Tips for Clear Water:

- Don't over-fertilize your plants or allow fertilizer from nearby planting areas to run into the pond. This will feed the algae.
- Don't overfeed your fish, or put too many fish in the pond. Excess fish food or waste will make the algae worse.
- Remove decaying vegetation and excess string algae from the pond.
- If 60% of the pond's surface is shaded by lilies and floating plants, you are very unlikely to have a problem with green water.
- Keep the water well-oxygenated with aerators, fountains or waterfalls.
- When filling or topping off your pond, be sure to neutralize the chlorine or chloramines in the water.
- A mechanical or biological filter may help, but only a balanced pond can prevent the overgrowth of algae.
- Exposing the water to an ultraviolet sterilizer may help reduce the amount of single-celled algae.
- Don't use algicides – anything which will kill the algae can also harm the plants, the fish, and the beneficial bacteria.

Colorado Water Garden Society

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Green Water

The Ecology of the Pond

Green water in the pond is the most common complaint of the water gardener. New pond owners are usually excited about their ponds and fish. They marvel at how fun and easy it was to get started and how much they enjoy their pond. Their excitement and enthusiasm often turns to frustration when their crystal clear pool turns into a green, murky bowl of pea soup.

It may seem that a quick fix would be to change the water, or reach for some chemical, but don't. The best solution is to develop a balanced ecology in the pond.

A healthy pond requires less maintenance by its owners, and provides more sensory stimulation, enjoyment and relaxation than most other forms of gardening for the time and energy expended. Achieving an ecological balance in the pond can seem difficult, but once basic biological principles are understood, it can become relatively simple.

The problem, quite simply, is algae. Algae is one of the most primitive and common plants. And algae is everywhere. Any body of water that receives enough sunlight will be colonized by algae, which absorbs its nutrients from the water. This normal, inevitable phenomenon can be minimized by understanding the source of the problem and taking steps to keep it in check.

Algae comes in many forms, some annoying and some beneficial. The "string" or filamentous algae, which we see growing on the sides of the pond, can grow to form dense green mats which float in the water or on the surface. Although this string algae can be unsightly, the excess can be easily removed. However, this type of algae is one of our best allies against its cousin, the single-celled algae.

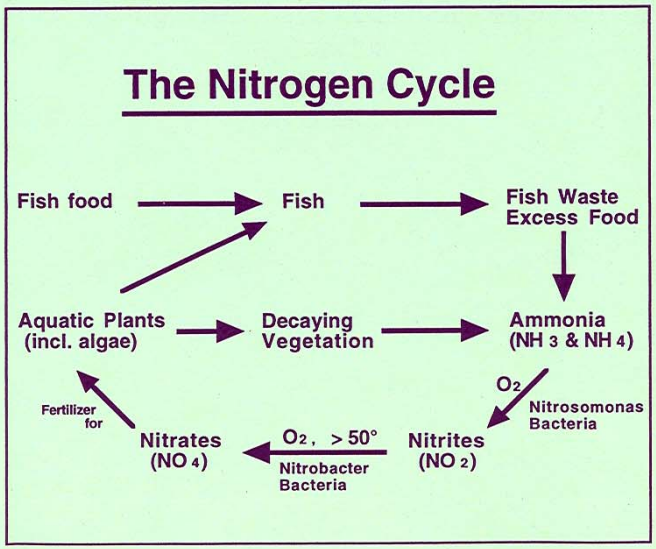
Green water is caused by an overabundance of single-celled algae. These microscopic plants take advantage of the abundant sunlight, mineral salts and nutrients found in a newly filled pond and can multiply much faster than any of the other pond plants. This is why even a healthy pond may go through a brief period of green water when first established. Changing the water at this point would only provide the algae with more minerals and nutrients and it can be stressful to both fish and plants.

It is important to set up a competition for light and nutrients by using other aquatic plants to absorb the available nutrients and to shade the pool, thereby starving the algae. Even aside from their aesthetic value, these various aquatic plants play a very important role in achieving ecological balance in the pond.

There are four basic types of aquatic plants: the waterlilies, the floating plants, the submerged plants, and the marginal, or bog plants.

Waterlilies are the jewels of the water garden, but have functional importance as well. Their floating pads serve to shade the surface of the water, denying sunlight to the algae below. However, if the lilies are overfertilized, nutrients leaching from the soil may also feed the algae.

Floating plants come in many forms, such as water hyacinth (*Eichhornia crassipes*) or water lettuce (*Pistia stratiotes*), and the much smaller azolla and salvinia. These plants shade the water, but also absorb their nutrients through roots which hang down into the water, competing directly with the algae.



Submerged plants (sometimes called oxygenators) are planted in gravel at the bottom of the pond, and never reach the surface. Although they don't produce as much oxygen for the water as once thought, these plants do absorb nutrients directly through their leaves (not their roots). They do not need fertilizing, and they compete with the algae.

The marginal, or bog plants, are those plants with roots that are partially or completely under water, but with foliage that comes up out of the water, such as cattails (*Typha*), water iris, or umbrella plants (*Cyperus spp.*). These plants create vertical visual accents, and can provide shade to the water.

The final element in the ecology of the pond is bacteria. Fish wastes and decaying vegetation produce ammonia and other toxins. Beneficial bacteria are necessary to break these down and convert the ammonia to nitrates, which in turn will feed the aquatic plants (unfortunately, including the algae). This process is called the nitrogen cycle.

There are two different types of bacteria required for this process, both of which are provided free by your fish and their wastes. Adding a commercial preparation of bacteria to a new pond may speed up the establishment of the colonies, but is usually not necessary. These bacteria require oxygen, temperatures above 50 degrees F., and a surface on which to live. This can be an artificial surface (a "biological filter"), but the bacteria can thrive on the side of the pond or on the roots of the plants.

Unfortunately, there is no "magic bullet" or miracle chemical that can clear a pond of algae and keep it clear. Quick fixes are temporary, and disrupt the maturing ecology of your pond.

But, with a balanced mix of plants, fish, sunlight, oxygen, bacteria, and patience, you can create a healthy pond with clear water.