pond Society
Our Mission Statement:

The purpose of the Association shall be to create, promote and enlarge the hobbies of ponds, aquatic gardening, and keeping, breeding, appreciating, and exhibiting the wonderful world of fish.

The Association shall disseminate information about the above to the membership to engage in educational and social activities related to our purposes; and to acquire and own such property as may be necessary for any or all of the foregoing purposes.