

## Pond Facts #15 Filamentous Algae

### Description

Many different species of filamentous algae exist, but all have a similar appearance and growth habit. These algae colonies begin their growth in the late winter and early spring on the bottom of the pond as warmer temperatures and sunlight activate the spores and surviving cells. Most filamentous algae growth begins in less than 3 feet of water where sunlight penetrates to the pond bottom. Algae growth is sometimes referred to as a “bloom” because the algae grow so quickly. In the case of filamentous algae, single-cells reproduce and join together into long hair-like strands or colonies that grow toward the water surface. By mid-summer, these strands form large mats that trap gases and float to the surface. These floating mats normally begin to appear in July and may cover the entire pond by late summer (Figure 1). Different varieties of filamentous algae may be favored by early, mid-, or late-season conditions. Most forms of filamentous algae prefer stagnant, nutrient-rich, warm water conditions found in many of Pennsylvania's ponds and lakes.

### Value and Concerns to the Pond Ecosystem

All types of algae are important to pond and lake ecology because they serve as food sources for protozoans, insects, and fish. As such, they serve as a vital component of the pond food web that will always be present at some level. However, filamentous algae frequently reach nuisance levels. Their abundant growth can result in a number of management concerns, including aesthetics, swimming nuisance, and interference with fishing. Abundant algae can also cause fish kills in late summer and fall as the dying algae consume oxygen from the pond water. Where algae levels interfere with your



**Figure 1. A picture of a filamentous algae as it typically appears in July or August after forming floating mats.**

pond uses and goals, various control strategies can be used to prevent or reduce algae growth.

### Preventing Filamentous Algae Problems

Any overabundant plant growth is a symptom of excessive nutrients (phosphorus and nitrogen) in the pond water. These nutrients may come from runoff from barnyards, crop fields, septic systems, lawns, and golf courses. Long-term control of overabundant aquatic plants is best accomplished by reducing or redirecting nutrient sources from the pond. This can be done by reducing fertilizer applications near the pond, maintaining septic systems properly, redirecting nutrient-rich runoff away from the pond, and maintaining vegetative buffer strips around your pond. If you fail to recognize and address the

underlying nutrient causes of aquatic plant and algae growth, you will probably encounter a perpetual need to control overabundant plant growth using the methods described below.

### **Filamentous Algae Control**

Multiple methods of control are available for filamentous algae that generally fall into physical, biological, or chemical categories. Combining and using multiple management methods is recommended.

#### ***Physical/Mechanical Control***

Mechanical control of filamentous algae usually involves netting or raking the algae mats from the pond surface. If this method is used, it is important to dispose of the algae mats away from the pond edge to prevent nutrients from re-entering the pond as the algae decays. While this method is labor intensive and time consuming, it can be very effective on small ponds. It is also advantageous because it results in a removal of nutrients from the pond, which may help to prevent future algae growth. Mechanical removal may also be used in combination with biological and chemical approaches to maximize success.

Aeration has also been used as a mechanical approach to control algae. Adding oxygen to the bottom layers of the pond can encourage phosphorous to bind within pond sediments. This prevents phosphorous from becoming available within the water column for algae use and growth. While aeration may have some impact on filamentous algae growth, it is generally more suited to controlling planktonic algae, which are tiny floating algae cells.

#### ***Biological Controls***

The use of barley straw has been shown to reduce filamentous algae growth in some ponds. Barley straw does not kill existing algae colonies. It must be added to the pond in late winter or early spring to prevent algae growth. About three to five bales of straw should be used per surface acre of pond. The bales should be separated and the straw submerged in loose bundles within wire or cloth. Ideally, the submerged barley straw should be placed where pond water will flow

through it (i.e., near the source of pond water). Keep in mind that results using barley straw have been very inconsistent. For more details on barley straw use, consult the fact sheet titled *Pond Facts #8: Using Barley Straw to Control Algae*.

Grass carp often become a topic of discussion when dealing with aquatic plant management in Pennsylvania. Grass carp do not find filamentous algae palatable and are **not** a primary management strategy for filamentous algae. Grass carp will eat algae if preferred plants are not available, but this is not a recommended control strategy. More details on grass carp are available in *Pond Facts #10: Using Grass Carp to Control Aquatic Plants*.

Water additives are also sold to reduce algae growth. These products usually contain bacteria and/or enzymes that reduce algae growth by consuming nutrients in the pond water. Results from the use of these additives have been inconsistent and they are costly to use on larger ponds. Additives are more often used in conjunction with other control methods to increase effectiveness. These products should not be used in a pond or lake with an overflow of water.

#### ***Chemical Controls***

When used carefully according to the label instructions, aquatic herbicides can be safe and effective management tools. Table 1 lists the most common aquatic herbicides that are available to control filamentous algae. Keep the following points in mind when considering the use one of these aquatic herbicides:

- *Positively identify the target plant.* The chemicals listed in Table 1 are targeted at algae control. They are generally not effective on other types of aquatic plants.
- *Carefully measure the pond area and/or volume.* The dosages for each chemical listed in Table 1 are based on the pond area (acres) or water volume (acre-feet). Improper calculation of pond area or volume may lead to incorrect dosing of the chemical. If the

**Table 1. Common aquatic herbicides used to control filamentous algae in Pennsylvania ponds and lakes.**

Trade Name	Active Ingredient	Dosage Rate
Algae Pro	Copper, elemental 7% (triethanolamine complex)	0.75 gal/acre-ft to 1.5 gal /acre-ft
Aquashade/Lesco Hydroblock	Acid blue 9 dye 23.6%, Acid yellow dye 2.4%	1 quart/acre-ft
Copper Sulfate	CuSO4 99%	0.68 to 1.36 lbs/acre-ft
Cutrine-Plus	Copper, elemental 9% (triethanolamine complex)	0.6 gal/acre-ft to 1.2 gal/acre-ft
Cutrine-Plus (granular)	Copper, elemental 3.7% (ethanolamine complex)	60 lbs/acre
Hydrothol 191	Monopotassium salt of endothall	0.6 to 2.2 pts/acre-ft
GreenClean	Sodium carbonate peroxyhydrate	30 to 170 lbs/acre-ft

pond area or volume is underestimated, insufficient chemical may be applied resulting in little algae control. If the pond size is overestimated (more common), too much chemical may be applied, resulting in a fish kill and other environmental damage. Consult the fact sheet titled *Pond Facts #4: Measuring Pond Area and Volume* for information on how to properly measure pond area and volume.

- *Obtain the required state permit.* You must complete and submit a two-page permit titled *Application and Permit For Use of an Algaecide, Herbicide or Fish Control Chemical in Waters of the Commonwealth*. This permit is required for any chemical application to any private pond or lake. The permit can be obtained from your local Pennsylvania Fish and Boat Commission office, county extension office, or online from [www.sfr.cas.psu.edu/water](http://www.sfr.cas.psu.edu/water). Once the application is submitted, the permit is usually issued within 2 to 4 weeks.
- *Purchase the herbicide.* Common herbicides can be purchased at home and farm supply stores, hardware stores, or from various online suppliers. Most algaecides will cost between \$50 and \$200 to apply per acre of pond area.

- *Follow the herbicide label carefully.* The herbicide label gives specific instructions on when and how to apply the chemical. An aquatic herbicide should not be applied to the entire pond during one application. Killing all of the pond algae with one treatment may cause oxygen depletion and fish kills due to the decay of the large amount of algae. Instead, treatments should be restricted to one-half or one-third of the pond at one time with a two-week delay between treatments. Many herbicide labels also include restrictions on water use after treatment. For example, the treated water may be unsuitable for swimming, irrigation, or animal watering for some period of time after the chemical application.

**Additional Notes about Algaecides**

- Most of these chemicals work to kill existing filamentous algae by disrupting the cell wall and inhibiting photosynthesis. The notable exceptions are the dye products, which color the water to prevent sunlight penetration and subsequent growth of algae. The dyes should be used early in the season when the algae first appears on the pond bottom. A permit is not typically issued for application of a dye to a pond that drains into a stream.

- A permit is not typically issued for application of a copper or endothall product to a pond that drains into a trout stream. The copper and endothall products are toxic to some fish, especially trout and carp. They should be used with great care or not at all if these fish are present in the pond. The dosage for copper sulfate is dependent on the pond water hardness (high dose for high hardness and vice versa). Water hardness should be tested before applying copper sulfate.
- It is best to treat filamentous algae early in the summer when they first appear on the pond bottom and before they form large floating mats. This will reduce the amount of plant material that must be killed and, thus, reduce the chance of a fish kill due to low dissolved oxygen from decaying algae.

### A Final Word

Many ponds suffer from filamentous algae problems. Where possible, you should strive to reduce nutrients entering the pond to prevent or reduce excessive algae growth. Chemical treatments for algae are inexpensive and effective but usually must be repeated annually or even multiple times per year to keep algae under control.



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Figure 2. Application of liquid Cutrine to a pond to kill algae.

### Additional Resources

For further information and publications on pond management in Pennsylvania visit our Web page at [www.sfr.cas.psu.edu/water](http://www.sfr.cas.psu.edu/water) or contact your local Penn State Cooperative Extension office.