Algae, Warm Weather Foe

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Algae, the most tenacious adversary with which the contemporary water garden enthusiast must cope, is actually a symptom of a more complex problem. Instead of being equipped with a clear-cut and direct approach for the control of algae, the pond hobbyist is, at best, often in the dark regarding the causes of algae growth and how to deal with the associated problems.

To better control algae the hobbyist must first understand algae and what it requires for a sustained bloom period. For prolific growth, algae has four main requirements: phosphate/silicate, nitrate, light, and an excess of organics. Although these natural byproducts of metabolism are required by plants, if levels become excessive, algae will bloom uncontrollably.

Most often the hobbyist can attribute algae bloom (green water) to one or a combination of two main factors, additives or inadequate filtration, or both. Most hobbyists do not realize that the additives that they use to keep their water garden pristine are often the cause of their algae problems. For instance, the vast majority of plant fertilizers and plant supplements available contain phosphate and nitrate that will accelerate the growth of the plants while also exacerbating algae problems. Until recently, buffers for the control of pH in the pond environment were entirely comprised of phosphate, and, although they would maintain a stable pH, they also promote algae. There are alternatives available in plant nutrition and pH control in the Seachem pond line, Water Garden Oasis™. The plant supplementation program from Water Garden Oasis™ utilizes the phosphate and nitrate produced by the pond in conjunction with a broad spectrum of essential trace elements, vitamins, and amino acids; it is rich in iron, manganese, magnesium, calcium and potassium, vitamins B12 and C, and inositol. The supplementation program consists of two products: Pond Flourish™, a concentrated liquid, and Pond Flourish Tabs™, a tablet form of Pond Flourish™ for direct dosing of the supplement to the root zone of the plants. Seachem also has the first non-phosphate buffers for use in ponds, Pond pH Buffer™ to maintain a stable pH, and Pond Acid Buffer™ to lower pH. In most cases the algae blooms start in spring when the water temperature starts to climb, which coincides with the normal accumulation of organic waste from the winter months, thus providing optimal conditions for the proliferation of algae. Current techniques for the control of algae are fairly limited and, until recently, were merely addressing the symptoms and not the root cause of the problem.

There are four main approaches to the control of algae: herbicidal, chemical filtration, foam fractioning, and ultraviolet sterilization. The utilization of copper sulfate (commonly used as a herbicide) is quite effective as an algae destroyer but only at killing the algae that is present while the treatment is being administered. Once the copper has been removed the algae usually returns within a couple of weeks. Copper is also a very indiscriminate herbicide, killing all plant life, making the removal of plants prior to treatment a necessity. Copper sulfate is extremely harsh on fresh water fish especially if dosing is not monitored; an inadvertent overdose could prove fatal for the aquatic inhabitants. Prolonged exposure to less than 0.1 ppm of copper sulfate can lead to gill burns and copper toxicity, making continual copper dosing very dangerous. You will find practically the same scenario with any type of herbicide: remove plants while treating, then remove the herbicide, replace the plants and finally the algae returns soon thereafter. To reiterate, herbicides do not address the cause, only the symptoms. With the impracticality of the herbicidal approach it is amazing to see the number of hobbyist who chose this tactic.

The most commonly used form of chemical/mechanical filtration is activated carbon. Utilization of a high grade

activated carbon will reduce the amount of organics in the water, thus removing one factor in the algae equation. For organic removal, activated carbon is extremely effective. However, due to the limited duration of usefulness, usually only one to two months, it is not as cost effective as would be the use of a regenerable ion exchange resin. When used properly a high grade resin can outperform activated carbon in both organic uptake and duration of use. Also, most resins are fully regenerable with the use of common household chemicals. The initial cost of most resins may cause reservation on the part of the hobbyist but one must look at the long term. Utilization of resins as a replacement for carbon will over the period of one year have a fairly large cost savings.

Since even the highest grade carbons will only last 30 to 60 days, in one year carbon must be changed a minimum of 6 to 12 times. For a moderately sized pond of 500 gallons, this equals approximately $30.00 per use for a high grade extended use carbon, which amounts to a yearly cost of between $180.00 and $360.00. When compared to even the most expensive resins with selective removal characteristics, which carry an initial cost of approximately $250.00 for a quantity that would last in the same 500 gallon pond approximately two years and allows for multiple regenerations that could extend the useful life of the product to a minimum of 6 years. When viewed this way, the cost of using resins in water garden management for organic removal and overall water quality control is relatively inexpensive. Utilization of resins in the water garden environment is fairly new, but resin use in in both freshwater and marine aquariums has through exhaustive research been shown to be beneficial in reducing the concentrations of organics in all types of water. One could extrapolate that this would reduce algae problems by directly attacking one of the causes without the adverse affects often associated with herbicidal approaches.

Probably the most important form of chemical filtration available to facilitate the demise of algae would be phosphate/silicate extracting media. Preferentially the media should be bead shaped, as should all types of chemical filtrants (resin, carbon etc.). This allows for optimal water flow characteristics, unlike impeded flow that is characteristic of granular products (arising from packing and channeling). A premium grade phosphate extractor should have a capacity to remove about 100mg/L phosphate in 100 gallons of water per 1 liter volume of media.

In the pond industry foam fractioning is increasing in popularity, and understandably so, since foam fractioners can remove organics efficiently. Foam fractioners provide a cost effective means for the hobbyist to reduce the organic buildup as well as directly removing algae from the water in the process. Although the capacity for direct removal of algae is limited, the ability to remove organics is quite substantial, and, in most large ponds, is well worth the time and effort of designing your own or purchasing a manufactured unit.

Ultraviolet sterilization destroys algae by burning its cellular structure as well as organic material. Although the use of ultraviolet sterilizers for aquatic use is well documented and is undeniably a positive addition, its main function is not directly for algae control. The primary function of ultraviolet is to destroy water born parasites to keep the fish healthy and disease free. Most ultraviolet units are at best over-rated as to acceptable flow rates; consequently, most hobbyist don't see the full effect of the units because water flow is too high to allow for adequate exposure time. If an ultraviolet unit is purchased for control of parasitic infestations, then the added benefit of algae suppression is icing on the cake, but there are more effective ways to control algae.

As for lighting, there are but a few ways to help reduce the amount of light that penetrates the surface of the pond. One that is simple but effective, is the use of shading plants (lotus, water lilies, duck weed or even shading trees out side of the pond such as willows or Japanese Maples). Another option that seems to help somewhat is the use of light diffusing dies to color the water. As long as these are not detrimental to the biological filter or the plant life. Malachite green and methylene blue should not be used for this purpose, since they pose hazards to the plants as well as the bacteria housed in the biological filter.

Sometimes in trying to simplify, we actually end up increasing the complexity of the what should be enjoyable to the point of drudgery. Pond management should be enjoyable and, if as consumers we are more informed as to the possible contraindications of additives, then we can make informed decisions as to which best suit our applications. Pond husbandry offers a combination of fish keeping and landscaping design, a side of the aquatic hobby that is unparalleled in the diversity of its scope. I have not yet seen an aquarium that could rival the beauty of a pond set amidst lush green foliage, with the blooms of the lotus and the lilies as accents, water so clear as to be black, and vivid contrasting colors of red, orange, and white, as the Koi move in the darkness. With the sheer beauty of a well designed water garden, there is no wonder why it is an oasis.