



# Extension FactSheet

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## Dyes and Aquatic Plant Management

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Submerged aquatic plants and algae cause nuisance problems for many Ohio pond owners. Often, these owners are reluctant to use traditional aquatic herbicides or algaecides because of post-treatment water use restrictions or general concerns over using chemicals. Aquatic dyes offer an alternative that can significantly reduce plant and algae abundance in many ponds. They are safe to use, easy to apply, and relatively inexpensive. Dyes can be easily purchased at many garden centers and agricultural supply stores.

### How Dyes Work

Like all plants, submerged aquatic plants and algae require nutrients and sunlight to flourish. These plants can grow only where sufficient light reaches the bottom of the pond or lake. This zone is called the “photic zone.” Beyond this zone, usually in deeper waters, plants cannot grow. Many factors affect how deep the photic zone extends, including plankton density, water color, and even wind.

In general, the more stained or colored the water, the shallower the photic zone. In some lakes and ponds, the water can be stained so dark by tannic acid from leaves or colored by a dense phytoplankton bloom that no submerged plants can grow except in the shallowest water.

Aquatic dyes work similarly by coloring the water a dark blue. The absorption and scattering of sunlight in the blue water significantly reduces the depth of the photic zone. This limits submerged plant and algae growth to only the shallowest areas of the pond or lake. For some pond owners, this reduction in plant biomass may be sufficient to meet their desired pond condition. Other pond owners

may need to spot treat with herbicides and algaecides or introduce grass carp (white amur) to eliminate remaining plants.

### Applying Aquatic Dyes

Aquatic dyes must be applied in March or early April to be effective for plant and algae control. The key to controlling aquatic plants is to prevent germination and limit early season growth. Because this occurs in April for most submerged plants and algae, the dye must be present to prevent germination. Late applications that occur after plants have grown several feet off of the pond bottom yield poor results. Sufficient sunlight will reach the top of the plants, allowing them to continue growing.

Application is as easy as pouring the dye into the water. It will quickly spread throughout the pond, usually within a few hours. Because the dye will naturally diffuse throughout the water, there is no need to use a sprayer. The applicator should take precautions to avoid getting the undiluted dye on skin or clothes, as it will stain.

The initial application in March will begin to fade in May or June, sometimes even earlier. Color is gradually lost due to rainwater dilution, photodegradation, and biodegradation. As the dye fades, sunlight reaches deeper water and can trigger plant germination there. This leads to a late summer aquatic plant or algae problem. Maintaining the correct level of blue color throughout the growing season can eliminate a late-season plant problem.

How does a pond owner know when more dye is required? The pond owner should regularly assess how much blue color is present in the water. This can be

accomplished by measuring how far down a weighted white object on a string can be seen as it is lowered into the water. These readings should always be taken at the same location and at the same time of day. The first reading should be taken 48 hours after the initial application in March. This will serve as the baseline color level for the recommended application rate.

Every two weeks or so, the pond owner can re-measure the depth at which the white object disappears. Once the measured depth increases by roughly 25%, more dye should be added to bring the measured depth back to the baseline measurement. For example, if the baseline measurement in March was 24 inches, an increase to 30 inches in May should prompt additional dye being added to the pond.

Pond owners should try to maintain the desired color through August to prevent late summer plant or algae problems. As water cools in September, submerged plant and algae growth will slow considerably, and the residual color will continue to inhibit their growth during fall.

A pond with an existing abundant submerged plant or algae community should not be treated with dyes for the first time in late spring or summer. This will cause a substantial die-off of plants in deeper water where sunlight no longer reaches. These dying plants begin to decay and can cause a fish kill due to oxygen depletion.

## Limitations

Ponds that have been dyed should not be used as a drinking water source for humans; however, consumption by livestock is permitted. Water can also be used for irrigation of all crops. Fish from dyed ponds are safe to eat, and recreational swimming is permitted. Swimming in dyed ponds once the dye has diluted to the proper level will not result in stained clothes, skin, or hair.

Dyes do not inhibit growth of all aquatic plants found in Ohio ponds. Dyes are recommended for use on submerged plants, such as pondweeds, watermilfoil, naiads, coontail, and elodea. Dyes also inhibit growth of filamentous algae, mat-forming algae, and single-cell planktonic algae. Dyes do not inhibit the growth of emergent plants, such as cat-

tails, and are not effective in controlling floating-leaved plants (duckweeds and water lilies) once their leaves are floating on the surface.

A major limitation in the use of aquatic dyes is the water exchange rate associated with the pond. Ponds with a substantial watershed receive considerable flow during rain events, and it becomes difficult to maintain the required blue color to inhibit plant growth. The owner would incur considerable expense in the continual addition of dye to compensate for dye lost through the overflow pipe.

Aquatic dyes are most effective in ponds receiving very little inflow water, even during heavy rain. For these reasons, dyes are very effective in excavated ponds receiving little runoff water. Dyes are not recommended for embankment ponds (dam) that retain water from a large watershed.

## Summary

Aquatic dyes are a viable tool in managing many submerged plant and algae species. Dyes work best in excavated ponds receiving very little runoff water. They inhibit plant growth by limiting how deep sunlight can penetrate into the water, which allows plant growth only in areas of very shallow water. The keys to effectively using pond dyes are to make the initial application in early spring prior to germination and then add supplemental applications as needed to maintain the desired color. Ponds already having an overabundance of submerged plants or algae that contain fish should not be treated with a dye as the dark blue water will begin to kill plants in deeper water and can trigger a fish kill.

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