



POND CARE SHEETS

Not all fish are kept in indoor aquariums.

Many fishkeepers are also fervent gardeners and have ponds, about which they may not be experts, but nevertheless enjoy throughout the seasons.

These Care Sheets may help them to sort out any queries they may have - whether they're just planning a pond or already up to their waists in trouble!

LINERS

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POND PROBLEMS

FEDERATION OF BRITISH AQUATIC SOCIETIES

POND CARE SHEET No: 1

LINERS

05/08/2004

POLYTHENE POND LINERS

Both Butyl and Xavan have superseded polythene and although seen as a less costly alternative to these, we would not recommend it as a pond liner. We suggest that it only be used to construct a temporary holding pond. When exposed to the weather, polythene becomes brittle and is subject to deterioration from exposure from U.V (Sunlight).

BUTYL POND LINERS

Butyl is still the most common Pond liner and comes in various thicknesses. One must be sure to select the correct thickness to suit the size of the pond.

A pond up to 10² metres a 5mm thick liner will be sufficient.
For a pond 20² metres you will need 1mm thick liner and over this 15mm thick.

A point to consider is that the thicker the liner the harder it is to fold or pleat into fancy shapes and, in cold weather, even a 5mm liner will require warming, so if you decide on Butyl keep your design as simple as possible.

XAVAN POND LINERS

Xavan is a more recent pond lining material marketed under the trade name of PONDTEX[®] and there is just one thickness – 0.5mm, this being suitable for any size of pond up to 4.5² metres. The liner is therefore much lighter to handle. Being only 0.5mm thick it is very easy to make neat folds or pleats if required even in cold weather and sections can be joined together with a purpose-made tape.

It is claimed to be three times more tear resistant than Butyl, it will not rot, is said to have a U.V resistance 6 to 7 times that of any other liner and carries a 25 year guarantee. However the most amazing quality of this material is that it can be nailed to a supporting structure without leaking. We would however advise the use of galvanised nails.

CALCULATING AMOUNT OF MATERIALS REQUIRED

The following is the formula to make sure you buy enough liner material for your proposed pond:

LINER LENGTH = Proposed pond length + twice maximum depth + 600mm

LINER WIDTH = Proposed pond width + twice maximum depth + 600mm

The extra 600mm on each dimension gives you enough 'overlap' to hide under pondside paving stones, rocks or even turf.

LINER GLUE: To glue sections of Butyl liner together you require 50grams of liner glue for every metre of liner seam.

REMEMBER, SEAMS CAN BE A POTENTIAL SOURCE OF LEAKAGE

LINER TAPE: Measure the seams and purchase the required roll of Pondtex[®] tape required and remember you must tape *both* sides.

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POND CARE SHEET No: 2

PUMPS

09/12/2004

If you move water with pumps for waterfalls, fountains or filters you will lose some water through evaporation. The amount lost will depend on how much water you are moving, the ambient temperature and the pond's position.

Continuous topping up from any source can increase the concentration of the any pollutants that are within the pond.

Domestic tap water contains chemicals that enable it to be fit for human consumption; these frequently have an adverse effect on fish and other pondlife. There are water conditioners available to treat tap water to prevent this.

ELECTRIC SUPPLY

Never use internal quality cable, plugs or fittings.

It is most vital that only the correct type of cable is used when extending an electric supply to a pond. It must be, *at a minimum*, of external quality (sub-soil quality if buried) and capable of carrying the load (amps) to be placed on it.

ONLY USE EXTERNAL QUALITY WATERPROOF CONNECTIONS, PLUGS AND FITTINGS

PROTECT THE SUPPLY WITH A GOOD QUALITY CIRCUIT BREAKER

Electricity and Water is a poor mixture but installed correctly there is no problem.

DO NOT TAKE CHANCES.

If in doubt either have a professional electrician install the supply or have it checked by one. Better to be safe than sorry.

PUMPS

If you have more than one feature i.e. a filter system and a fountain then use more than one pump.

Pumps normally have a simple sponge filter protecting the intake. Whilst this is satisfactory for a pump operating a fountain or water feature, it is quite useless when used in conjunction with an external filtration system. For this situation, the pump should be of the 'solid handling' variety so that all the dirt will be delivered to the filter rather than clog up, or severely damage, the pump.

Stand pumps clear of the bottom of the pond so that they do not clog with bottom mulm.

Filter systems relying on bacterial action to remove the pollutants from the pond water must be kept running 24 hours a day or the bacteria will die, and they will fail to work; worse than that, they can go 'anaerobic' and be the cause of serious problems.

Fountains and waterfalls on the other hand can be turned off at night if you wish to reduce water loss - and complaints from the neighbours!

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POND CARE SHEET No: 2

PUMPS

09/12/2004

CONNECTING HOSES

The size of the pipe connected to the pump is important, it must be large enough to accommodate the flow of water required - one cannot expect to produce a reasonable waterfall using a ½ " garden hose! Hose sizes of 25mm/1" or even 35mm/1¼" pipe may be required.

However, the larger the supply pipe the more weight of water contained within it to be pumped along resulting in a reduction of flow at the outlet.

You may be offered a black plastic pump hose that is made in a multi-rib form, the ribbing is there to give strength to the hose, but it causes considerable turbulence within the hose and a subsequent loss of flow through resistance. So make sure any ribbed hose has a smooth *inside* bore before purchase.

It is best not to use clear plastic hose unless it is covered or buried as, if exposed to light, it will become lined with algae and Blanketweed reducing the flow and eventually block. There is available from Plumbing Merchants various sizes of plastic push-fit plumbing pipes and fittings which make things easier when laying pipework.

UNDER NO CIRCUMSTANCES USE COPPER TUBE

The copper salts resulting from its use will kill fish, plants and biological filters.

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POND CARE SHEET No: 3 Waterfalls & Fountains

27/1/2004

WATERFALLS

Waterfalls can be made from natural or re-constituted rock sections, fibre-glass sections obtained from good Garden Centres

Alternatively, you can construct one yourself by using overlapping sections of liner. Here are a few tips:

Keep the lip of each fall level to produce an even curtain.

Dish the area behind the lip to form a small pool so that the waterfall does not dry out if turned off. Partially fill these pools with clean pea gravel, this will help hold the water - and also provide a better visual effect.

The higher the starting point of the fall and wider the fall lips the bigger the pump needed to effect a display.

If you intend to make a waterfall, first calculate how much water you need pumped to the top of the fall to achieve the desired effect and ensure that the pump will produce this (see **PUMP FLOW RATE** below). However, the flow rate of pumps have quite a reduction of flow the higher the outlet is raised above the pump.

STREAMS

A stream can also be constructed from fibreglass sections, again obtained from good Garden Centres or by overlapping sections of liner.

Natural rock or re-constituted rock can be used along the sides with smaller pieces in the stream itself. Cover the bottom of the stream with clean pea gravel, this will help hold the water, form an anchorage for plants as well as adding a natural look to the stream.

Do not make the stream too steep, a slope of 1 in 20 with one or two 50mm falls will suffice.

PUMP FLOW RATE

To calculate the pump required measure the lip of the widest fall.

The pump must be capable of producing a litre of water a minute for every 50mm of the widest lip

When calculating a pump's flow one must take into consideration the 'head height.'

This is the vertical height water has to be lifted above the pond's surface level and, in some circumstances, the length of the hose used to transport the water may also be a factor.

There is a considerable reduction of water pumped the higher the outlet.

Take as a typical example a Hagen "Powerjet 3000" pump.

With a head of 600mm this pump is rated to deliver approximately 3400 litres per hour (LPH).

At 1200mm, delivery drops to 2400 LPH and at 1800mm it reduces even further to 1200 LPH.

With smooth tubing up to 22mm allow a loss of 5 LPH for every 3 metres of tube from pump to outlet - and double that for tube sized 28mm to 42mm.

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POND CARE SHEET No: 3 Waterfalls & Fountains

27/1/2004

FOUNTAINS

There are three basic fountain types, Bells, Plumes (or Foamers) and Sprays. Bells and Sprays appear to be the most popular.

Bell Fountains

The pump and head of a Bell Fountain must be level or the 'bell' will not form uniformly. It may also be necessary to raise the pump in the pond. Do not use soft bricks or porous blocks. Use hard engineering bricks or weathered concrete blocks.

Plume (or Foam) Fountains

Plume or foaming fountains are very beneficial if fish are present as they ensure a good interchange of gases with the air, dispersing ammonia and nitrogen and taking up oxygen. However the fish do become used to the high level of oxygen.

The jet height should not be more than half the diameter of the pond, and in a windy position no more than a quarter, or splashing (and water loss!) will result beyond the pond. It may also be necessary to raise the pump in the pond. Do not use soft bricks or porous blocks. Use hard engineering bricks or weathered concrete blocks.

Sprays

Spray Fountains produce either a single jet, a column made up of several jets or a multi-tiered spray display depending on the number of jets or holes in the head and their configuration. These also have some value in the interchange of gases with the air, dispersing ammonia and nitrogen and taking up oxygen.

The jet height should not be more than half the diameter of the pond, and in a windy position no more than a quarter or splashing will result beyond the pond. It may also be necessary to raise the pump in the pond. Do not use soft bricks or porous blocks. Use hard engineering bricks or weathered concrete blocks.

Here is depicted a pond with a basic Hagen Laguna system consisting of a submersed filter, powered by a 1000 pump complete with a multi-spray fountain. It must be pointed out that the picture is only a representation. In practice a fountain as high as the one shown would be subject to a considerable amount of splashing in the slightest wind.

Here is depicted a pond with a complete Hagen Laguna system consisting of a submersed filter, a 3000 pump which is powering a multi-spray fountain, with a UV steriliser mounted on an external biological filter unit returning water to the pond via a waterfall. It is again pointed out that the picture shown is only a representation. In practice a fountain as high as the one shown would be subject to a considerable amount of splashing unless protected from the slightest wind.

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POND CARE SHEET No: 3 Waterfalls & Fountains

27/1/2004

POND LIGHTING

Lighting a pond at night can really set it off, especially if there is a spray or foam fountain in use. Lighting can be either above or below the depending on your choice. A mixture of surface and submerged coloured lighting can be used to produce quite startling effects, particularly if the pond is the centrepiece of a well laid out rockery.

Pond lighting has undergone a transformation in recent years with the development of 'safe' low voltage lighting kits. These take the danger out of using (and safeguarding) electricity in the water garden. Little harm will come to those accidentally cutting through a low voltage cable run to the pondside as the risk of an electric shock is minimal.

It may be possible soon to have efficient lighting (and perhaps even pond pumps) using solar power - if only our climate allowed enough hours of sunshine for its dependable use!

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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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POND CARE SHEET Part 4 : FILTRATION

20/04/2004

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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POND CARE SHEET Part 4 : FILTRATION

20/04/2004

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.

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POND CARE SHEET No 5 : POND PLANTS

17/10/2003

Plants, through chlorophyll, and with the aid of sunlight, use water to convert base chemicals, the nutrients in the pond into living tissue. In doing so, during the hours of daylight they give off oxygen as a by-product. Unfortunately during the hours of darkness they re-absorb some of the free oxygen in the water and in turn give off a corresponding amount of carbon dioxide.

It is this action that causes Green Water to be a problem to fish by producing too much oxygen in sunlight causing "Air Embolisms" by day or "Asphyxiation" at night by absorbing the oxygen in the water and replacing it with carbon dioxide. Plants then have both a clarifying and purifying effect on a pond by taking up the waste products, the nutrients in the pond; the fertilizers that the feed Green Water and Blanketweed algae thereby starving them out.

Plants, however, can also be great carriers of problems.

Therefore you must disinfect all plants before introducing them into a pond, stream or aquarium. Carefully examine them for snails, snail spawn and other nasties and remove these.

Pay particular attention to the underside of the leaves, as this is where most creatures hide and most deposit their eggs.

DISINFECT Alum (Aluminium Potassium Sulphate).

COMMERCIAL TREATMENT Pond Disinfectant.

SNAILS Eradicate using a 9v Bell Battery or Commercial Treatments.

SUBMERGED PLANTS

Aponogeton distyachos Water Hawthorn

Long oval leaves float on the water surface. White flowers smell of vanilla. Will flower repeatedly through the year.

Ceratophyllum demersum Hornwort

A native British plant with whorls of short dark green fine brittle leaves on long stems very small white flowers which rise 2-3cm above the water on thin stems. A good oxygenator and, as a native plant, it will survive our winters.

Egeria densa

A South American plant fast growing with 1-2cm whorls of light green leaves on long stems very small white flowers at water surface. A good oxygenator but half hardy, will not survive below 18°C, a sample should be removed from the pond and protected for the following year.

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POND CARE SHEET No 5 : POND PLANTS

17/10/2003

Hottonia palustris Water Violet

Branches of feathery light green foliage from a central stem. Pale violet/lavender flowers on stems 2-3cm above the surface. A European plant that should over winter.

Hydrilla verticillata

An Africa to Asia plant with groups of 6 to 8, 2cm whorls of green leaves on long stems; leaves have a slight saw edge. Small white female flowers lay on the water surface; the smaller male flowers float free to the surface and explode ejecting pollen into the air.

Half-hardy, it will not over winter or survive below 18°C; a sample should be removed from the pond and protected for the following year.

Myriophyllum brasiliense Parrots Feather

Has a feathery mid-green submerged foliage growing tips rise 15-20cm above the water in summer with stronger blue-green dense and thicker foliage producing small white flowers.

This plant will not over-winter; take cuttings and protect inside in a tray of mud.

Myriophyllum spicatum One of the Water Milfoils

A feathery light green submerged foliage, the yellow or red flower tips rise 10-15cm above the water.

A good oxygenator half-hardy, Protect in winter conditions.

Myriophyllum verticillatum Another Water Milfoil

Has feathery yellow-green to bronze submerged foliage, the bright red flower tips rise 10-15cm above the water. A good oxygenating plant half-hardy. Protect in the winter.

Potamogeton crispus Curly Pondweed

A central stem plant with many branches. New leaves light green in pairs every 2cm along the stem and branches turning to a coppery brown with age. Quickly forms foliage just below the surface sending small white or pink flowers just above.

A hardy plant, which dies back in late Autumn and over winters by producing a perennating bud, known as a Turion, which detaches from the plant, sinks to the bottom and remains dormant until Spring.

Ranunculus aquatilis Water Crowfoot

A central stem with 1-2cm branches ending in mid-green whorls of fine pinnate foliage, floating leaves narrow 1cm and elongated 3-5cm. Small white flowers with yellow base. Temperate plant, that prefers a constant flow of water, so place near the outfall of a filter system. Will only tolerate a very mild winter.

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POND CARE SHEET No 5 : POND PLANTS

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FLOATING PLANTS

Lemna gibba Duckweed

A small floating plant with oval light green leaves, it rarely flowers, reproduces by division and can quickly cover a pond; this inhibits green water and Blanketweed but needs controlling.

As most Fish eat and treat it as a food, it is often difficult to maintain on ponds containing fish.

A native plant that will over-winter.

Limnobium spongia Frogbit

A medium-sized floating plant with mid-green kidney shape leaves in a rosette form on extended shoots with long violet tinted roots extending below each rosette of leaves. White greenish flowers held above the water on short stalks, the seeds fall to the bottom of the pond to make new plants in the spring.

A North American plant that should over-winter.

Pistia stratiotes Water Lettuce

A large floating plant with bluish/green hairy leaves in a rosette form, a good root formation trailing below from 15-20 cm long, will flower in a hot summer, reproduces by runners.

Can quickly cover a pond in good conditions. Inhibits green water and blanket weed.

As a Mid- to North African plant it has to over-wintered in a heated greenhouse.

Eichhornia crassipes Water Hyacinth

A large floating plant with mid to dark green leaves pale blue flowers, reproducing by runners. Inhibits green water and blanket weed. A South American plant it has to over winter in a heated greenhouse.

Stratiotes aloides Water Soldier

A large floating plant, the last representative of a very ancient order. Possessing dark green sword like leaves with coarsely toothed edges, has been likened to a floating pineapple, small white and green flowers, reproduces by runners as most plants are female.

This native plant sinks to the bottom of the pond in late autumn to over-winter, resurfacing in Spring.

Trapa natans Water Chestnut

A long submerged stem with nodes along its length each having many rootlets protruding from each side. The floating leaves when new are dark red, turning mid-green on the upper side with age but remaining red below, their shape is nearly square. The fruit is mealy and eaten in some areas. Widespread throughout the globe is hardy and will over-winter.

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POND CARE SHEET No 5 : POND PLANTS

17/10/2003

WATER LILIES AND MARSH PLANTS

There are reds, pinks, yellows, violets, whites and all shades in between of named Water Lilies and so many Marsh, or so-called Bog plants, available that it is not considered reasonable to list or advise on them. Instead we recommend a small book devoted to this subject.

PLANTS FOR WATER GARDENS by Malcolm Edwards,
published by Dempsey Parr, 4-5, Queen Street, Bath BA1 1HE.

Priced at under £8, has 250 coloured illustrations of Water Lilies and Marsh plants together with all the information you will require to make an informed choice.

PLANT CARE

To give their best, all plants require some attention. Because they are submerged, once the leaves die off Water Lilies are often forgotten. Remove dead leaves and flower heads when they close and sink below the surface, and as much of the stems as possible.

Many pond enthusiasts have discarded Lily baskets and plant Lilies in buckets, such as 5-7lt Builders' Buckets according to the size of the Lily.

This has two advantages: first, the rooting compost is contained and does not leach out of a bucket (as it does with a Lily Basket) to cover the bottom of the pond with mulm, thereby providing nutrients for Blanketweed or green water. Secondly, the Lilies are easy to remove for dividing, re-potting, introducing fertilizer etc.

If you want to see lots of Lily flowers the plants will require, in addition to lots of sunshine, plenty of nourishment i.e. fertilizer. When introduced into a bucket it feeds the lily, not the pond.

The only drawback is that if planted in a bucket or 'sealed' container, Lilies must be removed and examined annually and re-potted with fresh soil. At the same time place a slow acting fertiliser in the base of the bucket or container, reduce the root stock size and the number of 'eyes' to no more than four.

Do not purchase any plant simply because it looks good or takes your fancy.

First, find out what size will it grow to?

Ask yourself if you can provide it with the right conditions to flourish?

Will it fit in with your existing plants or design?

Never purchase a Lily that requires a depth of 1 metre when your pond is only ½ metre deep, or visa versa.

Finally, Water Lilies are plants of lakes or very slow moving waters, they do not flourish with fountains or Niagara-type waterfalls. Marsh Plants also do not appreciate the continuous soaking they receive from fountains. It is no accident that with many large ponds in stately homes the Lilies are well away from any fountain, or are even without Lilies or Marsh plants.

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Pond Care Sheet No 6

FISH

3/01/2003

Before you decide to introduce fish into a pond consider that fish like all animals will require some of your time and attention.

Whilst everyone realises they require feeding, few consider the cleaning.

Fish and fish food foul the water. Some provision must be made to rectify this problem either by filtration and some water changing or without filtration by more frequent water changes.

To maintain fish health and prevent fish losses the pond water will require periodic testing to regulate its condition. All of which involves a little effort on your part. But at least they do not have to be taken for walks, do not make a noise and can be left without concern for two or three weeks to their own devices when you are away on holiday. Decline gracefully anyone who offer to feed your fish.

Always purchase fish from a reputable supplier, stand a while and look at them, see that they are alert, free swimming with all fins raised. Reject any fish that is damaged, has wounds on the body, if the fins have blood streaks in them or are frayed, and if the fish is lethargic or is swimming with closed fins.

Look for a fish that is both alert active and has a good swimming action.

An excellent test of a fish's health is to net the fish and turn it on its side; if the eye is looking straight up i.e. level with its body, reject it. In a healthy fish the eye should be raised above the body along the upper edge.

The most common fish kept in ponds are Goldfish and their close relations Koi.

GOLDFISH

One should refrain from introducing the more fancy varieties of Goldfish into ponds, as these tend not to survive over winter, especially Twintails. As the name implies these fish have been bred with two tails and are best suited for indoor aquarium display.

The varieties of Goldfish best suited for ponds are the Singletails, these are the 'fish-looking' fishes, such varieties as the Common Goldfish, the Comet and the Shubunkin.

Common Goldfish and Comets are available in red, orange and yellow body colours, Shubunkins are multi coloured with a Mother-of-Pearl appearance.

Pond Goldfish will grow to around 200mm/8" depending on the size of pond as they tend to adapt their size to the environment.

A Rule of Thumb when stocking is to allow 1cm of fish body length for every 60cm² of pond surface. However when first introducing fish start by allowing 3cm of fish for every 60cm² of pond surface and if all goes well after a month or so you can introduce two or three more. But please remember the fish will grow so this must be allowed for.

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Pond Care Sheet No 6

FISH

3/01/2003

KOI

Except for the rare long-finned variety Koi (Japanese for Carp) have retained their basic Carp body shape. Their attraction lies in the many colour varieties available.

Red, Yellow Black and White are the base colours and by mixing these in combination gives a very wide choice, add to these the skin and scale variations together with the amount of reflective material below the scales and one is presented with a vast choice.

Koi can grow up to 900mm in length as they do not seem to be restricted to their environment to the degree that Goldfish seem to be.

Although the same criteria applies when stocking with Koi as with Goldfish, their eventual size must be borne in mind when stocking a pond with Koi - they will grow very much larger!

OTHER POND FISH

With the exception of Grayling, Trout, Miller's Thumb, Stone Loach and Minnows, given the right conditions most Native Fishes can be kept in ponds. However it is best to keep to those species that are found in natural ponds or small lakes - Roach, Rudd, Tench etc.

Some are protected and require a licence to own, for instance the Barbel and the European Bitterling.

The drawback with keeping native fish is that their coloration is designed for protection against birds like Herons and this makes them hard to see in a pond.

However there are available cultivated Golden varieties of both the Rudd and Tench and, although not a native of Britain, the Golden Orfe a coloured variety of the native European Orfe (*Idus idus*).

All native fish will grow to their normal size, with the coloured varieties being slightly smaller.

With the recent introduction of government legislation, the keeping of non-native fishes in the pond has become more difficult as these species require a licence to be kept by both the dealer to stock them, and the pondkeeper to own them. This rules out many of the popular North American fishes for most people.

FEDERATION OF BRITISH AQUATIC SOCIETIES

Pond Care Sheet No 7

FEEDING

173/08/2004

The feeding of fish in an outdoor environment is not under as strict control as is the case with an indoor aquarium where only food donated by the fishkeeper enters the water.

In the great outdoors any manner of potential food can enter the pond ranging from aquatic 'wildlife' to seeds blown in by the wind. Add to this, the effects that seasonal temperatures have on the fishes' metabolism, and you will appreciate what a complicated subject pond feeding just might be.

SPRING

With the fish regaining not only their immunity from disease but also their appetite after the winter period, things must be taken slowly.

Easily-digested foods are the order of the day and it is usual to feed wheatgerm-based foods at this time. Once water temperatures have climbed, and remain, consistently above 10°C/50°F the regular flake, stick foods can be given. Live food such as *Daphnia*, clean *Tubifex*, Bloodworm etc can be given as a variant to the normal dry food diet and these foods will help the fish to get into breeding condition.

When spawning occurs, any subsequent fry will require very small food at first followed by a higher protein content food. However, the feeding of fry is more likely to be arranged in fry-raising aquariums than in the pond as serious Goldfish keepers usually remove egg-laden plants from the pond for hatching under more controlled conditions.

Where fry do stay in the pond from spontaneous spawnings then many will fall prey to carnivorous water insects but the survivors will find plenty of natural tiny foods in the water for them to feed on.

SUMMER

There will be an abundance of natural food in the pond throughout the summer and the temptation to feed continually should be resisted. Any undigested (or uneaten) food will contaminate the water and also lay good foundations for algae food in the next year's Spring.

AUTUMN

Summer's well fed fish will have laid up layers of fat to see them through the winter months of inactivity but, just like Spring, there needs to be a similar adjustment of food quality.

As the water temperature cools, the fish's appetite also diminishes and again easily digestible foods should be given.

WINTER

Once water temperatures remain consistently below 10°C/50°F, **STOP FEEDING.** Firstly, the inactive fish will not need it and secondly, if they do take food in, it can remain undigested in the fish's gut and so cause serious health problems.

FEDERATION OF BRITISH AQUATIC SOCIETIES

Pond Care Sheet No 8:

FISH HEALTH

10/09/2003

Fish are no more prone to illness than any other animal and, like all animals, have over time evolved an immune system specific to the basic ills that afflict them. Therefore the best means of keeping fish healthy is by keeping their environment in tiptop condition, a healthy pond invariably means healthy fish.

There are however a few simple basic rules to observe.

1. Before you fill or top up a pond ensure that the water supply is suitable for fish; there is no guarantee that tap water is, The water companies are only required to supply water fit for human consumption. Not fit for fish.
2. Unless you have a serious problem it is best not to change more than 50% of the pond water at any one time.
3. Do not keep topping up a pond through evaporation without first removing some water, from the bottom of the pond if possible, around 10% a week during the warmer months and 10% a month during the winter.
4. Never treat fish or the pond with a chemical in case something may occur.
5. If you have to treat a particular fish always isolate it from the others.
A 113lt uPVC cold-water tank from a local Builders Merchant serves as a good hospital or quarantine tank. Fill with 50% pond water and then top up with a suitable tap water.
6. If you have to treat a complete pond turn off any UV units and Particle Filters. Isolate Biological filters but maintain a minimum flow of water pumping the same water around a biological filter to keep it going, or the Biomass will die.
Remove any plants that the treatment may affect; also plants and planting medium will absorb the chemical making it difficult to measure the correct dosage.
7. Do not introduce any new fish into an established pond without first keeping them in Quarantine for the period recommended by the supplier.
8. Do not treat a fish or pond without first ensuring you have correctly identified the problem or disease and before you treat, and first take steps to correct the cause of the problem.
9. The main causes of fish illness are:
Poor water quality, over crowding (too many fish), an incompatible mixture of fish, too much water turbulence, disturbance, repeatedly netting them or simply you poking about in the pond.

FEDERATION OF BRITISH AQUATIC SOCIETIES

Pond Care Sheet No 8:

FISH HEALTH

10/09/2003

FISH COMPLAINTS & ILLS

It is often difficult to tell if a fish or shoal of fishes is sick, however their general behaviour should be easy to recognise by observation and any unusual behaviour should be apparent to you, typical examples are listed **STRESS**.

Fish not feeding, fins closed and held against the body, loss of colour, lethargic or laboured movement, rubbing themselves against objects as if to remove irritants etc. If a fish is netted and held on its side, when you look over it and the eye is looking straight at you i.e., flat to the body instead of the top of the eye raised, this is a good indication that the fish is not well and a reason for this should be sought.

It is a fact that fish like all animals have their 'off days' and it may be that isolation and a simple stress treatment will resolve the problem in a day or so.

BLOOD IN FINS: See '**FIN CONGESTION**'. If necessary see '**FUNGUS**' or '**FIN ROT**'

FIN CONGESTION:

SYMPTOM: Blood streaks and clots in the finnage, usually the caudal of long-finned fishes. This will quickly turn into Fin Rot if not dealt with.

TREATMENT: Fish are being kept too cool. Raise temperature and aerate. Some fancy fish are not suitable to be kept in ponds.

Cooking Salt Bath - Trim away long infected fins (not more than a third).
Keep long finned fishes at a slightly higher temperature.

FIN ROT:

SYMPTOM: Fins fraying with the membrane between the rays rotting away, leaving a series of filaments to the fin.

TREATMENT: Potassium Dichromate - Acriflavine. You can trim away infected fins (not more than a third).

COMMERCIAL TREATMENTS: 'Anti Fungus' - 'General Tonic'.

FISH LEECH & LOUSE:

SYMPTOM: Fish Leech(s) attached to the body of the fish - The same treatment applies for Fish Louse (*Argulus*).

TREATMENT: Remove the Louse by touching it with a baby bud soaked in Iodine. Try and keep the Iodine off of the fish's body. Cover the wound with Friars Balsam or Vaseline.

FUNGUS:

SYMPTOM: Clumps of white or off white cotton wool like threads usually a secondary infection associated with a wound or ulcer, and can occur on the body, fins or even on the gills.

TREATMENT: Malachite Green - Cooking Salt - Acriflavine.

COMMERCIAL TREATMENTS: 'Fungistop' 'Anti Fungus'.

FEDERATION OF BRITISH AQUATIC SOCIETIES

Pond Care Sheet No 8:

FISH HEALTH

10/09/2003

GILL FLUKES:

SYMPTOM: Fish are obviously ill, closed fins. Fish mouth surface even gulping air. Gill are pale, white instead of red.

TREATMENT: Methylene Blue - Potassium Dichromate.

COMMERCIAL TREATMENTS: 'Formaldehyde 30%' 'Gill-Wash'.

MOUTH ROT:

SYMPTOM: Damage to mouth as the tissue is being eaten away, signs of Fungus as a secondary infection.

TREATMENT: Potassium Dichromate - Acriflavine.

COMMERCIAL TREATMENTS: 'Anti Fungus' - 'General Tonic'.

SKIN FLUKES:

SYMPTOM: Fish are obviously ill, twitching and/or closed fins, rubbing against objects as if trying to remove an irritant. One can often see small blood marks on the fins and/or body.

TREATMENT: Methylene Blue - Cooking Salt.

COMMERCIAL TREATMENTS: 'Formaldehyde 30%'.

STRESS:

SYMPTOM: Stress recognised by fish not feeding, fins closed and held against the body, loss of colour, lethargic or laboured movement.

TREATMENT: Try feeding moving live food '*Daphnia*' etc.

COMMERCIAL TREATMENTS: 'Revite'.

WHITE SPOT:

SYMPTOM: Many tacking pin head size white, or off-white, spots on body and fins. *Ichthyophthirius multifiliis*, a minute parasite that feeds off the body of the fish encysting itself in a small white protective coating. Has a fairly complex reproduction cycle and can be cured simply by interrupting this cycle.

TREATMENT: Isolate the victim. Raise the temperature to speed up the cycle and change all the water daily. Or treat with chemicals. Methylene Blue, Potassium Dichromate, Acriflavine.

COMMERCIAL TREATMENTS: 'ContraSpot' - 'Anti Parasite'.

ULCERS:

SYMPTOM: Ulcers are an open ulcerated area on the body, sometimes infected with secondary problem usually a fungus.

TREATMENT: Cooking Salt, Acriflavine, Vaseline, and Friars Balsam.

COMMERCIAL TREATMENTS: 'Anti Ulcer' - 'Ulcer Swab'.

PERSISTENT ULCERS OR WOUNDS:

SYMPTOM: Ulcers or wounds that do not heal whilst in contact with water.

TREATMENT: Vaseline, Friars Balsam.

COMMERCIAL TREATMENTS: 'Anti Ulcer' - 'Wound Seal'.

DEAD FISH: If one of your fish dies DO NOT flush it down the toilet. This is one way in which fish diseases are transferred into our river systems and devastate our British native fish. Incinerate it, bury it, or put in a plastic bag in the dustbin.

FEDERATION OF BRITISH AQUATIC SOCIETIES

Pond Care Sheet No 8:

FISH HEALTH

10/09/2003

USING REMEDIES

CHEMICALS ARE DANGEROUS

1. Always read the instructions on the use of the treatment before using it - and adhere to them.
2. Handle all chemicals and treatments with care avoid spillage and splashing, wear 'Marigold' type gloves.
3. Protect your eyes from splashes with glasses or protective eye shields.
4. **NEVER** check a chemical by taste or smell. If not sure what it is do not use it and dispose of it safely.
5. Avoid breathing in any fumes.
6. Always measure or weigh out the required dosage using a graduated container or scales. Do not over or under treat, and never guess the dosage.
7. All sick fish must be isolated from the others at once.
8. All treatment must be undertaken in controlled conditions and in isolation.
9. Do not view an exposed UV tube when powered up with the naked eye it will damage the retina and can cause blindness.
10. Many chemicals will not store always keep them in the dark and in a refrigerator if possible clearly labelled and dated.
11. Last, but not least, prevention is always preferred to cure.
Quarantine fish before releasing them into a pond. Disinfect plants and examine them for snails, snail spawn and other nasties before introducing these into a pond or stream.

FEDERATION OF BRITISH AQUATIC SOCIETIES

Pond Care Sheet No 9: REMEDIES & TEST KITS

9/04/2003

NOTE : Since this list was prepared some of these aquarium treatments, together with some active ingredients, may have been withdrawn from the market or now not be generally available.

ACRIFLAVINE: (not the hydrochloride type).

Stock Solution (SS) = 3mg in 330cc distilled water store in the dark.

2cc of SS per litre immerse for 3 days.

Repeat in a week if required. Supply aeration.

ALUM: 2 x 5 ml teaspoons in 1 litre of water.

Soak plants for 5 minutes, then thoroughly rinse in clean water.

This will not kill snail spawn or the eggs of other pond insects.

Remove with your thumbnail or pick off the leaf.

ALGICLEAR: A commercial Green Water controller that flocculates the algae. N.T. LABORATORIES.

ALGOFIN PLUS: A commercial Blanket Weed controller. TETRA.

ALGOREM: A commercial Green Water controller. TETRA.

AMMONIA TEST KIT: INTERPET.

ANTIFOAM: A commercial product for eliminating foam and bubbles in ponds.

N.T. LABORATORIES.

ANTI FUNGUS: A commercial Fungus and General Bacteria treatment. TETRA.

ANTI PARASITE: A commercial White Spot and Slime treatment. TETRA.

ANTI ULCER: A commercial ulcer treatment. TETRA.

AQUAFIN: A commercial tap water conditioner for removing chlorine and rendering poisonous heavy metals harmless. TETRA.

AQUA TEST: A commercial freshwater water test kit that tests for pH (acidity),

KH (carbonate hardness), GH (total hardness), NO₂ (nitrite), NO₃ (nitrate). eSHA.

BARLEY STRAW: Works 50% of the time. Allow 20 grammes for each cubic metre of water

(1000 litres) in a clean nylon net sack suspended in the pond just below the water.

Effect if any, will begin to show after three to four weeks. Lift, and agitate the straw periodically to assist decomposition and enzyme production.

Replace the straw when well rotted in pond or filter.

BARLEY STRAW POUCHES: N.T. LABORATORIES.

FEDERATION OF BRITISH AQUATIC SOCIETIES

Pond Care Sheet No 9: REMEDIES & TEST KITS

9/04/2003

- BIO-START:** A commercial product that enhances and accelerates filter biological action in decomposing waste. INTERPET.
- BLANC-KIT:** A commercial product to control Blanketweed. INTERCEL.
- CLARIFIN:** A commercial Pond Water Clarifier. Clears cloudy water, accelerates decomposition. TETRA.
- CONTRASPOT:** A commercial treatment for White Spot. TETRA MEDICA.
- COOKING SALT:** A 2% solution = 20 grammes per litre of water. Immerse fish for 8 hours. Remove sooner if fish shows distress. Raise temperature, supply aeration.
7 day treatment programme:
1st day 7gm of salt per litre.
2nd day drain 50% of the water and top up with fresh water containing 11gm salt per litre.
3rd day drain 50% top up with fresh water with 13gm of salt per litre.
4th day top up 50% fresh water with 17gm of salt a litre raise temperature and aerate.
Repeat after 7 days if necessary.
- CURE BY WATER CHANGING:** Change all the water every day. Do this for seven days.
Keep any filters running continuously especially the biological type.
Raise temperature and aerate.
See '**FINCARE**' a fresh water neutraliser.
- CYCLE:** A commercial bacteriological agent that promotes and speeds up the natural biological action in the aquarium and filters. HAGEN.
- FINCARE:** A commercial water neutralising and stress relieving agent. HAGEN.
- FINROT AQUARIUM:** A commercial Finrot treatment. TETRA MEDICA.
- FORMALDEHYDE 30%:** A commercial wide ranging treatment for various fish diseases.
N.T. LABORATORIES.
- FRIARS BALSAM:** Dry the area to be treated with baby buds or kitchen towelling.
Apply Balsam to area with a baby bud. Repeat several times over an hour to build up a covering of Balsam.

FEDERATION OF BRITISH AQUATIC SOCIETIES

Pond Care Sheet No 9: REMEDIES & TEST KITS

9/04/2003

FUNGISTOP: A commercial Fish Fungus treatment. TETRA MEDICA.

GILL-WASH: A commercial treatment for gill flukes and infections. N.T. LABORATORIES.

GREENAWAY: A commercial chemical that controls green water in ponds by flocculation.
The coagulated algae which sinks to the bottom of the pond must be removed or the condition will quickly return. INTERPET.

IODINE: Dilute 1 drop Iodine with 9 of water. Remove fish, touch Fish Louse or Leech with a baby bud or matchstick dipped in the Iodine until it comes off. Do not pull Leech off with tweezers. Keep Iodine off of unaffected areas of body.
Use Vaseline to cover and protect wound from secondary infection.

MALACHITE GREEN: Stock Solution = 1cc in 450cc of distilled water stored in the dark.
Treat with 2cc a litre of stock solution. Supply aeration.
Immerse fish for one hour. Remove sooner if fish shows extreme distress.
It is reported that this is a mild carcinogenic chemical.

MEDIFIN: A commercial general treatment for pond fishes only. Not to be used with some other treatments. TETRA.

MELAFIX: A commercial treatment for several ailments. AQUARIUM PHARMACEUTICALS

METHYLENE BLUE: Stock Solution = 1 gramme in 100cc distilled water stored in the dark.
Fish to be immersed for 14 days.
1st day add 2cc of Stock Solution for each litre of water.
2nd day repeat dosage. If water colour fades add Stock Solution to colour as required. Raise temperature and add light aeration.

NITRATE TEST KIT: INTERPET.

PHOS-KIT: Phosphate Test Kit INTERCEL.

pH ADJUSTER: Two adjusting kits: one acid and one for alkaline. Use 'Pond Check' to check results. INTERPET.

PIMAFIX: A commercial treatment for viral ailments. AQUARIUM PHARMACEUTICALS

POND BALANCE: A commercial chemical to effect a bacterial balance in a pond and control Blanketweed. INTERPET.

POND CHECK: A test kit to check acidic and alkaline (pH) levels. INTERPET.

POND DISINFECTANT: A general disinfectant for plants and equipment.
Can be used to treat a complete pond without removing the fish or plants.

FEDERATION OF BRITISH AQUATIC SOCIETIES

Pond Care Sheet No 9: REMEDIES & TEST KITS

9/04/2003

POTASSIUM DICHROMATE: Stock Solution = 1 gramme in 99cc of distilled water stored in the dark.

Add 5cc of Stock Solution for each litre of water.

Raise temperature and aerate. Immerse fish for 7 days.

Remove sooner if in distress.

REVITE: A stress and recovery chemical aid. Use on stressed fish or those that have just been treated for disease. TETRA MEDICA.

VASELINE: Dry ulcer area with baby buds etc. Lightly smear area of ulcer with Vaseline. Repeat on alternate days. Dry area of body to be treated, lightly smear area around wound, Leech or Fish Louse, to be treated with Vaseline. Then treat the problem with the chemical.

TOTAL BREAKDOWN: Remove all the fish and other animals and plants. Disinfect the pond and all filters. The biological action of biological filters will be lost until they are re-established. Treat the fish and plants. Flush out the pond and filters several times and leave to thoroughly dry out. See 'CYCLE' to speed up the re-establishment of a biological filter.

ULTRA VIOLET: 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 the 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 the 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.

WOUND SEAL: A commercial waterproof sealant that seals wounds and aids healing following the appropriate treatment. N.T. LABORATORIES.

FEDERATION OF BRITISH AQUATIC SOCIETIES

Pond Care Sheet No 10 : Pond Maintenance

4/7/2003

SPRING

Check out the pump and fountain, etc. Make sure the filter is working; replace the filter medium if damaged and re-charge a biological filter with one of the bio starters to bring it up to full efficiency. Watch out for Frog or Toad spawn; remove it to a local wild pond. If the water quality is poor change up to 25%.

SUMMER

Monitor the pond water level and top up if necessary. It does no harm to change some of the water on an established pond.

Keep grass cuttings and leaves out of the pond and remove any dead Water Lily leaves and flowers with as much of the stem as possible. **DO NOT OVER FEED THE FISH.**

AUTUMN

Cover the pond with a fine fruit netting during the autumn to prevent leaves falling into the pond and fouling the water; this not only keeps the pond healthy it saves you the problem of draining and cleaning it out.

WINTER

Waterfalls and fountains should be turned off during the winter months, especially if there are fish in the pond. Due to low temperatures, fish are at rest and inactive and reducing water loss and turbulence helps retain water temperature whilst the fish are at rest.

Fountains and pumps can be removed from the pond cleaned up and checked over, Reduce the flow through Biological Filters, but do not turn them off.

GENERAL TIPS

TOPPING UP

Pond water evaporates to a greater or lesser degree depending on several factors. The time of year, ambient temperature the amount of water movement - fountains, waterfalls and streams. Moving water increases evaporation, so topping up becomes a necessity.

As water evaporates the proportion of any toxins in the water increases i.e. same amount of toxin in less water. If you keep topping up without removing some of the water, from the bottom of the pond if possible, toxins will build up exponentially.

It is a good policy to drain off around 10% a week during the warmer months and 10% a month during the winter, unless the pond is frozen over.

Ensure that the water supply is suitable for fish - there is no guarantee that tap water is.

Water companies are only required to supply water fit for human consumption, not to keep fish; so check it. There are water conditioners available to treat tap water.

FEDERATION OF BRITISH AQUATIC SOCIETIES

Pond Care Sheet No 10 : Pond Maintenance

4/7/2003

ICED OVER

When a pond is covered with ice it prevents the interchange of gases at the surface, this is when the pond can go sour and the fish die.

A simple way to prevent this is to place a plastic football in the pond during winter. When the pond freezes over remove the football leaving a hole in the ice.

With the minimum of disturbance bale out a little pond water and pour over the ice sheet to thicken it up. When you have made it thick enough to be self-supporting, lower the water under the ice 25mm or so and cover the hole with a piece of hardboard.

Do not break up the ice with a spade or hammer - this can stress the fish to the point of death. Use hot water to make a vent hole.

FEDERATION OF BRITISH AQUATIC SOCIETIES

POND CARE SHEET No 11 : POND PROBLEMS

17/10/2003

GENERAL: If you have a mild problem with your fish and need a general cure-all or wish to disinfect the pond without removing the fish then 'Medifin' pond treatment can be used.

BLANKETWEED: Airborne microscopic thread algae spores which attach themselves to the sides of the pond and or fountains, pumps, plants etc.

TREATMENT: Quite difficult to eradicate once established. Remove as much as possible by spinning a rough stick within a clump. Check the level of Ammonia, Phosphate and Nitrate present in the water with a commercial test kit, try and get these as low as possible as this feeds the Blanketweed.

Introduce more broad leaf plants into the pond. Ensure you are not over feeding the fish?
If all fails, try Commercial Treatments 'Algofin Blanc Kit' 'Algofin Plus' 'Algin P' 'Blanc-Kit' 'Phos-Kit'.

GREEN WATER: Airborne algae spores representing a large group of microscopic plant organisms which turn pond water into "Pea Soup", clogging filters and preventing you seeing the fish. Heavy infestations can kill fish by producing too much oxygen in sunlight causing "Air Embolisms" by day or "Asphyxiation" at night by absorbing the oxygen in the water.

TREATMENT: If possible reduce the sunlight reaching the pond; add more pond plants into the pond, or consider putting a Pergola over a formal pond. Check levels of Phosphate and Nitrate present, try and get these as low as possible as this feeds the algae.

Have you too many fish? Are you over feeding them?

If you filter the pond, fit a UV tube in the filter line before the filter.

If all else fails then try a Commercial Treatment: 'Algae Kit' 'Algiclear' 'Algizin A' 'Algorem' (may effect other plants) 'Barley Straw' and 'Excel' (will not).

HERONS: Herons have absolute protection, it is illegal to kill, injure or maim one. This said, they are a major problem if attracted to a garden pond. A garden pond stocked with fish provides easy pickings for a Heron and it will visit time and time again until all the fish are gone. You have to convince the bird that there are no pickings to be had.

The initial action is to completely net the pond over with a heavy duty netting, it is made to give support to such plants as peas or beans and will be made up of 100mm/4" x 100mm/4" squares and is available from the larger Garden Centres.

Suspend 150mm/6" above the water level; it may require supporting in the centre of the pond.

Of course, a Heron can fish through netting with squares of this size but it is only used to take the weight of the Heron without sagging and to support a covering of fine fruit netting. After a few fruitless trips to the pond the bird soon gets the message and stops coming. The netting can then be removed. Bird Scarers are also said to be effective against cats and seagulls.

FEDERATION OF BRITISH AQUATIC SOCIETIES

POND CARE SHEET No 11 : POND PROBLEMS

17/10/2003

PROTEIN FOAM: Foam formed by waterfalls or fountains, often with a Brown, Grey or a Greenish scum in the bubbles or at the edges of the foam. Caused by protein in the water from overfeeding fish, fertilizers leaching into the pond from the surrounding land or a rockery and from protein released from the decomposition of dead animals/fish or plant material.

TREATMENT: By removing the protein, Phosphates. Ammonia, Nitrite and Nitrate.

You are most likely overfeeding the fish. If you filter, check that it is working efficiently - get it working by priming with 'Cycle' or 'Bio-Start' bacteriological agents that promote and speed up natural biological action.

When treating Blanketweed or Green Water with a chemical treatment, the release of protein from the dead cells can cause foaming, however, this will settle down.

If all else fails try Commercial Treatments: 'Algae Kit Phosphate Remover' 'Antifoam' 'Clarifin'.

SNAILS: There are several species of freshwater water snails native to Britain. None are to be welcomed in an ornamental pond.

TREATMENT: Once established only Commercial Treatments will have any effect. All of which will kill the fish and most damage plants.

**Thoroughly check all plants for snails and snail spawn
before introducing into the pond.**

FEDERATION OF BRITISH AQUATIC SOCIETIES

POND CARE SHEET No 11: POND PROBLEMS

17/10/2003

NITRATE: Bacteria converts Ammonia into Nitrite and then Nitrite reconstructs into Nitrate. If you suspect high levels of Nitrate use a test kit to determine the water quality. A good natural way to reduce nitrate is by growing Water Cress in the cascade. Regular harvesting the crop will remove nitrate from the system. Commercial Kits: 'Aqua Test' 'Nitrate Pond Test'.

NITRITE: Bacteria converts Ammonia into Nitrite. If you suspect high levels of Nitrite use a test kit to determine the water quality. Commercial Kits: 'Aqua Test'.

UNDERSTANDING THE AMMONIA/NITRITE/NITRATE CYCLE

Garden pools and formal gardens are completely unnatural man-made constructions to bring order and pleasure into our lives, and require some attention if they are to maintain their appearance and add to one's pleasure.

If you understand what is happening with a pond, and why, then you are able to resolve any problems that may occur or even before they occur.

All living organisms when they die are returned to their base chemical compounds, add to this to the waste material that living all organisms produce and one can see that, in an enclosed artificial environment (a garden pond), unless measures are taken to either remove or treat the excess waste material, problems will ensue.

Bacteria converts all dead and natural waste material into chemicals that can be used by proceeding life forms. At the basic level, Ammonia into Nitrite, then Nitrite is reconstructed into Nitrate. All is re-used time and time again.

Left to its own devices, Nature will attempt to effect a balance of sorts in a garden pond, unfortunately one that is so close to the margin, that it requires little interference from man or some minor natural catastrophe to tip it over the edge. In the typical garden pond one has little chance of effecting a natural balance simply because one wants to see fish, plants and maybe a selection of Water Lilies.

To achieve this one over-stocks the pond with both fish and/or plant life to produce a pleasing effect. Therefore provision must be made to deal with the excess waste material produced by overstocking, otherwise nature will attempt to do it for you. The advent of green water, or Blanketweed, cloudy or unpleasant smelling water are sure signs of excess nutrients in the pond and, if no action is taken soon, the fish will show signs of illness and eventually die.

This is Nature's way of attempting to create a balance. The green water, or the Blanketweed is taking up the excess nutrients in the water. Fish become ill and then die. This is Nature's way of removing some of the major waste producers. Unfortunately, unlike a natural pond a balance can never be truly achieved because all the nutrients are trapped within a man-made pond and are unable to leach out into the surrounding soil because of the pond lining.