

FILTRATION BASICS

Written by Russell McAndrews

Monday, 25 May 2015 21:31 - Last Updated Friday, 19 June 2015 15:24

The most common types of aquarium filtration commercially available can be placed into one of three classes; biological, chemical and physical. Biological filtration is far and away the most common and generally the best and most broadly applicable. All filters employ some of aspects of each of the three classes, but are typically marketed as one or the other. As you may have guessed, the processes of each of the filtration types are different as is the equipment generally. This means they do different jobs, utilizing specific reactants, produce different products, require different maintenance and are sensitive to different disruptive influences.

Biological filtration is, without a doubt, the most natural. In my opinion it is also the most reliable, easiest to maintain and capable of supporting the most delicate of organisms. Biological filters have taken on an array of forms over the years. It is safe to say that the processes of biological filtration are taking place in almost every aquarium filter and to some extent even without a filter.

Bio-filters typically employ benign bacteria (and sometimes algae or plants) which feed off toxic fish wastes and produce less and less toxic byproducts in two single step processes from which the bacteria derives energy.

The most outstanding characteristic of this filter and one that is unique, is that it is alive. Consideration must be given to the filter bed as any other organism in the system. Two of the most noteworthy implications are; the time required for bacterial population to reach levels capable of handling all the waste products in the system, also, and very importantly, it is susceptible to damage by the use of antibiotics often used to medicate the aquariums other inhabitants.

FILTRATION BASICS

Written by Russell McAndrews

Monday, 25 May 2015 21:31 - Last Updated Friday, 19 June 2015 15:24

Bacteria are attached to surfaces everywhere but and population levels can be maximized by maximizing surface area available for their attachment. In addition, their metabolic rate for neutralizing waste is directly proportional to the amount of oxygen available to the bacteria. This means that flow of oxygenated H₂O through the filter should be adequate to ensure O₂ reaches every area of the filter bed.

NOTE: solid fish waste known as detritus is beneficial for attachment and as a source of metabolites for the filter bed, but when it accumulates to the point of reducing flow then some of it needs to be removed.

Maintenance of a bio-filter therefore is simply maintaining an even and sufficient flow through the bed. Load on the bed, the area, size and porosity of the bed all contribute to how frequently it must be maintained. Aside from the resistance of the bed to flow, the only other factor is the operation of the device generating the flow. Power-heads and airlifts can over time become clogged or even fail resulting in a reduction or halt to the filter capability. A light stirring of an UG filter or squeezing of a sponge is diagnostic of how much detritus can be present. NEVER scour the filter medium just ensure it is not clogged. A dirty filter is more efficient than a clean one and a sterile bio-filter is no filter at all. When accompanied by a H₂O sufficient detritus is removed. Remember that it should not be a detritus "witch-hunt" and that the cloudiness will not linger. Be sure to re-slope the gravel slightly deeper around the lifts, fill any pits, which will short circuit flow and stir under decorations where flow is prevented. Often anaerobia pockets will develop here. Blackened gravel and/or gas bubbles indicate the toxic H

²
s byproduct of anaerobic metabolism (w/o O

²
)

FILTRATION BASICS

Written by Russell McAndrews

Monday, 25 May 2015 21:31 - Last Updated Friday, 19 June 2015 15:24

Sponges should be either wrung out or back siphoned. When wringing out a sponge, first remove it from the hard plastic part then either; wring it out in the tank (CAUTION: only if you intend to do a large H₂O) or remove it from the tank to a pail of tank water, submerge it and squeeze it tightly while rotating the sponge in your hand. Repeat several times. "Slimey" sponges must be thoroughly cleaned.

If biological filter media is to be removed from the aquarium for any time, ensure it stays moist to prevent it from dying. Be sure to reassemble for proper flow.