

WHAT IS A BIO-FILTER?

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Everybody I know with a koi pond tells me they have a “bio-filter”. When asked further, I hear they have pressurized gizmos, all-in-one jobbies, elaborate multi-faceted systems, and simple home-made filters with scrubbies or pads in a 55-gallon drum. I hear they have a skimmer and waterfall “bio-filter”. I hear they have this media and that media, all very important to the biological processes, but not exactly comprising a bio-filter in and of itself.

Technically everyone is right of course but, not necessarily for the reason they may think. Technically, nitrifying bacterial activity occurs on all surfaces below the water surface including those surfaces inside the various gizmos. It is just that, unlike the lakes and streams, there are not enough surfaces, due to our fish loads, to provide a home for the unbelievable number of nitrifying bacteria needed to do the job. Ergo, we have a designated separate bio-filter designed with huge surface area producing media to support our good bacteria.

A bio-filter is just one segment of your filtration system, probably the last phase in the line-up for effective pollutant removal. First, you have to remove the larger solids in a mechanical filter or settling chamber. The mechanical filter, while having a few surfaces suitable for nitrifying bacteria, is not considered your bio-filter, it is your mechanical filter, and its main purpose is to prevent the bio-media from becoming dirty, clogged up, and channeling so it loses its effectiveness. When dirt covers biological media, it simply cannot function. So, if the mechanical filter works adequately the bio-media will fare well, requiring no maintenance from you. The mechanical filter, however, should be serviced (cleaned) frequently to prevent buildup of ... gunk and debris. It catches this stuff so the bio-filter does not have to. The purpose of the bio-filter is not to capture this gunk and debris buildup. It is to convert ammonia to nitrite and then nitrite into nitrate. It will even convert nitrate back into harmless nitrogen gas to be eliminated from the pond.

The more fish, the more waste being produced. So, the more waste, the more often you will need to “unload” your mechanical filter. If you fail to clean the mechanical stage of your bio-system, the bio-media will begin to fail. First thing you will see is a decline in water quality. Pushing more water (bigger pump) or feeding less at this point will not solve the problem once there is a buildup of debris. Once the bio-media clogs – or begins to - the nitrifying bacteria decline and invisible ammonia levels rise causing quick death. The pre-filter must be cleaned to protect the bio-filter. I cannot stress the importance of maintaining the mechanical segment of your bio-filter or you will begin to see sick fish and then dying fish due to invisible ammonia, nitrites, oxygen deprivation, or pathogenic organisms which will begin to flourish in poor water.



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Bio-filtration needs of the whole pond are often insufficient when your only filter is mechanical removal of fish waste. It is important to understand the mechanics of your filter, what you can expect and what the pond requires. This way, you can anticipate the needs and do the cleaning before trouble begins. Remember, the bio-media should only have to be cleaned of a little mulm which is the natural by-product of healthy happy beneficial nitrifying bacteria and NEVER have to be cleaned of dirt and debris in a properly designed and functional pond system.