There are two different types of bacteria required for this process; your fish and their waste provide both free. Adding a commercial preparation of bacteria to a new pond may speed up the establishment of these colonies, but is usually not necessary. These bacteria require oxygen, temperatures above 50° Fahrenheit, and a surface on which to live. Surfaces can be either artificial such as a "biological filter" or natural such as the sides of the pond or plant roots.

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 can disrupt the maturing ecology of your pond.

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

Tips for Clear Water:

- Don't over fertilize your plants or allow fertilizer from nearby planting areas to run into the pond. Fertilizer is also food for algae.
- Don't overfeed your fish or put too many fish in the pond. Excess fish food or waste will make algae worse.
- Remove decaying vegetation and excess string algae from the pond.
- If lilies shade 60% of the pond's surface 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 over-growth of algae.
- Exposing the water to an ultraviolet sterilizer or an ion generator may help reduce the amount of single celled algae. Don't use algaecides – anything that will kill the algae can also harm the plants, fish, and beneficial bacteria.

Tips for Clear Water: (cont'd)

- Have patience. Most of the time, the algae multiply to the point excess nutrients are exhausted and then die. One day you look out and the pond is crystal-clear again.

Colorado Water Garden Society

Green Water

The Ecology of the Pond

For more information about the Colorado Water Garden Society or other aspects of pond keeping along the front-range go to:

http://www.colowatergardensociety.org
or send an e-mail to:
info@colowatergardensociety.org

Written by Cyndie Thomas, originally published 2003
Revised by Vicki Aber & Edited by Dorothy Martinez 2013

www.colowatergardensociety.org

Green water in the pond is a 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 turn to frustration when their crystal-clear pond turns into a green, murky bowl of pea soup.

It may seem 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 stimulations, 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. In addition, algae are everywhere. Any body of water receiving adequate 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 floating on the water surface. Although 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 also be stressful to 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 shade the pond, thereby starving the algae. Aside from their aesthetic value, these aquatic plants play an important role in achieving ecological balance in the pond.

There are four basic types of aquatic plants: water lilies, floating plants, submerged plants, and marginal/bog plants.

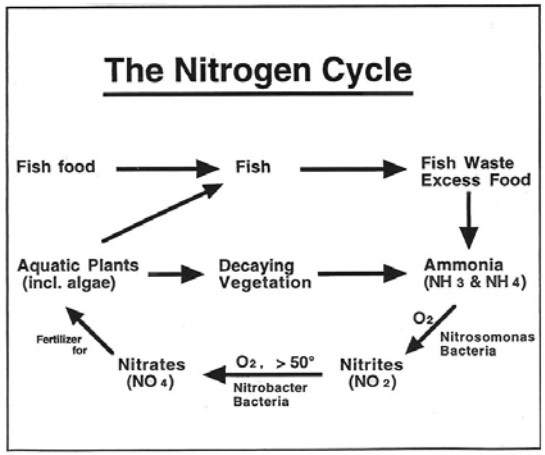
Water lilies are the jewels of the water garden, but have functional importance as well. Their floating pads serve to shade the surface of the water, denying sunlight to the algae below. However, if the lilies are over-fertilized, nutrients leaching from the soil may also feed the algae.

Floating plants come in many forms, such as Water Hyacinth (*Eichhornia crassipes*) or Water Lettuce (*Pistia stratiotes*), and the much smaller Fairy Moss (*Azolla)* and *Salvinia rotundifolia*. These plants shade the water, but also absorb nutrients through their roots, which hang down into the water and compete 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 don't need fertilizing and also compete with the algae.

Marginal/bog plants are those plants with roots partially or completely under water, such as Cattails (*Typha*), Water Iris, or Umbrella Plants (*Cyperus spp.*). These plants create vertical, visual accents also shade the water.

The final element in the ecology of the pond is bacteria. Fish waste 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 feed the aquatic plants, including algae. This process is called the nitrogen cycle.



The Nitrogen Cycle