Many homes and ranches in rural America have ponds ranging in size from ¼ -acre to five acres or more. Three puzzling questions can arise in regard to these ponds: 1) Why did the fish suddenly die? 2) Why is the water pea green? And, 3) Why are there so many aquatic plants growing in the water? All of these questions, and a host of others, point to a disruption in the ecosystem of the pond. The disruption usually can be traced to a drop in the level of dissolved oxygen.

Oxygen is an absolute key to a healthy pond. In a perfect world oxygen enters the pond at the surface of the water. Wave action at the surface and/or mild thermal currents carry the oxygen into the deeper depths of the water. Beneficial algae growth at various depths in the pond also produces dissolved oxygen during the daylight hours. Aerobic microorganisms (called aerobes) breathe this subsurface oxygen as they digest the organic nutrients in the water. Several factors can disrupt this perfect world. For example, if the pond was created by damming up a flowing creek, then excessive amounts of nutrients can flow into the pond. These nutrients take the form of decaying leaves or other organic matter, and they can overwhelm the microbial population. If the microbes cannot digest the nutrients fast enough, then aquatic plants suddenly have access to these nutrients as a readily available food source.

Dissolved oxygen promotes microbes that strip the ability of algae and pond scum to gain a foothold in the pond by robbing them of their nutrients.
Lack of Dissolved Oxygen in a Stock Tank is not only Bad for the Health of the Pond and Fish but also Livestock

Stagnant pond water consumed during hot, dry weather can be dangerous to livestock, reminds Charles Stoltenow, North Dakota State University Extension veterinarian. “The water can contain certain species of cyanobacteria (formerly known as blue-green algae) that typically grows in stagnant, warm pond water.” At least four types of potentially poisonous cyanobacteria are known to occur. Toxins from these bacteria are poisonous to most livestock, including cattle, horses, sheep, pigs, chickens, domestic and wild ducks, pigeons, geese, and even frogs and fish.

There can be other sources of excessive nutrients in the pond. Cattle, for example, will often wade into a pond. Not only do they roil up mud on the bottom, but livestock manure is high in nutrient loading. As the microbes ramp up in growth to consume these nutrients, they quickly deplete the naturally occurring dissolved oxygen. At this point the microbes begin to die off. As the nutrient load continues to grow, the pond becomes susceptible to the growth of harmful algae and/or aquatic plants.

Even fertilizers, pesticides, mown grass, or excessive amounts of fish food thrown into the pond can add to the nutrient load. To maintain a healthy pond, you need to control as many of these factors as possible. Even so, a good mechanical aerator is almost a must if you want to ensure that your pond stays healthy.

Pond Roll Over

Another issue that few understand is the phenomenon known as “water turnover” in the pond. Water turnover occurs when the water near the surface begins to sink to the bottom, thus causing the water at the bottom to rise. This turnover normally occurs when colder weather arrives.

In the summer months large populations of microscopic algae create green “blooms” which block the sun from reaching lower depths in the pond. As a result the lower level of water remains cooler than the surface level. Since water becomes denser as it cools, a layering of the water occurs as the cooler water sinks and warmer water rises. This layering is called a thermocline (thermo = heat and cline = slope.)

If your pond is much more than six feet deep, then you can assume that the really deep layer has little or no dissolved oxygen. Such deep layers cannot benefit from the surface mixing of air and water. Plus, since sunlight usually cannot penetrate much more than six feet through the algae bloom, then there is no beneficial plant or algae growth in the the deep zone to produce oxygen. This condition can spell disaster if the water turns over.

“Did you know that some types of algae are harmful to humans”
Two types of aerators are most often used in farm ponds. One is some sort of air diffuser system. This type of aerator has a diffuser head that sits on or near the bottom of the pond. Air is forced through the diffuser by means of an air compressor or an air blower. The advantage of this system is that air can be introduced at depths greater than is possible with many other aerators. The challenge is that the air bubbles tend to rise straight to the surface, thus providing little mixing or dispersion throughout the pond. The other common method of introducing oxygen into the pond is the fountain sprayer. These systems spray water into the surface air in the hope of mixing oxygen in the spray. The spray patterns can vary from fine delicate sprays to agitated boiling-type sprays. These systems can look impressive, yet they create very limited water circulation. Plus, their short contact time with the air means they encapsulate only limited amounts of oxygen.

While oxygen can dissolve into the water at the air/surface interface, much of the dissolved oxygen in the pond comes from beneficial algae. Microscopic algae “blooms” produce oxygen during the day but then consume this oxygen at night. In a perfect world there exists a balance between daylight production and night consumption of oxygen. Plus, the constant decay of algae and other organic matter can further deplete oxygen levels. An extreme drop in oxygen levels can kill all fish, invertebrates, and much of the microscopic algae populations. As the algae bloom dies, the bright green color of the water can change to black or to gray with black streaks. During this process larger fish can begin to die. Smaller fish can be seen gasping (called piping) at the surface. Warm water fish such as bass or catfish need about 5 milligrams per liter (5 mg/L) of dissolved oxygen to live. They will die at 3 mg/L or less. Coldwater fish such as salmon or trout need about 7 mg/L. Concentrations of 5 mg/L or less will kill them. All species of fish can survive for short periods in low dissolved oxygen, but the added stress can lead to disease.

In virtually every pond or lake a self-aspirating aerator is ideal for oxygen entrainment. There are many designs of these types of aerators on the market but only one can claim the most efficient dissolved oxygen generator “the Toring Turbine” This device uses the engineering principles of precession and centrifugal force. The Toring quickly entrains and then gently, but firmly disperses dissolved oxygen in a 360 degree radius. At the same time it forces a plume of dissolved oxygen straight down. The net result is an almost magical saturation of the surrounding water with an underwater cloud of dissolved oxygen. It is virtually impossible for the Toring to clog with aquatic plants or debris. There is nothing to wear out except for the electric motor. Toring Turbine is the most efficient, reliable, cost effective self-aspirating aerator in the global market.
The Advantages of Toring Turbine

- Muscle to tackle large volumes of water with a single unit.
- Efficiency to produce results.
- No internal moving parts to wear out.
- Cannot clog up with debris.
- Built to run continuously with no maintenance.
- Turbine has a lifetime warranty.
- High efficiency motor.
- All electrical components provided.
- Professional installers.
- Except for the turbine all components are made in the U.S.A.
- VaraCorp has an engineering staff to determine the exact system that will work best for your needs.
- Phone in technical assistance available.

performance

Transfer Rate:
Toring Turbine can efficiently transfer up to 16.5 liters of air per/second into the water.

Dissolved Oxygen Rate:
Toring Turbine has determined through testing that under certain conditions the turbine can deliver 8 lbs. of dissolved oxygen per/horsepower hour.

Average life of the motor:
Motor warranty is two years from date of purchase. However, the average life of the motor is five years of continuous operation.

Ranking:
Not only is Toring Turbine ranked #1 in the world in efficiency for self aspirating aerators, but also provides the least expensive oxygen transfer per/horsepower hour.

info@varacorp.com
www.varacorp.com
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