

Algae Solutions!



Algae Topics

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What is Algae?

Algae is often a catch-all for all aquatic plants and aquatic plant related problems. GotAlgae.com separates the two for this reason. Not all aquatic plants are algae. Also, not all algae is created equal when it comes to how desirable or undesirable it is in your pond.

Part of the reason many call all aquatic plants algae is because even experts differ on what to call or classify algae. Defining algae is very difficult, but basically, algae is a simple organism that can be composed of one cell or many cells grouped together in a colony. There are three basic types of algae, planktonic, filamentous, and attached or erect forms.

Planktonic algae are single-celled, microscopic plants which are distributed worldwide. Blooms can be bright green, pea soup looking or even a blood red color. They are the base of the food chain and a healthy existing pond or well prepped new pond must have planktonic algae as a food source.

Filamentous algae are called many things such as pond scum or moss, and they are typically found at the surface in the form of greenish mats. Typical growth begins on the edges of ponds and will slowly rise until

it arrives at the surface. This series of cells joined together has a slimy, cottony or course texture. Filamentous algae will grow in ponds with higher levels of calcium and phosphorus. It is common to have this type of algae encouraged after ponds are limed to enhance fish production. Filamentous algae typically are of little or no value to you or your pond.

Attached-erect algae are non-rooted but dense. A misconception is that it looks like a higher vascular plant, which causes a lot of confusion. It typically has a gritty and bristly texture and is not much use to the overall pond health.

Blue-Green algae is often the biggest culprit when it comes to "pond scum" problems. Recently, it has been reclassified in the Monera Kingdom which consists of bacteria instead of being classified with other types of algae because the blue-green algae relates more closely to bacteria than other forms of algae. Within the blue-green algae grouping, there can be several varieties that can have many different colors such as red, brown, or yellow. Blue-green algae are nitrogen-fixing organisms and only need nitrogen and carbon dioxide to live, both very prevalent in most ponds. When there is a blue-green algae bloom, it forms dense masses on the surface of the pond and can cover the entire body of water. In fact, it is believed that the Red Sea was given its name from a red species bloom of blue-green algae.

Benefits of Algae

Algae in general serve a purpose and are essential for a healthy pond. Planktonic algae is the first link in most food chains that occur in your pond and your pond ecosystem needs algae. Zooplankton feed on planktonic algae and bait fish and fingerling sport fish in turn feed on the zooplankton. Without a food source, the bait fish and fingerlings will struggle and not thrive in your pond. Often times, pond owners who are managing their pond for trophy bass production will fertilize their ponds to keep the planktonic algae population very high. This serves to provide more food for zooplankton, bait fish and fingerlings and also blocks much of the sunlight from reaching the bottom of the pond. In turn, other aquatic plants struggle which decreases the areas for bait fish to hide and gives the bass a much easier meal to come by.

Problems with Algae

Often the most frequent complaint about algae is aesthetics. A green pond covered with algae is unsightly and is an eye sore. The enjoyment of the pond or water feature is diminished when algae has taken over.

Algae poses a problem to your pond health when you have too much algae and during algae blooms. During the photosynthesis process when plants use sunlight and carbon dioxide to produce food, they give off oxygen. Photosynthesis is a good process for your pond. The plants are using carbon dioxide and giving off oxygen which is needed for your fish, the decomposition of organic matter, and other processes within your pond. However, photosynthesis only occurs when there is sunlight. As the sun goes down, plants turn from oxygen producing organisms to oxygen consuming organisms. Therefore, the more aquatic plants and algae you have in the pond or body of water, the more oxygen they will give off during the day and the more they will consume during the nighttime hours. As the night goes on, the oxygen levels continue to decrease. The lowest levels of oxygen will be just before sunlight in the morning before the algae and plants start producing oxygen again. If your pond has too much plant life, the oxygen levels can decrease to the point that large fish struggle to live.

An algae bloom is a rapid reproduction and spreading of algae when conditions are right. Algae blooms typically occur during the hot, sunny, calm part of the summer. When an algae bloom occurs, your pond can be covered with algae in a very short period of time. The major problem with an algae bloom is the algae die

off. Often even quicker than the bloom itself, the algae die off can create major problems. A die off of an algae bloom can be caused by a cloudy day and lack of sunlight, a cold front, storms, etc.

When the algae bloom dies off, it adds a large amount of dead organic matter to your pond. This organic matter is decomposed by microorganisms at the pond bottom. With the added organic matter load on the pond, the total amount of decomposition occurring in the pond increases and the decomposition process uses up oxygen and gives off carbon dioxide.

This causes two problems. The first is lack of oxygen. When the oxygen in the pond is used to decompose the dead algae, it is not available for fish and other aquatic life. A die off can be so severe that most of the available oxygen in a pond can be used up in the decomposition process and your fish and other aquatic life will start to die off. The larger the organism, the more oxygen it uses. Therefore, your larger fish that have been in your pond for several years will be the first to die when oxygen is taken up.

The second problem with a large die off and increased organic matter is nutrients. When the algae die off and are decomposed the carbon dioxide and nutrients are released back into the pond and is available for the next generation of plant material. The carbon dioxide and nutrients help to begin the cycle all over again.

In salt water or brackish water areas, Red Tide can occur. Red Tide is a naturally occurring phenomenon that can affect brackish and salt water areas and is a generic name for a harmful algae bloom. Among the thousands of algae species there are maybe 100 that produce toxins, which can be ingested by filter feeding shellfish. The right mix of ocean conditions including low salinity, high nutrient levels, warm water, and calm seas causes algae to grow rapidly. Red Tide often occurs when an extended period of sun follows an extended period of rain. Filter feeding mollusks such as clams, mussels, and oysters are not safe to eat when harvested in waters affected by Red Tide because the toxins can build up in these organisms. This build up is known as bioaccumulation, and over time, the more toxins an organism is exposed to the more will accumulate in them, especially in bones and fatty tissues. When the organism is eaten, those toxins that have bioaccumulated are transferred to the organism or person eating it. Crustaceans such as crabs, lobsters, and shrimp as well as fin fish are safe to eat because they do not accumulate the toxins.

Excessive algae growth will also limit sunlight from penetrating your pond and can cause significant thermal stratification, which is temperature layers throughout the pond. The water that does not receive the sunlight and warmth cools and becomes more dense. This dense water sinks and oxygen levels decrease because it is not in contact with the air. It can also cause turnover in fall and spring, which is discussed in more detail in the Temperature Solutions page.

Another problem with excessive algae growth is irrigation problems. Many golf courses, farmers, and home owners use ponds as a holding area for irrigation water. If the pond has excessive algae growth and is pumped for irrigation purposes, the algae can clog the pump and filters within the pump, adding many hours of labor to the project. The algae that passes through the pump will be distributed throughout the lawn or area irrigated and can be unsightly when it dies off, as well.

How Aeration Can Help

There is hope for your pond, though. Aeration can protect your pond and your fish during an algae bloom and die off. Adding an aeration device, such as a Kasco Pond Aerator or Aerating Fountain will provide added oxygen to the water and help buffer the effect of an algae die off. When the algae die and are being decomposed, the added oxygen allows the decomposition process to occur properly and also provide oxygen for the fish and other aquatic organisms. By splashing the water in the air, the aeration device is not only adding valuable oxygen, it is also helping to vent gases such as carbon dioxide which is being produced in large amounts from the decomposition process.

Using a Pond Aerator or Aerating Fountain will also help prevent an algae bloom in the first place if it is installed before there is a major problem. As discussed above, the added oxygen will help the decomposition process and actually make that process occur quicker. It will also vent the extra carbon dioxide. This means there will be less available for the algae to use, which is one of the key components to blue-green algae problems.

Adding a Kasco Pond Aerator, Aerating Fountain, or Water Circulator will also create surface agitation in the pond or body of water. This is beneficial in a few ways. First, it helps eliminate the still stagnant water areas and mimics natural wind. As stated above, algae and algae blooms typically occur in the hot, calm, sunny times of the year. The agitation at the surface that eliminates the stagnant areas decreases the areas algae have available to them to thrive. Just simple movement of the water will help limit the amount of algae present in the pond. Just think, when's the last time you've seen a lake that always has ripples or a river covered with algae? Algae do not like moving water or surface agitation.

Surface agitation is also beneficial because it helps to mix up the algae that is already present within the water column. Algae is not able to sit at the surface of the water and soak up all the sunlight it needs for photosynthesis and it cannot survive without large amounts of sunlight. The agitation also helps to destratify the pond by mixing up the water and limiting the negative effects of turnover. With water that has been thermally destratified, the pond is now more hospitable for desired plants and algae species and creates a better pond ecosystem.

Aeration can cause a shift in the carbon dioxide levels within the pond and, in turn, can shift the pH levels causing conditions that are more favorable for desirable algae to out compete the undesirable blue green algae.

Finally, the agitation helps refract some of the sunlight that hits the surface of the water. This limits the amount of sunlight that can penetrate the water column. With less sunlight throughout the water column, algae and other aquatic plants struggle to survive. Some will still linger, but it will help limit the overpopulation of algae and other aquatic plants.

Aeration should not be viewed as a panacea, or silver bullet, but more as one of the many tools typically used in combination with other methods of algae control. Added aeration can never hurt a pond (unless start up of an aerator causes turnover) and most of the time there will be some type of water quality benefit of added oxygen, not to mention the increased oxygen levels are great for your fish.

Other Methods of Treatment

Adding a Kasco Pond Aerator, Aerating Fountain, or Water Circulator will help add oxygen and surface agitation to your pond or body of water and will help with algae problems. However, aeration and water movement are not cure-all's or silver bullets for algae or water quality problems. As with many things in life, it is all about balance and working with other items that produces the best results. There are several available methods for algae control and prevention, such as herbicides, bacteria and microbes, chemicals, UV sterilizers, and other additives like barley straw. Each has a slightly different way of attacking algae and some may work better in different situations and applications. However, each is designed to help eliminate and prevent algae from growing. Some only treat one generation of algae blooms; others may work for a longer period of time. Either way, when the algae dies off from natural causes or from one of the above treatment methods, there will be a large oxygen demand and Kasco Aeration can help. Also, the added water movement and mixing helps evenly distribute the treatments used and often makes the treatment work more effectively.

Dyes : This is old technology but it can work. Dyes are available in blue or black, powder or liquid, and act to shade water and reduce sunlight penetration that feeds algae growth. Aquashade is the only EPA registered product for weed and algae prevention, but most other products work, they just do not have the EPA registration. A side benefit that has been explored with some success is tinting the water blue or black to keep predacious birds from harvesting the fish in your pond because the birds cannot see the fish as easily. Aeration works great with dyes because it helps mix up the water and evenly distribute the dye that is added to the water. This method of treatment does not work well in ponds that are pumped from for purposes like irrigation or overflow into other ponds, because the dyes are removed during this process.

Bacteria and Enzymes : This is a non-chemical approach which basically involves living organisms feeding off of the excess nutrients that would otherwise be available for plant growth. Typically they are a concentrated blend of naturally occurring bacteria and enzymes that rapidly biodegrade sludge, improve water quality, decrease suspended particulate matter and solids, and control odor if used correctly in the proper blend for the pond. Many different products boasting fantastic results are out there for consumers. What is critical to the success of using this approach are a few basic guidelines:

1. Bacteria are living organisms and if you use them in conjunction with herbicides there is a good chance they will prove to be marginally successful at best.
2. Dissolved oxygen levels must be at least 2 ppm for effective aerobic activity.
3. As the temperature drops, so does the effectiveness.
4. pH range of most products is 5.5 to 8.5.

Ultraviolet Sterilizers : This product basically works by using a wavelength of light that will zap planktonic algae. It is very effective for green water, but will do nothing for filamentous or erect algae forms because they will not pass through the unit to be exposed to the light. It should be viewed as a fairly effective approach for watergardens and fairly small ponds, but not that effective for larger ponds because of the costs associated with the larger scale units and applications. Flow rates are readily available from any of the major manufacturers of this type of equipment and are measured by micro watts per second per centimeter squared.

Barley Straw : Barley straw has been used as a natural alternative to algaecides for centuries throughout England and Scotland. If it is to be sold as an algaecide here in the US, it must have an EPA registration number. Research has suggested that barley straw can aid in balancing the water quality by lowering the pH and carbonate hardness of the water, which can control the growth rate of certain undesirable plants and algae. As the straw degrades in the presence of water and sunlight, it creates peroxide, which can kill both filamentous and planktonic algae. It is better at deterring algae than controlling it once there is already a problem. Application rates are all over the board and success varies from pond to pond. A commonly recommended dosage for private ponds (this is how many get around the EPA registration problem) is 225 pounds of barley straw per acre of water (about 5 bales) in relatively shallow ponds of 4-5 feet deep. It is critical that the barley is loosely packed and that it gets some type of water circulation through the bales. Kasco aeration and circulation products can add this water movement and circulation needed for better success. The bales can also act as a substrate for beneficial bacteria to adhere to and grow. There are also several products, such as barley straw pellets and barley straw extract that can be added to your pond instead of the actual bales, but these products are more expensive.

Ultrasonic Sound Waves : The basic science behind these units is fairly sound. They use resonance of ultrasonic waves to kill algae. A submersed transducer generates ultrasonic waves that shock the algae and kill the algae by tearing the gas vacuole which allows them to float. This type of product should not harm your fish. The problem with this approach is that the cost for the unit is high and the results are highly variable and marginally successful at best. The biggest reason behind this is each pond should be looked at almost as a separate organism with varying water quality. A unit should then be sized for those conditions. The problem is that this type of approach does not lend itself to an off the shelf type of sale and more importantly, drives the cost up to the point where it is not feasible for many to spend that type of money on a product without knowing the chances of success.

Skimmers : There are several types of skimmers available on the market. Skimmers are usually not feasible in larger ponds or lakes, but work well in small applications such as watergardens. There are several manufacturers on the market that make skimmers as part of their pond kits that include filters, liners, pumps, etc. to create a watergarden. The skimmer collects water and floating plants and sends them through the attached filter. The filter takes out the plant material and returns the clean water.

Copper : Copper is usually the first answer most people get when they bring up the subject of algae control. Copper is toxic to certain species of fish within the minnow family as well as salmonids depending on the dosage and water chemistry. Water with high hardness and alkalinity buffers copper from being toxic, but also limits its effectiveness. The most common form of commercially available copper is granular copper sulfate. Its effectiveness and cost as a broad spectrum controller of planktonic and filamentous algae has led to its high usage. Liquid chelated copper products are used to control a broad range of algae including planktonic, filamentous, and bottom attached types of algae. Cutrine Plus is an example with application rates from 0.6 to 1.2 gallons per acre-foot of water treated. Consistent usage of some copper products can lead to bioaccumulation within the sediments and this approach is on the radar of some regulatory agencies, so a varied approach is probably the most sensible path to take.

Fish : Sterile grass carp have been used to effectively eliminate weeds within many ponds. Contrary to popular believe, they do not like to eat filamentous algae or any other types of algae. They are mentioned here because sometimes they are the cause of a species shift from rooted aquatic plants to a filamentous and planktonic algae dominated pond. The easiest way to understand this is to assume that the fish eat the plants, excrete the waste back into the pond and algae form as a result. The nitrogen and phosphorus that was in the rooted plants has not been removed and will manifest itself in algae, which are not desired by these fish. The questions is , do you want rooted plants or algae in your pond? Grass carp are not legal in every state so consult your regulatory agencies prior to stocking them.

Tilapia have been used to control blue green and filamentous algae in ponds, but they are a tropical fish and will start to "stress" when water temperatures drop into the 50's. They are also not legal in every state and they are what they eat so there is a tendency for them to be off flavor if they are consuming a fair amount of plant material as a decent portion of their diet.

Reward : This product is a diquat based, powerful herbicide/algacide commonly used in natural ponds. It is safe to use according to the label for all types of algae control in natural ponds, but restrictions concerning fish harvest apply. This type of treatment works well with aeration to combat the negative effects of the algae die off.

Peroxides : Granular based peroxides are super fast acting contact algacides for string algae and have been EPA approved within the last few years. Green Clean is one of these products that has organic approval. It is fast acting and bubbles as it oxidizes similar to medical grade hydrogen peroxide. They byproduct is oxygen and it is safe for fish at the recommended dosages. The remaining filaments and cellulose must be taken out of the water or it will settle back to the bottom of the pond. It is a bit more expensive than some of the other products, but is amazing for spot treatment and does not leave any harmful residues. Application rates vary greatly so it is important to follow the label instructions. As a side benefit, it works well at cleaning algae off of tanks, aerators, sidewalks, and even roofs. This type of control method works well in small applications such as watergardens.

Physically Removing Algae : This method is used for filamentous algae and erect algae and is very labor intensive. The benefit to this approach is that you remove nutrients with the plants which gets the fertilizers out of the water to temporarily stop the cycle of growth. People have used dip nets, rakes, pulled by hand, etc. Whatever works or whoever works because you will not have people lining up to pull out your algae. The "Algae Monster" at the top of the page has pulled out a few pounds of filamentous algae in his day.

Binders : Aluminum Sulphate (Alum) and forms of alum have been used to clear up muddy or cloudy water and remove phosphorus. Barraclear is a fairly new product with active ingredients of alum, bentonite clay, and a buffering agent to prevent pH change. It is not an algacide or herbicide, but it binds phosphorus to starve the plants. The amount required is dependant on the phosphorus levels within your pond so it would be a good idea to get a phosphorus test kit and consult the label for application rates.

True Cause of Pond Problems

With all of this said, algae or aquatic plants are not the problem with the pond, they are simply a symptom. Nutrients are the main problem with most ponds. The main reason for any algae or aquatic plant problem is there are too many available nutrients in the water for the plants to grow and thrive. Grass clippings, leaves, runoff from fertilized lawns and farm fields or pastures, animal waste (from geese, ducks, fish, etc.), and organic matter in the pond (dead aquatic plants) are some of the most common sources of nutrients in ponds. All of these supply an enormous amount of nitrogen and phosphorous that aquatic plants and algae need to survive and thrive. The key to algae and aquatic plant control is controlling the amount of nutrients entering and existing in the pond.

Limiting the nutrients is easier said than done. More detailed information can be seen in the Nutrient Problems page, but physically blocking nutrients from entering the water is a first step. The second is helping remove the nutrients that are already in the pond. This can consist of physically removing aquatic plants by cutting or raking them out of the water. All the organic matter in the pond has nutrients in it and when it dies, it will release those nutrients that will be available for others in the future. Simply killing the plants doesn't do much for the overall problem, they need to be removed. The third step is to add aeration. The extra oxygen, as stated earlier, will help the decomposition process occur faster and will help limit the amount of nutrients available. Also, the aeration will help vent some of the gases like carbon dioxide and others that contain nutrients that plants need to survive.

Kasco aeration products, such as the Pond Aerators, Aerating Fountains, or Water Circulators are one piece of the algae solution, but a major piece at that. By adding oxygen and surface agitation, a Kasco aeration product can help prevent a major algae problem, help reduce the effects of a algae bloom and die off, and over time help limit and remove the root of the problem, which is too many nutrients in the water. Kasco aeration may not be a cure-all or a silver bullet for your algae problem, but it will be a big first step forward in the fight to either reclaim your existing pond or protect your new pond.



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