How to Improve Pond Biological Filtration

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BASIC BIO filtration

Effective biological filtration occurs when certain conditions are provided for the beneficial bacteria. First, biological filter media must possess sufficient surface area to support a bacterial population large enough to process the volume of nitrogenous waste produced. Secondly, proper aeration (oxygenation) must be provided for the bacteria to efficiently process these materials.

Bacterial Population

Koi ponds are notoriously nutrient-rich environments requiring very large bacterial populations to adequately process nutrients. The population of beneficial bacteria must be proportional to the amount of waste products generated by the koi. There are a variety of biological filter media available but porous bio-media provide maximum surface area for countless beneficial bacteria to colonize. Biological media must stay clean of debris otherwise the porous structures can become clogged and eliminate the site for bacteria to colonize. An adequate mechanical filter must be in place to prevent biological filter media from clogging.

Proper Aeration

Moving water transports organic materials to the biological filter media where beneficial bacteria break down harmful nitrogenous materials into less toxic forms. In order for these beneficial bacteria to function efficiently, they require oxygen-rich water provided by good water movement.

Aeration occurs when water vigorously tumbles over rocks and waterfalls. Moving water comes into greater contact with air in these areas, making it a crucial site for proper gas exchange. Harmful gasses are released and oxygen is incorporated into the water. The oxygen-enriched water is then re-circulated to help support the overall health of the pond. Without continuous water movement to replenish oxygen, beneficial bacteria can deplete the available oxygen and conditions can degrade water quality.

Supplementing Biological Filtration

Creating an environment that supports a large population of beneficial bacteria

We recommend:

- Water Repair™ Colonize

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is not difficult. For example, waterfall filters are the perfect site for cultivating large colonies of beneficial bacteria and microorganisms. These filters are capable of producing oxygen-rich water and are deep enough to accommodate a thick layer of biological media – two conditions needed for efficient propagation of aerobic, sludge-eating bacteria. Once well established, the bacteria will process any ammonia present in the water as it percolates up through the bio-media.

Large water changes with chlorinated water and certain medications can affect the bacterial population and compromise efficient biological filtration. Use a water conditioner to remove chlorine, chloramines, and other toxic heavy metals before they can cause damage to your fish and filtration system. The bacteria will naturally repopulate over time but supplementing with bacterial additives will replenish the bacterial population quicker and minimize any potential negative effects due to the loss. Use bacterial additives as part of a regular maintenance program to ensure a healthy environment.

- **Water Repair – Colonize**, fortifies existing pond filtration with beneficial bacteria and enzymes.
- **Pro Biological Filter Falls**, helps you create a stunning waterfall design with highly effective filtration.
- Find beautiful plants to decorate all areas of your pond at **LiveAquaria.com**.

Another way to supplement biological filtration is through the use of plants. Plants are not just decorative additions to a water garden, but a living filtration system that removes and processes organic waste materials from the water column before they have a chance to break down.

Submerged and floating plants are ideal for this purpose. Some submerged plants are also referred to as oxygenators since they efficiently use carbon dioxide and release oxygen after photosynthesis. Though these plants are often hidden from view (since they grow underwater), they play a vital role in the overall health of an aquatic system by improving water quality and clarity. Anacharis is the most popular of the oxygenating plants.

Floating plants, as their name implies, float on the water surface and develop extensive root systems that filter excess nutrients directly from the water. They also provide shade to further curb aggressive algae growth and are commonly used as part of an algae-control regimen.

Healthy plants grow vigorously, processing large amounts of nutrients in the pond water that encourage aggressive algae growth. Furthermore, plants host hundreds of other beneficial microorganisms in their root system, all equally eager to consume the organic debris that contributes to poor water conditions.

These plants should be protected from the hungry mouths of koi. Place these plants in strategic areas inaccessible to koi. Consider the waterfall filter, in which floating plants provide extra biological filtration as well as a more aesthetic, natural appearance.

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