A POND’S PATINA

(Part 2)

Part One of A Pond’s Patina (APP) dealt with what it is, what it can do and how it colonizes a pond’s ecosystem. Simply stated, it is a biofilm in an established water garden that consists of algae, bacteria and invertebrates. This patina layer exists and grows on everything the water touches — the rocks, liner, tubing, plant pots, etc. but it must also have enough oxygen for this layer of life to live. A lot of ponders would call this, the slime layer. It is your pond’s natural biological filter and it can be a big enough filter in a lot of water gardens to have a healthy pond without any additional biological filtration. Please refer to Part One (PONDKEEPER, Summer 2006) for more information.

Aquatic plants can be an important part of the ecosystem of a pond. They absorb nutrients that could become toxic to APP but also provide more surface area for bacteria and invertebrates of a healthy Patina to colonize.

A water gardener’s main focus is to nurture APP in order to be successful with a balanced ecosystem. This process is what I call Proper Pond Management or PPM. PPM will not only insure that APP survives but will grow and mature. Besides having a beautiful water garden with clear water and healthy fish, an added benefit is that PPM can mean less work and cost for the water gardener. The more successful that our clients are, the more they tell their friends how fun this hobby can really be.

Let’s get started in going over what is involved with PPM.

I mentioned in Part One that oxygen is a very important component to insure a healthy Patina. Without it, APP cannot exist. Even low levels will inhibit the development of a Patina layer that has all the potential critters and algae. This is a mature Patina. To insure that there is enough oxygen we must supply enough circulation in the pond at all times. This means a turn over rate of at least one pond volume per hour. Of course, you can go greater than this but eventually an oxygen saturation point will be reached. Then it can become a waste of money to move it any faster. Having a large turnover rate also means a greater chance that there are no areas of the pond that have very little circulation. These areas can become dead zones for the Patina. The fish may survive these areas because they can swim out of them.

Properly designing a water garden can also improve the chances of having a healthy Patina. Complicated designs with things like islands and “coves” can restrict good circulation. Placing the pump’s intake at the opposite end of the pond’s waterfall so that better circulation is created is always a good design. Also, in the initial design, we think we may have enough circulation but as we add various filters, fountains, tubing and associated fittings we may have reduced the circulation to a much lower level than is needed.

Part of an important maintenance routine is checking the pump’s intake, impeller and outlet tubing throughout the season. If any part of this system is compromised then circulation is affected and we then risk lower oxygen levels.

Some clients want to save money by shutting the pump off overnight. Of course, this can be certain death to the patina and the ecosystem on a hot summer day. This is okay for a water feature that does not have life in it but is a potential catastrophe for any kind of critter that exists in water.

Scrubbing and power washing will remove APP. Sure, these techniques will remove string algae but that is only a temporary solution to this problem. String algae will grow back and with even more vigor than it was growing before. It seems that people believe if it is “slimy or smelly”, then it is dirty and we have to get rid of it. They do this by either adding something that will kill it or they scrub it off. This is an area where a client can save money and work.

Allowing leaves and other organic material to build up in an ecosystem can do a lot of harm to APP. These organics not only compete for oxygen but the intermediate and end products of protein decomposition can become toxic to most forms of life. So, it is very important to not allow the fish population to get too high. Do not overfeed the fish and do not allow organics to accumulate.

By Jamie Beyer, Midwest Waterscapes

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Adding rock to a lined pond will double or triple the surface area that can be colonized by APP. However, I would not add rock to the very bottom. The patina does not grow there anyway as mentioned in Part One but it also makes removing the sediment and organic matter much more difficult. This turns into more labor for a client to do or pay for. Adding rock to the sides of a pond and the first shelf is a great way to add to APP.

Of course, biological filters can add to APP in a big way. A properly designed biofilter is certainly recommended for water gardens with a large fish load. The main focus of the filters is all about providing more surface area for bacteria and invertebrates to adhere to. PPM with these involves regular maintenance and flow checks. Too often I have seen poorly designed filters that either make the maintenance very difficult or they simply are undersized for what they are sold for. In these cases, a water gardener is better off without the filter and make sure that PPM is practiced.

For those where the winters are very cold and ice forms there is an extra step to PPM that is needed to insure that the Patina survives. We must provide oxygen during the winter to the pond. We are not only overwintering our fish but we are also overwintering the critters in our Patina. The bacteria and invertebrates go into some type of dormancy but most of them still need oxygen. Simply adding an aerator to the pond is all that is needed for those ponds where the water pump/stream is shut down. For those ponds where supplemental heat is provided, aeration is still a must. The in-ground pond must be at least 24 to 30 inches deep in the Midwest – even deeper in the Northern tier of states. I know that 30 inches is deep enough in Northern Iowa and Illinois. Above ground ponds are more of a challenge and each one would need to be analyzed to determine appropriate depth.

What type of surface is the best for APP to grow on may be asked. A really smooth surface will allow the patina that attempts to grow, to slough off easily. Is EPDM liner too slick? No – Patina can grow very easily on that type of liner. As for the other types of liner – I do not know the answer to this. PVC liner seems very smooth to me but I need to research this as well as other liner’s ability to grow a Patina.

The smoother the surface, the easier it is for the Patina to be removed by the fish. Some of Koi and goldfish’s natural foods are in APP that can provide a lot of nutrition to your fish. They can easily be observed grazing on the rock, liner and plant surfaces. The fish can normally only remove a small portion as they nibble on it because of how well APP is attached to the substrate.

If a pond owner understands the principles of APP and adheres to PPM then we have achieved the goal of having a successful water gardener. They then understand what an ecosystem is all about and how they can always be vigilant about what is good for APP. Remember, what is good for APP is good for the fish, plants and the beauty of a water garden.

About the Author

The very popular subject of adding water features to a garden is one that Jamie Beyer brings a lot of knowledge and enthusiasm to. Jamie is a Lifetime Master Gardener and is founder and immediate Past President of the Central Iowa Water Garden Association. Water gardening has been a passion of Jamie’s for over 45 years and, currently, he has three 10,000 gallon ponds and one 27,000 pond which contains many kinds of water plants and fish. He combines this experience with his Master’s Degree in Fish and Wildlife Biology to become uniquely qualified to be one of the Midwest’s foremost experts on the subject. His broad background of fisheries, dynamics of water, wildlife ecology, and horticulture gives him impressive credentials. Jamie frequently speaks and writes on all aspects of water features and water gardening to gardeners in the Midwest. In addition, he also has a consulting/installation business, called Midwest Waterscapes, which he works as a water garden, fountain and pond consultant/installer to people that want extra help. Jamie has considerable experience installing ponds, diagnosing water garden problems, teaching classes and helping do-it-yourselfers, do it right. Since the late 80’s, he has been involved with the design and installation of over 500 water gardens and features.

Jamie and co-author Veronica Fowler, wrote the Ortho Book "All About Garden Pools and Fountains". Over a half million copies of the book have been sold in the six years since it’s publication.

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