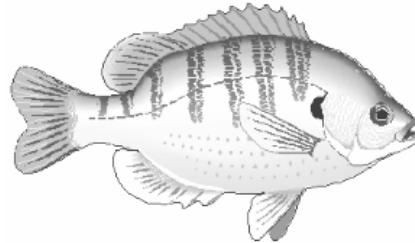


Ohio Pond News



The Ohio State University



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Pond Bacteria - A Story of Efficiency

Every pond produces live, organic matter that eventually dies and will decompose in the pond. Examples of organic matter are fish, aquatic insects, aquatic plants and algae, plankton, and yes, even leaves from nearby trees. Upon death, these living things settle to the pond bottom and begin to decompose. The ramifications to the pond's health depends largely on how efficient the bacteria are in decomposing the material. Not all aquatic bacteria are created equal. Pond bacteria responsible for decomposition can be divided into two major categories: anaerobic bacteria and aerobic bacteria.

Anaerobic bacteria decompose dead organic matter in the absence of oxygen. This is a very inefficient, slow process and generally results in only partial decomposition. The general outcome of anaerobic bacteria decomposition is black muck, which no pond owner likes. The more organic matter a pond produces or the more that enters from the land, the quicker the accumulation of black mud. Keep in mind, anaerobic bacteria are naturally occurring in ponds and lakes, and generally predominate in older water bodies. Anaerobic bacteria are the major player in ponds and lakes gradually filling in and becoming wetlands.

Aerobic bacteria are very efficient in decomposing dead organic matter, resulting in little build-up of residual material. However, aerobic bacteria require oxygen to do their work and unfortunately, unless oxygen is provided, they will use up the oxygen. This causes a shift to the anaerobic bacteria. The wastewater

treatment industry is dependent on aerobic bacteria to decompose human waste to the fullest extent possible. That is why treatment plants continuously aerate and sometimes oxygenate their tanks. If they didn't, they'd run out of oxygen and anaerobic bacteria would take over. Decomposition is incomplete, resulting in the plant having to dispose more "gunk" to a landfill. Also, an undesirable outcome of anaerobic bacteria is the production of foul smells, namely hydrogen sulfide (rotten eggs). No wastewater plant manager wants anaerobic bacteria to take over, because calls from the local citizens will surely result.

Are there factors that lead to a predominance of anaerobic bacteria in ponds? Yes, there are two important factors and they are pond age and whether a pond is stratified or not. And they tend to work synergistically to make the inefficiency more prevalent. As ponds age, they begin to accumulate organic matter. In new ponds, there may be sufficient oxygen down deep for the first few years to allow for aerobic decomposition. However, most ponds in Ohio will stratify with the result being a colder, deep layer below a warmer, upper layer. The deeper layer receives no new inputs of oxygen until fall. In many ponds, the deeper layer loses its oxygen because dying, organic material settles into the deeper water and the aerobic bacteria use up that oxygen to begin the decomposition process. Once these bacteria use up the oxygen, decomposition shifts to the anaerobic bacteria. Thus, ponds

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Did You Know?

- A mink can be a pond owner's best friend in battling muskrats. Mink are very adept on entering muskrat dens and killing the muskrats. Mink like to run along shores at night but can be seen at twilight. Mink resemble a miniature otter.

Pond Bacteria - A Story of Efficiency (continued)

that are strongly stratified most of the summer tend to build-up black muck quicker.

So what can the pond owner do to ensure that most of the decomposition process is done by aerobic bacteria? The answer is simple and that is to prevent the pond from stratifying. Aeration is the method of choice to accomplish this, but not all aeration types will de-stratify a pond. Fountains and other types of surface aeration will not de-stratify a pond, although they may slightly increase aerobic bacteria efficiency in the shallow, upper layer. As an aside, surface aeration is a great insurance policy against most types of fish kills.

The preferred aeration system to prevent stratification is bottom bubble systems, also known as diffuser systems. The placement of the diffusers near the bottom in the pond's deepest area forces deep water to the surface, allowing shallow water to move along the slope into deep water. This prevents the pond from stratifying during the summer provided the system is of sufficient size for the pond. An un-stratified pond means new injections of oxygen occur into the pond's deep water, thereby allowing aerobic decomposition to continue. Organic material decomposes more completely and the accumulation of black, smelly muck slows or stops. There is some evidence that a bubble aeration system will very slowly eat away at the black, partially decomposed organic material deposited in previous years. In a newer pond, the placement of

aeration soon after completion of pond construction can really inhibit the build-up of partially decomposed materials for many years.

I would be remiss in not mentioning the plethora of pond bacterial products currently on the market. These products contain large amounts of aerobic bacteria that once in the water, go about their work in more efficiently decomposing organic materials. While there is no doubt that these products can increase the amount of aerobic bacteria in the pond, simply preventing stratification with bubble aeration will do the same. Once bubble aeration is in place and oxygen levels are high throughout the pond, aerobic bacteria will increase substantially in response to the more "oxygenated living space" provided to them. That may be all that is needed to improve the pond. A viable strategy is to bubble aerate for several years and document the improvement. Then the pond owner can decide if he/she wants to add bacteria to initiate more improvement if need be.

Finally, I'm often asked why aerate when natural de-stratification will occur in October, thereby allowing oxygenated water down deep until stratification occurs again next spring. The answer is simply this: as water temperatures decrease, decomposition rates decrease. Thus, during winter very little decomposition occurs. Most decomposition occurs during June - September, the typical period when oxygen levels in the lower layer are zero. That's when we need to elevate deep water oxygen levels if pond health is a priority.

VHS Virus and Ponds

Some of you may have recently read about Viral Hemorrhagic Septicemia (VHS) and its implications on fisheries in Lake Erie and elsewhere. VHS is a highly infectious viral infection of fish that can lead to significant mortality. It is a coolwater illness, with most mortality occurring when water temperatures are in the 55-65 F range. Substantial die-offs of yellow perch and freshwater drum occurred in spring 2006 in Lake Erie due to VHS. Visual symptoms include lethargy and a "corkscrew" swimming pattern near the surface. However, many fish diseases can cause similar symptoms. Positive identification must be done by a lab.

So what does this mean for Ohio pond owners? USDA APHIS has listed bluegill, largemouth bass, black crappie, and channel catfish as species known to be vulnerable to VHS infection. These four species are commonly stocked into Ohio's ponds and lakes. They have also put new rules on the transport of live fish out of eight quarantined states, of which Ohio is one. It is recommended pond owners not stock their ponds with fish unless from a reputable commercial hatchery. Fortunately, vectors of spread are not favorable for VHS infecting

your pond's fish. Are there other potential vectors for spread. Yes, with major concern being expressed about bilge water and birds. As for moving infected water, the major concern is boat bilge and live well water from Lake Erie. Few pond owners who own large fishing boats actually launch them in their pond. Finally, the virus cannot survive passing thru a bird's digestive system so the only way a fish-eating heron is going to infect your pond is if it carries an infected fish to your pond and somehow drops it into the pond. While it appears remote a pond might become infected with VHS, it might occasionally occur.

If you want to learn more, just type in VHS into any internet search engine and you will be able to access many publications on VHS plus better understand the new Federal Rules.

Bill Lynch, Program Specialist, OSUE Natural Resources

Early Season Control of Filamentous Algae

Over the last several years, many pond owners have become concerned about early season growth of filamentous algae. They ask the question “why do I have it so early?” The simple answer is excessive nutrients, specifically phosphorus. Excessive phosphorus leads to lush algae growth, even in cold water. Keep in mind, on a calm sunny spring day the temperature in the pond’s middle can be 10-15 F cooler than very shallow water. Algae present in very shallow water take advantage of this warmer water and begin to grow.

The first control method, and the cheapest, is to diligently work throughout the year on limiting phosphorus inputs into your pond from outside sources. Be mindful of Canada geese visitation, fertilizing your grass, farm field runoff, domesticated animals in the watershed, and even a septic system too close to the pond. All can lead to unwanted phosphorus additions to the pond.

If the pond owner wants to treat and kill the algae, there are several options. On those calm, warm spring days, some control can be attained by sprinkling a granulated copper product directly on algae growing in very shallow, warm water. Keep in mind, copper products produce poor results in waters colder than 58- 60 F. So, treat only when the shallow water is very warm, even though out in the middle, pond temperature might be 48-50 F. Avoid cloudy or windy days because the shallows will not warm much.

A second product that can be used is GreenClean or Phycomycin which are formulations of sodium carbonate peroxide. Sprinkle on the algae as described above on sunny days. It does not have the same temperature limitations as copper products, but does work better in warmer water.

Bill Lynch, Program Specialist, OSUE Natural Resources

Pond Factsheet Update

Available

Placing Artificial Fish Attractors in Ponds and Reservoirs: OSUE Factsheet A-1.

Pond Measurements: OSUE Factsheet A-2.

Controlling Filamentous Algae in Ponds: OSUE Factsheet A-3.

Chemical Control of Aquatic Weeds: OSUE Factsheet A-4.

Muddy Water in Ponds: Causes, Prevention, and Remedies: OSUE Factsheet A-6.

Understanding Pond Stratification: OSUE Factsheet A-7.

Winter and Summer Fish Kills in Ponds: OSUE Factsheet A-8.

Planktonic Algae in Ponds: OSUE Factsheet A-9.

Fish Species Selection for Pond Stocking: OSUE Factsheet A-10.

Cattail Management: OSUE Factsheet A-11.

Algae Control with Barley Straw: OSUE Factsheet A-12.

Ponds and Legal Liability in Ohio: OSUE Factsheet ALS-1006.

Ice Safety: OSUE Factsheet AEX-392.

Farm Pond Safety: OSU Factsheet AEX-390.

Notifying the Ohio EPA Prior to Applying Aquatic Herbicides: OSUE Factsheet A-13.

Duckweed and Watermeal: Prevention & Control: OSUE Factsheet A-14.

When to Apply Aquatic Herbicides: OSUE Factsheet A-15.

Pond Dyes and Aquatic Plant Management: OSUE Factsheet A-16.

Benefits & Problems of Aquatic Plants in Ponds: OSUE Factsheet A-17.

Note: these factsheets are available at ohioline.osu.edu.

2007 Pond Clinic Schedule

The following is the 2007 Ohio Pond Clinic schedule as of press time. For time, location, and other details, contact your County Extension or SWCD agent.

Thursday, March 22 - Union County

Thursday, April 5 - Wood County

Thursday, April 12 - Knox County

Tuesday, Sept. 18 - Farm Science Review (numerous pond topics)

Wednesday, Sept. 19 - Farm Science Review (numerous pond topics)

Thursday, Sept. 20 - Farm Science Review (numerous pond topics)

If you want a pond clinic scheduled in your county, contact your county OSU Extension or SWCD office and let them know of your desire. They are always appreciative of folks who offer their pond as a clinic site.

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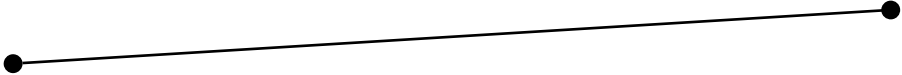
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