

THE FILTERING SYSTEM

The following is an extract from the South African Koi Keepers Society website

<http://www.sakks.co.za>

It is essential to provide some sort of filtration system as fish live in a closed system and use this space to excrete their waste in. When they digest proteins they produce Ammonia which is excreted through their gills into the pond. Ammonia raises the ph and quickly builds up to a level that is toxic to fish. In addition there are the leaves that rot, and all sorts of other organic debris. These produce Ammonia which must be kept to an acceptable limit as described above. There are various options which remove these. It is important to understand that a filtration system should have both mechanical AND biological filtration stages. In the mechanical filter, the solid wastes are filtered out as much as possible so that the water entering the biological filter is as free of solid wastes as possible. This is because the nitrifying bacteria in the biological filter require oxygen and water flowing over them to perform and these bacteria will be smothered in waste solids if they are not removed in the mechanical filtration stage.

i) Wetland, with a surface area approximately 25% to 30% of the pond area, This would be a smaller pond filled with plants that will effectively remove the Ammonia, nitrite, nitrate gases and other solids. It is best to provide a drain plug to be able to clean out the system. A list of suitable plants can be obtained from the local nursery. Just a warning, some plants are toxic to fish and cannot tolerate a high water salt content. (salt is sometimes added for medication). The pond return water can be split to this vegetable filter and to a venturi or a waterfall. Then in the winter all the water can pass through the vegetable filter and to the pond. Just note, when medication is applied to the pond, the vegetable filter system should be bypassed. It is not recommended that you rely solely on a wetland for your filtration needs, but use it in conjunction with other filtration.

ii) Up and Under filter system: This system is the old traditional system used prior to the Vortex systems, and many a Koi keeper still believes in this method. It consists of a long rectangular container of which the surface area is to be approx 20-30% of the pond surface area, with a min depth of approx 500mm. This is subdivided into a minimum of four smaller chambers. Each chamber must be provided with a drain point to enable it to be flushed out. The first chamber overflows into the next and then gets forced to the bottom of this chamber via 100mm pipe ducting, and then all of the water must be able to pass along the whole floor area and up through the media then overflow into the next chamber, ---the same then goes for the third and fourth chambers. The first chamber is traditionally longer than the rest as this is the settlement compartment with nothing in it, It could also be made deeper than the rest as one really wants to slow the water down as much as possible. The second chamber is also normally used as a mechanical filtering area and could be filled with any sort of media that would entrap smaller particles that escaped the first chamber. The last two chambers are traditionally used for the growth of Nitrifying bacteria on suitable filtration media. Never wash these last two chambers out with ordinary tap water, as chlorine may kill off much of the good nitrifying bacteria. There are many different types of filtration media such as brushes, matting, plastic media and gravel stone. Each has different surface areas on which the bacteria attach. Some are light and easy to clean (maybe once or twice a year) - others are heavy and difficult to clean(e.g

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gravel stone). Speak to experienced koi keepers and get their views before making your own mind up on what to use.

iii) Vortex systems. Mini and Maxi vortices are available where water enters a circular chamber at a low level, spinning the water and allowing solids to settle at the bottom of the vortex before the water exits at a higher level. Brushes are normally hung inside the vortex to entrap all particles. In this process of rotating the heavier particles settle out to the cone bottom, and can be flushed out regularly via a valve on the bottom. Vortex systems are adaptable to suit your pond requirements. Discuss this with your dealer.

iv) Trickle filters. This is a circular or square shaped container with a conically shaped floor so that any settling debris may be drained off via a valve similar to a Vortex. The vertical section is filled with a coarse media resting on a grid just above the taper section, Nitrifying bacteria can grow on this media and consume Ammonia & Nitrate. Water is evenly sprayed over the hole top and then trickles to the bottom where it is collected and drawn off at a point where it starts to taper and is then fed back into the pond. Note: the media must never stand in water.

v) Sand filter, should be filled with the 2 to 4mm silica sand, as the fine sand normally used with a pool filter will block too easily, and the addition of a bag or two filled with Zeolite in the filter could help with the absorption of ammonia. (NOTE: Prior to adding any salt to the pond the Zeolite MUST be removed as salt will release any absorbed Ammonia). Remember there is quite a bit of pressure / flow loss when installing a sand filter and must thus be taken into account when selecting the required pump, You will also have to stir up the sand by hand or by installing a blower in the bottom to loosen the crust that normally forms on the top surface. Sand filters are normally installed after a Vortex or an up and under system to remove the final bits of debris before returning to the pond. Just note, sand filters should not be used just by themselves as they provide too little area for adequate biological filtration.

vi) Multipurpose filters available on the market. These come complete as a plastic container, that can service various sizes of ponds, and can be connected together in series or parallel depending on the design. You just have to connect as per manufacturers instructions, and are then ready to go. Note that some of the units have a maximum operating pressure of one bar or approximately 1Kgr/mm².

vii) UV Light: Ultraviolet is a term used to describe the wavelength between blue violet range of the visible spectrum and the shorter wavelength or X-ray. UV has two primary functions, i) Controlling green water, ii) disinfecting water supply. By installing the correctly sized UV filter in the pipe line just before returning water into the pond, floating algae and the targeted pathogen can be effectively controlled / eradicated. UV lights come in various sizes to suite you pond. Note the tube MUST be replaced once every year if the light is kept on all year round. But be aware when medicating fish this must be switched off as the UV can also destroy the medicine.

viii) Last but not least it is strongly recommended to do a 10 % water change every week, this water can be re used in the garden as it would be full of good plant nutrition. Once a year do a 20 to

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30% water change when flushing your biological filter chambers. Just remember to add a chlorine or chloramine neutralizer.

If you really want good clean water one can use a combination of the above systems. See line diagrams on Page 8 for some of the possible combinations of various elements. Remember, clean water does not always mean healthy water.

There are also various additives available that can be added to the water to try and come as close to the natural environment as possible. Your dealer will be able to assist there.

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