

Gardennote

Guidelines for garden ponds

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A garden pond is a living system which, when it is kept in a healthy state of balance, rewards its owner by being a visual delight.

Clean water with healthy fish and attractive plants is the obvious aim in a garden pond. Much mystique seems to have developed around the subject of pond care, making some people think that improving murky water is a complicated business. In reality, keeping the whole system in balance is not hard to achieve.

Fish food contains phosphorus, and fish excrete nitrogen in the form of ammonia. Without the right plants and enough bacteria to remove these nutrients, either they are utilised by algae which turn the water green or, if algae are absent, the ammonia builds to levels that are toxic for the fish even though the water remains clear.

This situation is avoidable. With a pump, filter and suitable plants, you can create a sustainable pond where life thrives - and you will not have to spend money on quick-fix solutions.

Safety first

Any pond is a potential hazard for young children. Fence it off, or cover with a strong metal grill. The latter also keeps fish safe from predatory birds and cats.

Mosquitoes, which pose health risks, breed in any still water pond. Fish eat the larvae, but if you choose not to have fish, install a fountain because mosquitoes dislike moving water.

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Biological filters

Ammonia-eating bacteria play a vital role in cleaning pond water. All they require is a home and oxygen – and these needs are met by putting in a simple filter and a pump to aerate the water.

The size of filter and pump depends on the size of pond and the number of fish you want to keep. Take these measurements and statistics to a reputable retailer, so the staff can calculate the correct size equipment for adequate water turnover. They can also advise on the maximum number of fish that the pond, pump and filter can sustain.

Experts speak of “biological filters” or “bio-filters”, terms which tend to sound highly technical. In fact any inert filter media – whether plastic, foam or gravel – soon becomes a biological filter, since bacteria that are already present in the water colonise it within about a month. It is possible to buy packages to accelerate the process but this is unnecessary, as colonization will happen naturally without assistance.

Poor quality water is usually the result of using too small a filter, which cannot house enough bacteria to deal with the volume of fish waste.



Having a large enough filter is crucial to keeping pond water clean.

Getting the balance right

Bacteria grow until their feeding capacity matches the amount of ammonia being produced. The colony will never outgrow its food source, so a balance is established – unless circumstances change.

For example, if you add more fish, the bacteria need a week or two to increase before they can cope with the extra ammonia. In garden ponds this is seldom a major problem, since it is common sense not to increase your stock drastically.

What is more likely to upset the balance is a crash in the bacteria population. A biological filter is a living system that needs a constant supply of oxygen. If the pump stops for just a few hours – because of an electricity blackout, for example – the bacteria will die from suffocation.

This does not mean your pond instantly becomes a disaster zone, however. All you need to do is reduce feeding so that the fish excrete less waste until the bacteria recolonise the filter.

Similarly you lose most of the bacteria when you clean the filter - which is necessary periodically as it gets clogged with debris and puts a strain on the pump. Once

again, reducing fish food for three or four weeks gives new bacteria time to grow.

Commercial products consisting of a crushed mineral are advertised as being capable of cleaning green water rapidly by absorbing excess ammonia. However, once the medium is full it cannot absorb any more, and ammonia levels start building again. Consequently these products should be regarded as emergency measures or short-term solutions. A healthy colony of bacteria, on the other hand, never stops working.

Suitable plants

To help water stay clean, the best plants are those with fairly large leaves that either float on the surface or emerge above it. Their roots draw nutrients from the water and deliver them to the growing parts. It is easy to remove dead leaves and, if the plants become too big, it is also easy to pull or cut them out.

These are plants such as temperate or tropical water lilies (*Nymphaea* species and cultivars), lotus (*Nelumbo* species), water snowflake (*Nymphoides indica*), water poppy (*Hydrocleys nymphoides*), papyrus (*Cyperus papyrus* – a large plant unsuitable for small ponds) and various sedges and reeds, including local species.

Less suitable are plants that grow entirely submerged. Since they are often promoted as oxygenating plants, most people assume they are better for fish. While it is true these plants put oxygen into the water during the day, at night they take it out. Also, when the leaves of submerged plants die they rot on the pond floor, adding even more nutrients to the system.

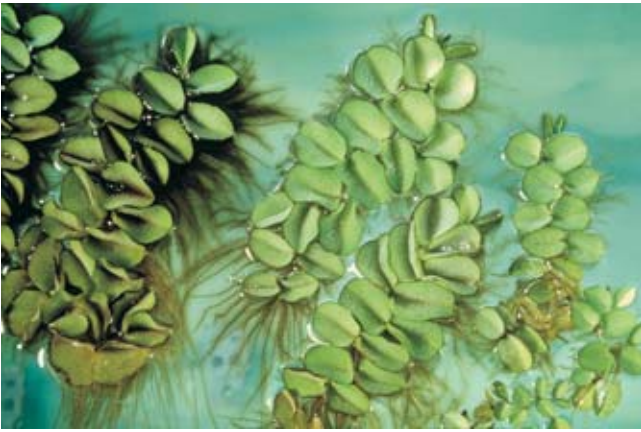
Plants such as nardoo (*Marsilea drummondii*) are rooted in the bottom of the pond but form floating clumps. These are useful for hiding fish from predators, but you may



Tropical *Nymphaea* water lily.



Temperate *Nymphaea* water lilies.



Salvinia (Salvinia molesta) is a declared plant in Western Australia and plants must be destroyed.



Water hyacinth (Eichhornia crassipes) is a declared plant in Western Australia and plants must be destroyed.



Lepidosperma tetraquetrum, a Western Australian sedge (Photograph courtesy of D Blumer, Botanic Gardens & Parks Authority).



Water poppy (Hydrocleys nymphoides).



Nardoo (Marsilea drummondii) (Photograph courtesy of D. Blumer, Botanic Gardens & Parks Authority).

have to remove some of the clump occasionally to prevent it covering the entire pond. Dense mat-forming plants whose roots are just below the water surface, such as the tiny, fern-like *Azolla filiculoides*, quickly create the same problem but on a worse scale because it is difficult to remove every individual piece.

Aquatic weeds

Certain aquatic plants are highly invasive in garden ponds and have become serious weeds in natural waterways.

Alligator weed (*Alternanthera philoxeroides*), arrowhead and sagittaria (*Sagittaria montevidensis* and *S. platyphylla*), Canadian pondweed (*Elodea canadensis*), *Cabomba caroliniana*, hydrocotyle and shield pennywort (*Hydrocotyle ranunculoides* and *H. verticillata*), *Lagarosiphon* species, leafy elodea (*Egeria densa*),

parrot's feather (*Myriophyllum aquaticum*), salvinia (*Salvinia molesta*), Senegal tea (*Gymnocoronis spilanthoides*), water hyacinth (*Eichhornia crassipes*) and water lettuce (*Pistia stratiotes*) are declared plants in Western Australia.

All are eradication targets that must be destroyed and prevented from spreading from the area in which they grew. However, they persist in some private gardens. Never accept cuttings from friends or neighbours.

Other plants commonly grown in or around ponds have become environmental weeds – prime examples being elephant's ear and taro (*Alocasia* species), arum lily (*Zantedeschia aethiopica*) and bulrush (*Typha* species). Never dump unwanted pond or aquarium plants in waterways. Instead, seal them in black plastic bags and bin them.



Hardy goldfish are tolerant of small variations in water quality.

Choosing fish

Goldfish and koi are hardy, being tolerant of less than perfect water quality. They are also visually attractive because of their bright colours which, unfortunately, make them easy targets for predators unless you have a protective net or grill.

Western pygmy perch are an excellent local species because they eat mosquito larvae. The same is not true of the misnamed mosquito fish or gambusia, which should be avoided. Bearing live young they soon reach plague proportions and are impossible to eradicate. Through thoughtless dumping, they are present in most natural ponds and lakes.

Koi is another species which should never be dumped in natural waterways where they proliferate and compete with native species.

When koi hatch, they range in colour from highly desired hues and patterns through to plain brown. In the wild, bright coloured koi are easily seen by predators, although a few manage to breed first. In the next generation, again the brighter ones are picked off. Within a couple of generations, natural selection means most wild koi become drab carp that are less visible and less vulnerable.



Koi are specifically selected for their bright colours and bold patterns which are intended to be viewed from above.

If you wish to dispose of koi or any other fish, please telephone the University of Western Australia Aquaculture Research Laboratory on (08) 9284 0937. However, if the only reason you want to dispose of your koi is because you fear they will outgrow their pond, think again. In a small space the majority do not reach maximum size. What is more likely is that, in any domestic koi population, one fish always grows much faster and bigger, and this dominant individual tends to harass the rest.

Other forms of pond life

Frogs usually find their way into any garden that offers enough shelter so, contrary to popular belief, you do not

need a pond - unless you want the frogs to breed there. If so, do not have koi as they eat spawn and tadpoles. Instead, stock the pond with western pygmy perch which will coexist with native frogs.

Specialist retailers offer many interesting aquatic creatures but, before you buy, consider which qualities you want in your pond inhabitants. Axolotls, for example, lurk on the pond floor where they are hard to see, especially if they are dark – so if you want to be able to observe them, an aquarium might be better. Koi, on the other hand, are selected specifically because their patterns and colours can be seen from above.

Marron are becoming increasingly popular, as they are intriguing animals. Again, if you want pond life that you can watch, choose iridescent blue marron rather than dark brown ones, and be aware that they tend to hide during the day.



Marron occasionally leave the pond, especially if the water quality is not quite to their liking.

Also, marron prefer cool water and a shaded pond - which generally means locating it under trees. This tends to be counterproductive because the trees drop leaf litter that rots in the pond, adding to the nutrient loading – and when marron do not have excellent water quality they will walk away. Although silver perch have been grown in marron ponds, you cannot keep fish in the same pond unless it is quite deep, because the marron catch and eat them.

Shellfish can be intermediate hosts for some diseases of fish. If your fish develop a disease and you treat them, most of the treatments will kill molluscs and possibly crustaceans, too.

The larvae of freshwater mussels attach themselves to the gills of fish. In nature this is their way of hitching a ride up-river, but in a garden pond where the fish may be quite small, these tiny shellfish stowaways can kill them.

All of the above is not meant to imply that amphibians, crustaceans and molluscs are problematic in themselves. Rather, it simply indicates that you cannot keep a random mixture of different pond animals without consequences.

Also, it is important to decide what kind of pond you want and how much time you can devote to it. If it is a deep pond and you are prepared to be vigilant, constantly, regarding perfect water quality, then marron, pygmy perch and frogs would be a good combination. But if you want a simple pond system where slight variations in water quality will not harm the inhabitants, koi or goldfish might be better.

Whether you decide on fish, crustaceans, amphibians or molluscs, always buy from a reputable dealer whose stock you can be confident are healthy.