PRINCIPAL RULES
FOR OPTIMUM KOIKEEPING

See the difference

Aquatic Nature®

WWW.AQUATIC-NATURE.COM

2,00 €

Introduction

As proud owner of a Koi pond, you want to do everything to copy nature as closely as possible, to achieve a biological balance and thus offer your koi's a natural habitat.
If you practice this hobby for a long time, experience will already have taught you that this is not so easy.

Many factors point to the fact that a lot of problems can arise in a closed system if we do not act apropriated to control things.
The most important problems are over population, due to growing fish, and not only due to new purchases, high water temperature from intensive sunlight, which may result in a quick increasing of algae growth, owing to which the oxygen content in water can drop to dangerous low levels.

Many problems that we encounter in Koi ponds pose no problems at all in large natural ponds. Because there is a lot of water per fish and the water is constantly moving, harmful substances are degraded much better and, thus do not reach concentrations dangerous for fish.

However, we know that problems can occur in nature during summer, extreme high temperatures, cause a lack of oxygen. We should take these into consideration when looking at a Koi pond project.

Most koi fans already know that health, vitality and colour depend on water quality and food to a large extent !

Contents

Fascinated while feeding

Because of its many years of experience handling Koi and due to intensive cooperation with professional breeders, AQUATIC NATURE can improve and stabilise water quality using natural high quality products.

Filtering is essential to ponds. But food also plays an important role.
Quality and composition should come as close as possible to the natural nutritional for Koi.
Moreover, food should not place a significant burden on the water.
This requirement has led to balanced food mixtures in the form of floating Koi pellets.
Since the water quality plays a decisive role as regards appetite and digestion, there are differently composed types of food.

With its many years of experience, permanent research and broad product range, AQUATIC NATURE is well known as partner for cutting edge Koi products.

In this brochure, we discuss the most important basic rules for optimum care of our Koi and Koi ponds.

Visit our website:
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Water quality

Koi behaviour is the first indicator for stable water values and any impairment. Fish that swim lively around looking for food are certainly doing just fine.

You always have to remember that Koi ponds are highly burdened systems, in which you must keep the balance as natural and constant as possible! To achieve this, you must perform controls, and, if necessary, correct conditions by using additives.

Oxygen is very valuable for our Koi!

Normally, there are no plants in Koi ponds. They will be eaten or destroyed causing problems with respect to filtering. Thus, oxygen must be supplied via the filter mechanics.

After the cold winter period, during which there are no oxygen problems in the case of open ponds, the water temperature rises and it becomes more and more difficult to achieve oxygen saturation. If ponds are covered or frozen, aeration is necessary via membrane pumps or small compressors. This also applies to the summer at water temperatures above 22 – 24∞C. The occupation density and filter capacity are important elements with respect to deciding whether to supply air or not.

Sturgeons, often kept with Koi react clearly more sensitive to a deficiency in oxygen than Koi, but a minimum value of 5 mg, independent of the temperature should be the absolute lowest value. At 20∞C, this corresponds to a relative saturation of approx. 60 % of oxygen.

Importance of the pH-value

The water quality should be checked regularly with test strips or liquids test: KH and GH are relevant for the pH.
If the water is to acidic or alkaline, the mucus of the koi can be damaged (natural protection against parasites) as well as the very sensitive gills.
The tolerable pH range for Koi is between 6.5 and 8.2.

How acidic or alkaline water reacts depends directly on the carbonate hardness content.

Consequence: the higher the KH, the higher the pH! On the other hand, carbonates are absolutely necessary, because they act as buffer. Carbonates are salts of the weakest acid, carboxylic acids and reduce the effects of stronger acids.

Simplified: carbonates plus stronger acids, e.g. humic acid, results in humic acid carbonate that is insoluble and precipitates and carboxylic acid discharged via water movement. Thus, in spite of the addition of acid, the pH remains stable.

KH+

With **KH+ Pond** (packaging size 1000 ml raises 8 till 10° dKH/5000 L.), a too low carbonate hardness will increase and the pH stabilised.
Since all extreme KH changes stress fish, the KH will be gradually increased: max. 2° per day! Test and if necessary repeat the next day!
Koi compatible carbonate hardness value is between 5° and 12° dKH.

GH+

Total hardness or sulphate hardness is measured in degree dGH. It influences conductivity, which should not be too low with Koi. The value should be between 400 and 1000 microsiemens, it can be much higher as treatment for some problems.
Total hardness should be between 8 and 12 degree dGH. If the total hardness is too low, use GH+ Pond (packaging size 1000 ml raises 8° dKH/5000 L.) to set the right value. Follow the method described for the correction of carbonate hardness.

Protein degradation with the help of nit

There is a lot of nitrogen in all protein compounds, one of the most important building blocks of life. Protein of plant or animal origin is an important component of nutrition for our fish Whether absorbed by fish or present in food: protein must be removed from the cycle, it must be oxidised! This is the task of special bacteria sources, nitrobacter and nitrosomonas.

Protein molecules are gradually degraded and when the cycle is completed, nitrate (NO_3) remains. Since nitrate is not really toxic (high concentrations inhibit growth and reproduction), everything would be ok if there were no extremely toxic intermediate products.

Nitrite (NO_2) is extremely toxic because it binds to the red blood cells in the place of oxygen.

Also ammoniac, the first step in the degradation of protein is especially toxic at high pH values.

At pH values under 7, ammoniac turns to the non-toxic ammonium.

Thus, it is important that nitrifying bacteria are in sufficient numbers and have suitable living conditions.

This includes a sufficiently large occupation area (nitrobacter and nitrosomonas are sessile, mounted and are hardly found in free water), made available in filter and not to be underestimated also in ponds.

A short algae strip on the walls is an ideal place for our aid. Moreover, oxygen is part of any oxidation procedure! Higher temperatures mean improved working conditions.

Of course, sufficient nutrition must be offered. But that is of little concern in highly burdened Koi ponds.

In the case of newly created ponds, or after drug treatment or after winter, in which part of the bacteria source died, or when extreme water change, adding **Bio-Bacter Pond** and **Pond Activator** is strongly considered to prevent bacteria imbalance.

Here the motto applies: prevention is better than curing!

rifying bacteria (nitrification proces).

BIO BACTER POND AND POND ACTIVATOR

The pond as active biological pre-filter

Normally, the degradation of organic substances, such as rest of food, plant parts, takes part almost exclusively in pond filter.

For this purpose, flow behaviour must be optimal in the pond, to bring all organic coarse substances into the filter. This is usually not the case.

By using **Pond Activator** in combination with **Bio-Bacter P**, your pond becomes an active biological pre-filter. **Pond Activator** is a fine, highly porous natural mineral and quickly reduces harmful substances, such as ammoniac or nitrate also sludge is reduced.

At the same time, essential minerals for fish and plants are added to the water.

By combining use with **Bio-Bacter P**, the number of nitrification bacteria is increased and stabilised.

Result :

- *Visibly less sludge formation in the pond.*
- *Faster degradation of harmfull substances such as ammoniac and nitrite.*
- *Strongly reduced algae formation.*
- *Clear water*

Extremely strong growth of filamentous algae indicates a problem with too high nitrate and phosphate level. A sign of normal filter function, the value of 30-50 mg/l is quickly exceeded than that seen as tolerable (tap water can contain 50 mg/l in Germany).

Thus, besides the nitrate value of the pond water, the nitrate value of fresh water should be controlled regularly. Use test kits! Suitable measure in the case of too high nitrate and phosphate values, are partial water change and the use of Pond Activator.

Pond Activator must be used if the nitrate value is too high in fresh water.

Feeding Koi

The eating behaviour of Koi can be compared with that of humans.
Koi like to eat just about any thing. But, you need to exercise precaution when feeding Koi because not everything that they eat is good for them or compatible with the water quality. You can weaken Koi with bad food to the extent that they die from normally harmless problems because their immune system is damaged.

THUS, THE IDEAL KOI FOOD MUST SATISFY MANY REQUIREMENTS:

1. Animals must like the food. This is the only way that they will eat it all.

2. Pellet size must fit animal size.

3. The food composition must correspond to that of natural food as much as possible.

4. Food must float for a long time on the water surface, without dissolving and sinking. This would automatically lead to extremely cloudy water.
   In the case of sinking food, control of use by the animals is hardly possible and not possible at all in some animals.

5. Possible full use of food by animals burdens water as little as possible.

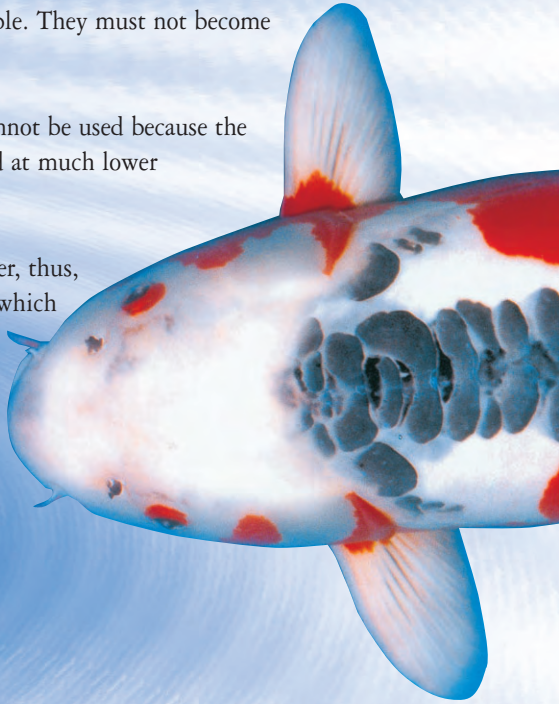
6. Particularly sensitive substances like vitamins, among others, should be added to pellets and depending on burden to animals: transport stress, sickness, before and after winter break.

But, also under normal conditions, such substances should be added. Pellets must be stable. They must not become soft and must continue to float.

7. Only pelleted food can be used for Koi. Just remember the ability to float. Flake food cannot be used because the manufacturing process requires high temperatures (90°C). Vitamins are usually destroyed at much lower temperatures.

8. Distributing daily rations over several portions is positive in that food is used much better, thus, also growth! Carps have small stomachs, food goes directly into the intestines, owing to which digestion is not very effective. A lot of food at once means many non-digested components are secreted.

9. We expect colour-promoting effect of food in the warm periods, achieved by corresponding recipes.



Koi pellets from *AQUATIC NATURE* are made softly and with respect to their composition, meet all requirements of our Koi. Koi Vita is a multi-vitamin preparation that is simply applied to the pellets. We are absolutely certain that we have done everything to provide vitamins for our animals.

Remember that the appetite of your Koi depends directly on the water temperature. As exchange warm animals, fish do not need energy to maintain their body temperature. It is always the same as the water temperature. However, animals become slower and slower with dropping temperature. In fact, they just rest at a water temperature from about 4°C. Appetite drops quickly with decreasing temperature and under 6-8°C they refuse food completely.

This is normal behaviour and must be taken into consideration when feeding, as regards quantity and composition of food. During the transition period in autumn and spring, food must be easily digested. Parts that are difficult to digest are reserved for higher water temperature (from 15°C), because they burden the water when secreted non-digested.

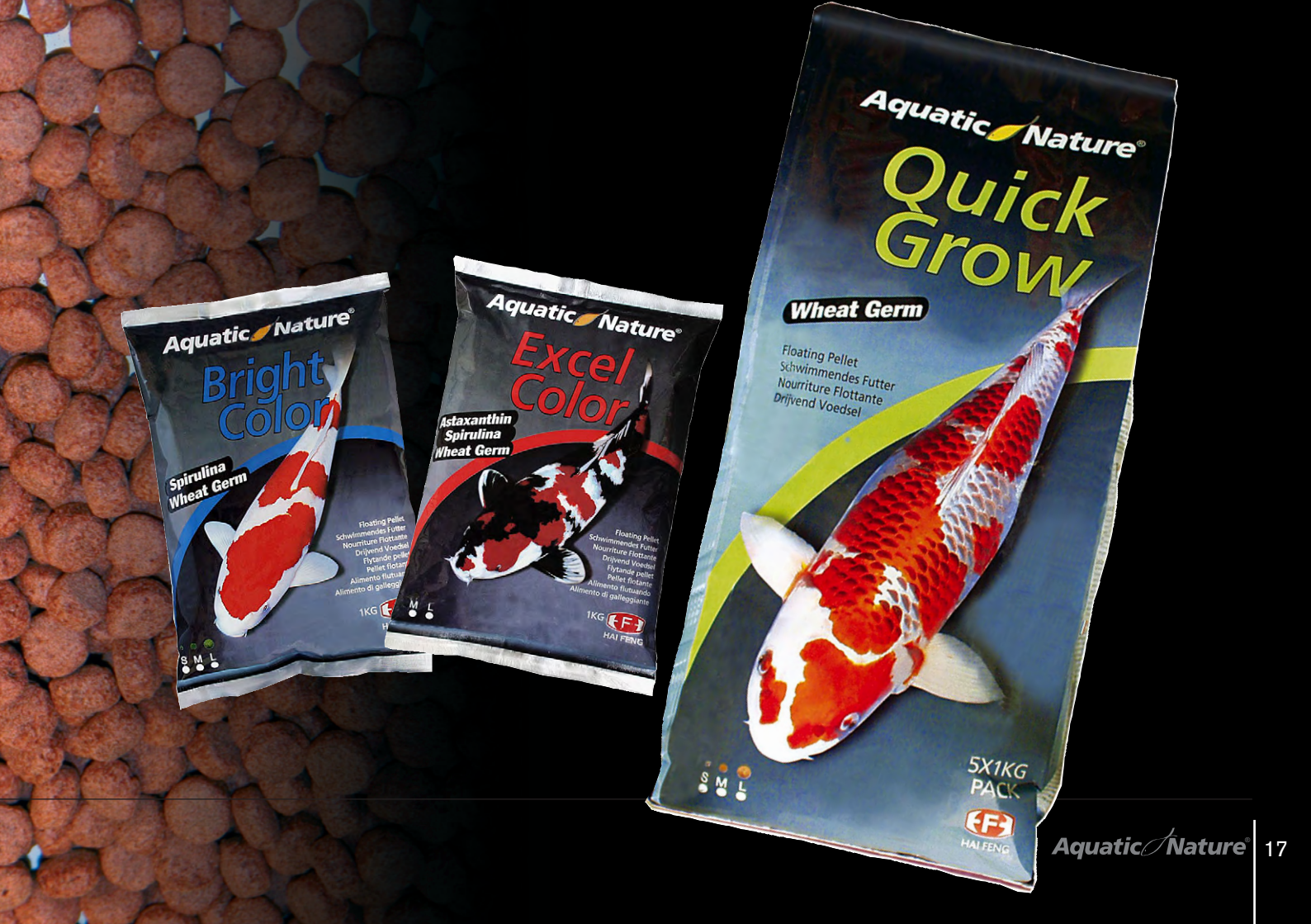
Optimum water temperature for Koi is 24°C, occasionally reached in the middle summer months in our region and only optimally when there is enough oxygen. Animals show us this with their behaviour: loss of appetite at high water temperature means that something is wrong with the water. Lack of oxygen is often the cause.

At temperatures under 6-8°C, the first animals stop eating. Offer easily digested food and stop feeding only fish no longer accept food. You must be able to control this. Thus, only floating pellets are suitable for Koi!

Table

The following table informs about properties and utilisation possibilities for different AQUATIC NATURE - Koi pellets:

Food Type	Water temperature	Properties	Supplied pellet size	Use	Packaging size
QUICK GROW 	from 8°C	Principal food for a quick growth, easy digestion	Small (3 to 3,6 mm) Medium (5,5 to 6 mm) Large (7,5 to 8,1 mm)	Main food at low temperature regularly add **Koi Vita**	1kg 5 x 1 kg fresh packaging
BRIGHT COLOR 	from 12°	High Spirulina concentration for colour stabilisation	Small (3 to 3,6 mm) Medium (5,5 to 6 mm) Large (7,5 to 8,1 mm)	No significant worsening by adding 50% Quick Grow with respect to colour stabilisation	1 kg 5 x 1 kg fresh packaging
EXCEL COLOR 	from 15 °	High Spirulina concentration and addition of asthaxanthines cause quick and visible intensification of colour parts	Medium (5,5 to 6 mm) Large (7,5 to 8,1 mm)	No significant worsening due to addition of 50% Quick Grow with respect to colour intensification.	1 kg 5 x 1 kg fresh packaging


Aquatic Nature
Bright Color
Spirulina
Wheat Germ
Floating Pellet
Schwimmendes Futter
Nourriture Flottante
Drijvend Voedsel
Flytande pellet
Pellet flotante
Alimento flutuante
Alimento di galleggiante
1KG
S M L
Aquatic Nature
Excel Color
Astaxanthin
Spirulina
Wheat Germ
Floating Pellet
Schwimmendes Futter
Nourriture Flottante
Drijvend Voedsel
Flytande pellet
Pellet flotante
Alimento flutuando
Alimento di galleggiante
1KG
HAI FENG
Aquatic Nature
Quick Grow
Wheat Germ
Floating Pellet
Schwimmendes Futter
Nourriture Flottante
Drijvend Voedsel
S M L
5X1KG
PACK
HAI FENG

Why are vitamins important?

Life without vitamins is also inconceivable for humans. Vitamins steer different body functions as catalysts. They are also important for growth and fertility.

Resistance of Koi to outer attacks depends on balanced vitamin supply.
This also applies to colour development and intensity.

Koi Vita is a highly concentrated vitamin complex, it contains: Lecithin, Vitamin C, E, B6, B1, A, B12, D3 and Beta-carotene.

KOI-VITA

AQUATIC NATURE recommends that Koi Vita be applied to the necessary daily ration of pellets at least weekly.
Because of its oily consistency, it adheres for a long time and can be taken in by fish.

Filtration for koi ponds

Why a filtration ?

A lot of ponds are over populated.
Mostly to much fish swim in insufficient water quantity. If we compare the auto purifying power of a natural pond against a artificial koi pond, the result will be largely in favour of the natural pond.
Do not forget that artificial ponds are isolated systems without any influence from nature, in which we daily add organic substances. Finally, what gets in must get out.

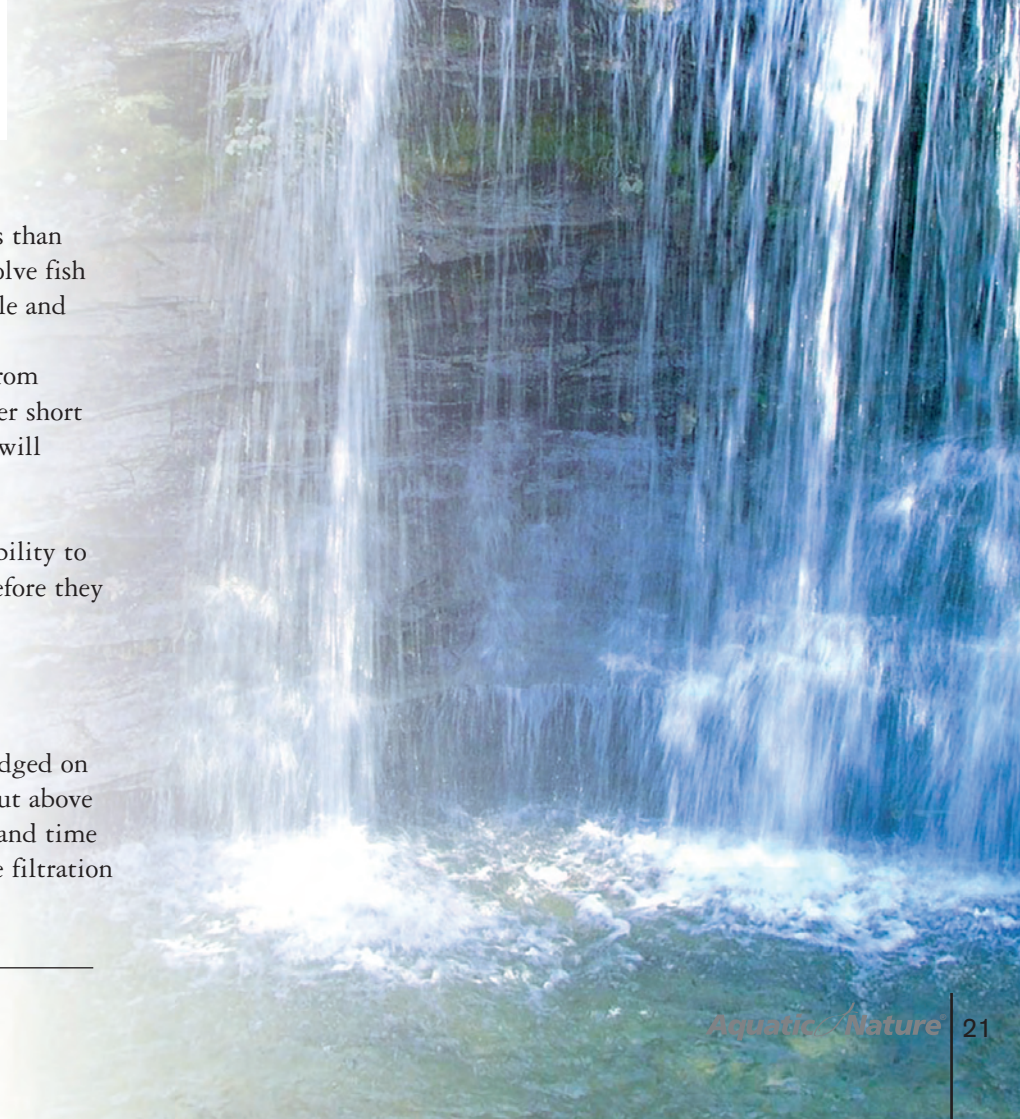
Filtration, how ?

The market offers many filter systems leaning to confusion for the starter.
Anyway some points has to be considered.

Some of the pollution factors:

- Fish excrements (principal source of pollution and most dangerous)
- Algae (especially filamentous algae)
- Leaves, dust, pollen.

These are mechanical impurities. Furthermore we have the pollution of already decomposed but not degraded organic substances, mainly supplied by rest of food and excrements.



These substances are more dangerous than mechanical particles, while they involve fish directly and besides, they are invisible and therefore difficult to diagnose.
Be careful, all mechanical particles from organic origin will dissolve in a rather short period and from then on they really will pollute the water.

Important on a filter system is the ability to remove the mechanical substances before they dissolve.

Urine of fish is removed biologicaly

The efficiency of the filter will be judged on the mechanical filtration function, but above all, on the practical work – the way and time passed by removing and cleaning the filtration media inside the filter.

It is of no use having a huge filter, if it is nearly impossible to remove the filter media and to clean the filtration parts inside the filter.

In the case of such filters, the filter is the most polluting part of the pond, while the continuous passing water will permanently transport biological decomposed organic substances and will bring it back into the pond.

All filter systems used in koi pond work on the oxidation process.

Organic waste is transformed into the end stage nitrates with the help of bacteria.

Nitrates are harmless in relatively low concentrations, anyway they charge the water, and when the level raises, they reduce growth and breeding capacities by fish, and stimulate algae growth.
Keep in mind to make a frequent water change, even with a good filter system.

If you need more information about the filtration of a pond, ask a specialized retailer advises.

Aquatic Nature®

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