

FEDERATION OF BRITISH AQUATIC SOCIETIES

POND CARE SHEET Part 4 : FILTRATION

20/04/2004

There is a simple fact of nature - for every gramme of food (calories) you put into a pond, a corresponding amount must either be absorbed by the pond's inhabitants - fish or plants - or a corresponding amount removed.

Depending on temperature and temperament, fish use approximately 60% of the energy available in commercial pond food. This then leaves approximately 40% to feed the green water or Blanketweed and the other aquatic plants.

OVERFEEDING FISH IS THE MOST COMMON CAUSE OF PROBLEMS WITH PONDS

Fish, as poikilotherms, do not need food to maintain a body temperature. More than two-thirds of the food we consume is used to maintain our body temperature, fish simply do not need this, but it is very difficult to convince people to stop overfeeding, therefore other means have to be employed to remove the excess food. This is where filtration comes in.

There are two basic types of filtration - Particle Removal and Biological Conversion.
So how large a filter do you need?

A Particle Filter should be approximately 10% of the pond's volume.
A Biological Filter approximately 20% of the pond's volume.

In general, filter containers are based on the black uPVC plastic water storage tanks found in most lofts, ranging in size from 45l/10gall to 227l/50gall.

Filter systems come as single units or in multiples according to the amount of water to be treated. External filter containers in the majority of situations will require hiding or camouflaging either by building a rockery around them using the earth dug out for the pond, or by installing them in an adjacent garden shed.

For the small pond there are available submerged filters; some thought must be given to their positioning in the pond as they will require the usual maintenance.
A unit manufactured by Rolf C. Hagen is shown below.

By using two sponge chambers (1) the filter reduces maintenance.
Water enters the two sponge chambers, the one nearest to the pump outlet (2) having initially the least resistance will clog first forcing more water through the rear sponge chamber until that too clogs; the sponges must then be removed and washed clean of filtered material.

The Biomax chamber (3) contains the medium on that is colonized by a Zoogeal Film. This should not be disturbed and must not be allowed to dry out.
Initially, periodic checks must be made on the sponge chambers to ascertain how long it takes for the sponge chambers to clog.

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PARTICLE FILTRATION

Particle filtration is the simple system and is self-explanatory.

The basic requirement is a single container for the filter medium, a pump to move water from the pond through the container and return it back into the pond.

With particle removal pond water is passed through a filter that contains a medium which removes the particles that are in suspension in the water.

The size of the particles removed will be dependent on the quality of the filter medium (today this is usually sections of foam), as will the rate of which the filter medium absorbs the particles and has to be removed and washed clean.

It is important to appreciate that this type of filter does not remove any of the chemicals in the water and whilst it will remove green water algae (when used in conjunction with a UV lamp) it will not remove the waste chemicals causing the problem.

However the filter is not subject to natural alteration that can occur in Biological Filters. It will not suddenly go sour on you and start releasing waste chemicals it has absorbed back into the water.

The major consideration with a particle filter is that the filter medium must be cleaned on a regular basis and an overflow bypass incorporated into the system so that if the filter medium should become clogged water continues to be returned back into the pond, either direct or via a waterfall.

Particle filters can be left running whilst treating a pond with chemicals; simply include the water contained in the filter as part of the total volume of pond water when calculating treatment dosage. During the winter months when fish are inactive particle filters can be turned off.

BIOLOGICAL FILTRATION

This is a more complex system of filtration.

It usually consists of one large container that is divided into three or more compartments or two or three separate containers linked together.

It works on the simple principal that the waste products of one life-form is the food of another.

The pond water is first passed through a filter medium that removes the larger particles in the water; the water is then passed through a medium that is colonized by a Zoogoeal Film. This is mixture of oxygen-using microscopic animals and plants, in fact some of them are so odd it is difficult to classify them as either animal or plant as they seem to fit equally into both categories.

They feed on, and therefore remove, the excess waste chemicals from the water.

To achieve this, the water turn-over through the filter should not be greater than 20 to 30 minutes. The Zoogoeal Film also has an optimal temperature range of 10° to 40°C

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As the filter relies on a living aerobic i.e. an "oxygen-dependent" Zoogoeal Film to absorb the waste material the system cannot be turned off, it must operate for 24 hours a day.

Also a bypass must be designed into the system to allow water to bypass the particle pre-filter should it become clogged so that the Zoogoeal Film is always supplied with fresh pumped water, otherwise the aerobic film will die and this in itself will foul the pond.

Finally the treated water is returned to the pond direct or via a waterfall.

Because biological filters use a living medium to remove waste material, they require time to become established - depending on temperature it takes from one to three months before they are fully effective. However several manufacturers produce 'seeding' compounds that will reduce the production time of a Zoogoeal Film from months to weeks or even days. Bio-Start and Cycle are two such products.

In time all filters require some attention, the particle section primarily and eventually the biological section with the removal of excess Zoogoeal Film which, like Topsy, the more it's fed the more it grows.

Never remove more than 10% at a time.

If the film is being grown on a brush filter medium then remove and clean brushes at the entrance end of the filter, move the other brushes forward and insert the cleaned brushes at the exit end this will speed up their re-colonization.

During the winter months when the fish are inactive the water flowing through the filter can be reduced by as much 75%, this maintains the filter in good health and reduces water turbulence whilst the fish are at rest.

ULTRA VIOLET CLARIFICATION:

Ultra-violet light will only clear green water when used in conjunction with a filtration system. UV light on its own will not clear the pond.

Fit a commercial encased Ultra Violet (U.V.) tube into an existing filter system before the main filter. Tubes must be the correct wattage for the amount of pond water being treated; they require a 240volt power supply and it is recommended that tubes are replaced annually.

U.V. not only kills algae but also pathogens and parasites. and fish become use to this protection and in time are reported to lose their natural immunity.

You must ensure that water does not pass through the U.V. too fast for it to have any effect, you may have to introduce a bypass if the filter serves a waterfall.

If treating a pond with chemicals switch off the U.V. during the treatment, as U.V. can break down some chemical action.

WARNING: DO NOT VIEW AN EXPOSED ULTRA VIOLET TUBE WITH THE NAKED EYE, when powered up and alight, it will damage the retina and can cause blindness.