



Livestock Tanks and Stocked Fishing Ponds

The typical farmer or rancher has a pond that serves a dual purpose. First, it serves as a water source for his/her livestock. Second, it serves as a fishing pond for recreational use. What the farmer/rancher does not always realize is that the pond can be a source of disease for livestock. The reason is that oxygen depletion, which is so common in such ponds, can lead to the growth of harmful microorganisms.

When a farm animal wades into the pond and drops its waste, both aerobic (air breathing) and anaerobic (non-air breathing) microbes go to work to process this waste. As the beneficial aerobes grow in number, they consume larger and larger amounts of dissolved oxygen. In a short order they can deplete the pond of dissolved oxygen to the point at which they begin to die. As these aerobes decrease in number, the pond is left with an overabundance of anaerobes.

The lack of dissolved oxygen not only can result in the growth of harmful microbes, it can lead to the increase of both noxious and toxic gases. The most common gases are ammonia and hydrogen sulfide. Either of these gases can lead to pneumonia and other stressful illnesses in livestock.

Finally, a lack of dissolved oxygen can lead to algae growth and fish kills. The farm pond in effect can morph from a beneficial source of water for animals and fish to a source of disease and death.

Regarding disease, stagnant water containing manure or other excessive organic material can result in the growth of blue-green algae. These algae are known to poison animals. They can cause muscle tremors and liver damage, sometimes leading to death.

Certain harmful bacteria reside in the urine of diseased animals and use both water and pond mud as their means of transmission from animal to animal. Disease can manifest in the form of infertility, abortion of the fetus, low milk production, and other problems in the reproductive tract.

Another common infection in farm animals is foot rot. Foot rot is caused by a bacterium that is carried on the hooves of animals. When these infected animals wade into the farm pond, the water becomes contaminated. Transmission of these pathogens to other animals then becomes imminent. The bacterium often gains access to a non-infected animal through cuts or wounds in the feet. Early evidence of foot rot can be seen in swelling just above the foot and in consistent lameness. While foot rot can be treated with drugs, it is far better to prevent the disease than to treat it.

Two methods exist to limit water transmission of disease in animals. A primary means is to fence the pond and pump the water to a nearby water trough. The other method is to use an aerator to charge the water with dissolved oxygen. In either case it is critical to the health of the pond that the watershed leading to it is covered with grass and that no water runoff containing manure or chemicals can flow into the pond.



If a pond is already infected with disease bacterium due to high urine and manure content, it will do little good to use it as a source for the water trough. The need here is to aerate the water. By introducing dissolved oxygen through an aerator, the farmer/rancher can drive out the noxious gases.

Dissolved oxygen also will support the much needed aerobic bacteria population which in turn will digest the manure and other organic debris. Once the bacteria digest these excessive nutrients, they will have effectively removed the food source required to support the blue-green algae and other harmful aquatic plants. The oxygen also will effectively reduce the harmful disease-causing bacteria. Finally, dissolved oxygen will help support a healthy, stress-free population of fish.

There are four major types of aerators that are used by farmers and ranchers to aerate livestock ponds. All of these aerators will provide some benefit, but their individual performance varies greatly.

One type of aerator sometimes used is the fountain sprayer. These devices spray water into the air in an effort to capture dissolved oxygen. The unspoken goal is to mimic rain which picks up oxygen as it falls to the earth. The problem is that the air/water contact time in a fountain sprayer is usually too short to be truly effective at saturating the water with oxygen.

Paddle wheel aerators are sometimes used in farm ponds. These units thrash the pond in an effort to mix atmospheric air into the water. They can be effective at providing circulation which is often needed in the farm pond. While the newer paddle wheel aerators are more efficient than older units, they still tend to put large air bubbles into the pond. Because of their buoyancy, these larger bubbles rise too quickly to the surface and escape back into the air.

Air diffusers are also used in farm ponds. These devices force air through some sort of a ceramic or perforated pipe diffuser. The diffuser breaks the air into smaller molecules which then enter the water. Diffusers are often touted as having very high oxygen transfer efficiency. However, there are serious challenges with air diffusers. First, they are not particularly effective at circulating dissolved oxygen in a body of water. This drawback requires that multiple diffusers be placed throughout the pond, thus raising the overall installation cost. Second, they are notorious for clogging. They often have to be removed and either cleaned or replaced. Most farmers/ranchers do not have the time to perform such maintenance.

There is an alternative type of diffuser known as a laminar flow diffuser. These diffusers are much less prone to clog, though they are not immune from clogging. They force huge volumes of air from the bottom of the pond to the surface. On the way to the surface this column of air does not really mix with the surrounding water (hence the name "laminar flow" as opposed to the "turbulent flow" in other diffusers.) As the column of air rises, it pulls oxygen-depleted water from the bottom of the pond to the surface. At the surface this water is naturally dispersed outward where it meets the surface air. This water continues outward picking up dissolved oxygen as it travels. At some point it begins to sink as it replaces the next volume of water being escorted from the bottom to the surface.

Laminar flow diffusers are effective when a deep pond, say twenty feet or more, needs to be aerated. However, in a shallow farm pond this type of aerator is not very effective.



The final type of common aerator used in farm ponds is the self-aspirating aerator. These aerators create a low pressure zone at the end of an air tube beneath the water surface. Atmospheric pressure forces air down the air tube where it is then discharged into the surrounding water.

There are two types of self-aspirating aerators. The older version uses propellers to create the low pressure zone. These propellers also serve as the motive force to disperse the entrained air into the body of water.

VaraCorp's aerator falls into the class of self-aspirating aerators. However, it uses an air turbine, not propellers, to create the low pressure zone. It thus sets itself apart from any other aeration device. The air turbine is one of the most efficient self-aspirating aerators in the market.

The air turbine is an ideal aerator for the farm or ranch pond. It uses a quiet 5-horsepower motor which is strong enough to aerate a two-acre pond in most cases. It has an extremely high oxygen transfer efficiency. It is virtually clog-free and is designed to operate 24 hours per day. It disperses a gentle but effective plume of dissolved oxygen in a 360 degree radius. It also forces dissolved oxygen downward into the lower depths of the pond, up to ten feet deep. Unlike propeller driven aspirators, the air turbine does not roil the bottom of the pond or create a donut mound of disturbed earth at the bottom of the pond. The air turbine can be floated on pontoons, or it can be mounted on the side of a fishing pier.



Farmers/ranchers sometimes ask a question about the need to use microbial inoculants in their pond. These inoculants are designer mixes of beneficial aerobes. The microbes are selected for their specific ability and propensity to digest the organic matter typically found in a pond.

The answer to the question is that these inoculants can certainly help a pond in distress. However, there are two issues which need to be addressed. First, these bacteria will consume huge amounts of dissolved oxygen as they digest the organic matter. In many cases they can consume more oxygen than can be added through natural processes, resulting in oxygen depletion. Thus, the use of a microbial blend still points to the need for artificial aeration such as through VaraCorp's air turbine.

Second, you should be aware that untold trillions of aerobes naturally exist in all types of wastewater. While these microbes might not be as focused on digesting pond organics as those microbes in special inoculants, they still will do an admirable job of cleaning up the pond. The bottom line is that if you use a microbial blend in your pond, it is best to have an aerator also such as an air turbine.

