Britain's best-selling fishkeeping magazine

12 PAGE DISCUS SPECIAL

practical fishkeeping

www.practicalfishkeeping.co.uk

Healthy diets for your fish

What to feed - and what to avoid

Safer substrates for cichlids

Why you should choose carefully

How to improve your pond

PLUS:

What Koi dealers are doing to ensure their fish are KHV-free

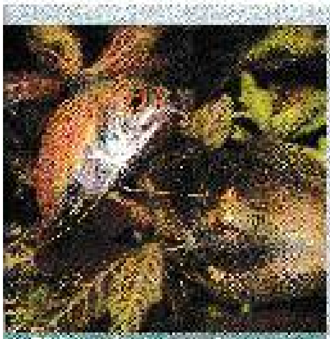
Get zoned!

The latest thinking in marine filtration

practical
fishkeeping

Contents

Issue 4 April 2004. On sale March 24 - April 20 2004



20 For a [illegible]

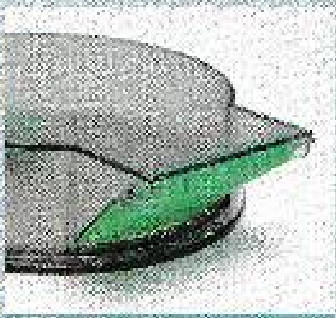
40 Ask the experts

52 Not a load of rot

COVER [illegible]

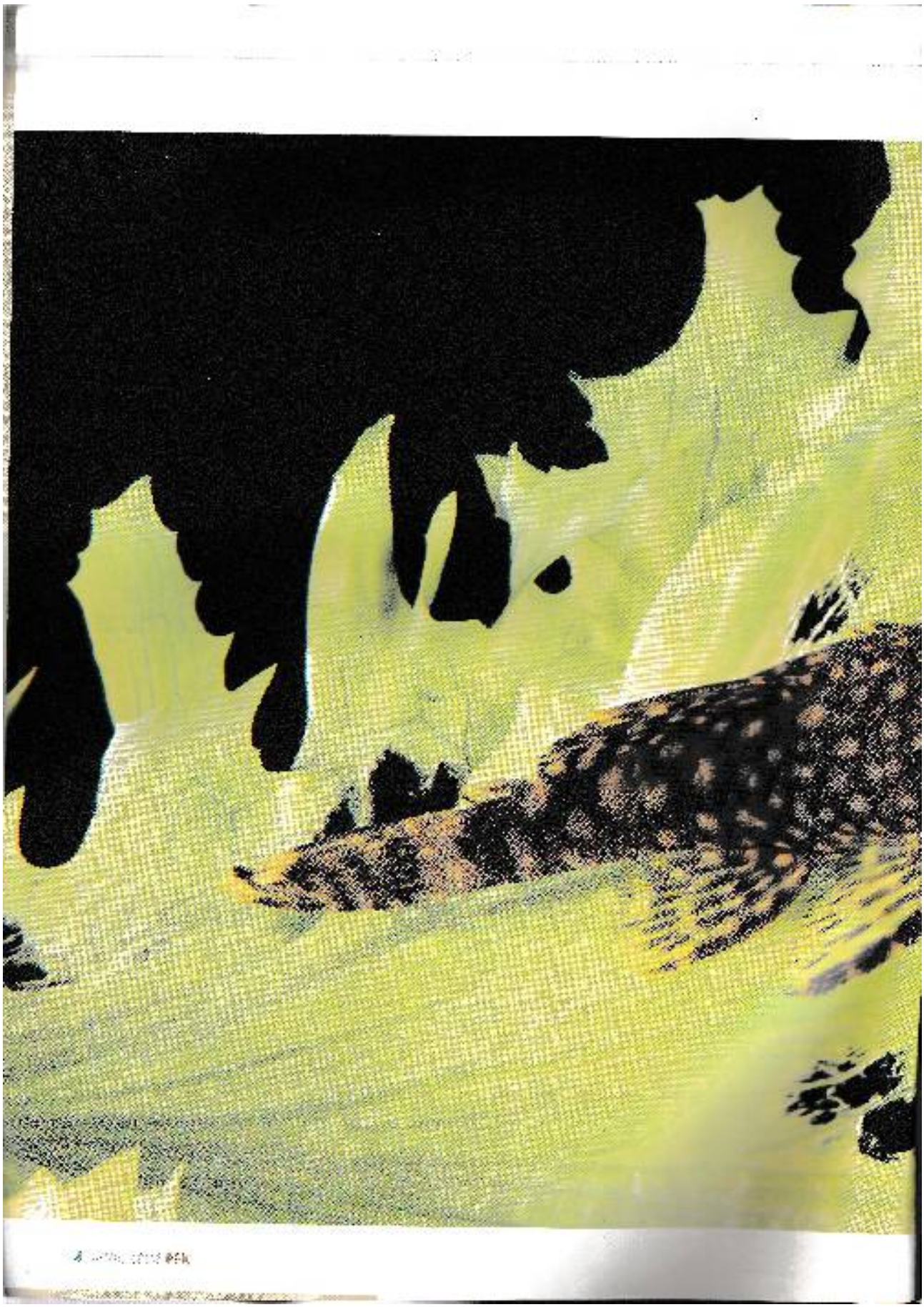
82 Scales of justice

91 Spotlight on Discus



118 Buyer's guide

turn to page 122 or call 0845 601 1356 or visit www.greatmagazines.co.uk



Eat to live

You'll be amazed what some people feed their fish. Cheese, pork chops, fish fingers - we've heard it all in the PFK office. But such diets are obviously not good for your fish. Dr Peter Burgess of the Aquarian Advisory Service takes a closer look at how to ensure you offer them a well-balanced and nutritious diet.

ABOVE: Feeding your fish a balanced diet is crucial for their well-being.

For some reason, catfish seem to be fed all manner of strange foods - apart from the classic case of [illegible], another reader once wrote in saying he fed his fish cat biscuits. Hopefully this fourth part in the series Healthy Living for Fish will set the record straight for once and for all.

What is a good diet for fish?
A quality diet contains all the necessary proteins, lipids, vitamins, minerals and other nutrients that are needed by fish for growth, maintenance and energy.

These various constituents must be present in the right types and in the correct proportions. This is the essence of a complete, balanced diet.

What goes into a dry diet such as flake foods?
Look on the back of the pot label for a list of ingredients. These will probably include fish and shellfish, algae, vegetable derivatives, eggs, oils and fats, cereals, yeast, minerals and various vitamins. Top-end manufacturers use only natural foods, not artificial substitutes.

What else makes a good food?
However good its nutritional composition, a fish food is useless if the fish cannot or will not eat it.

The food must be of a suitable size and texture so the fish can either swallow it whole or bite off edible-sized pieces. The food must also be tasty. Certain chemicals within the food will encourage fish to feed. Night-feeding catfishes, for example, 'taste' the water for the presence of tell-tale food molecules (probably amino acids), and by following the trail of the molecules, they can home in on the meal.

The presence of chemical food attractants is particularly important when formulating diets for catfish and other nocturnal feeders that locate their meal by 'distance-tasting' rather than by sight. In contrast to humans who taste with their tongue, the taste receptors of fish are scattered all over the body surface and are abundant on the whisker-like barbels of catfish.

What makes a low-pollution diet?
The quantity and quality of the protein composition is very important. If the food is too rich in protein, the fish will simply excrete the surplus as toxic ammonia.

Between 25% and 40% protein is considered optimal for most adult fish (young fish need slightly more).

Some inferior foods contain significant amounts of indigestible protein which the fish cannot use. This is simply excreted where it will decompose, making water pollution.

What are essential amino acids?
These are the building blocks of proteins, and there are about 20 types. Fish synthesise some amino acids themselves, but 10 of them cannot be made, certainly not in sufficient quantities and have to be

Major groups of nutrients required by fish

Nutrient	Benefits and features
Proteins	Provide essential amino acids for tissue growth and repair. Proteins are also a potential energy source. Some amino acids are important food attractants.
Lipids (oils and fats)	A rich source of energy (provides [illegible] twice the energy of protein). Lipids provide essential fatty acids for tissue and cell regeneration.
Carbohydrates	Although not an essential dietary requirement of fish, carbohydrates are [illegible] as a low-polluting energy source.
Vitamins	These diverse groups of chemicals serve many vital functions. For example, vitamin A is important for healthy sight, and vitamin C (L-ascorbic acid) benefits the immune system.
Minerals	Essential for tissue growth (e.g. calcium for bone development [illegible]).

Examples of popular fish foods and their uses

FISH FOOD	USES
DRY FOODS	
Flakes	Probably the most versatile: small fish can break off fragments from a whole flake, whereas medium to large fish are able to gobble up the flakes whole. A wide range are available, eg tropical, marine, goldfish, herbivore, carnivore and many others. There are also colour flakes that are enriched with pigments (such as carotenoids) to help bring out the fish's natural colours.
Granules and pellets	Available in a range of sizes to suit medium to large fish. Recently, micro granule foods have entered the market, suitable for small fish.
Floating sticks	Pond stick foods are formulated for Koi, goldfish and other pond fish, encouraging the fish to feed at the surface where they can be seen. [illegible] Accidental overfeeding is no problem as uneaten sticks can be skimmed off the surface.
Sinking tablets and wafers	Ideal for bottom feeding fish such as catfishes and loaches. These foods break up very slowly, allowing time for grazing species (such as plec catfish) to feed at leisure.
FREEZE-DRIED FOODS	
Freeze-dried Tubifex worms, Daphnia and others	This process first freezes the organisms and is followed by removal of their water content by subjecting them to low pressure and low temperature conditions. Freeze-dried foods can be stored at room temperature.
LIVE FOODS	
Daphnia (water fleas)	Not real fleas, but small aquatic crustaceans (1-5mm in length). Some use Daphnia alone or as a supplement to the staple dry diet. Readily taken by most small to medium fish.
Brineshrimp (Artemia)	Either fed as newly hatched shrimp (nauplii, about 0.5mm) or as adults, these crustaceans are suitable for a wide range of fish, both freshwater and marine species.
Mosquito larvae	These black larvae ([illegible]) spend much of the time breathing at the surface, hence are ideal for surface-feeding fish.
Bloodworms (midge larvae)	These bright blood-red larvae (reaching [illegible]mm) are taken by all but the smallest of fish species.
Tubifex worms	These slender red mud-worms were once a popular live food but are now considered risky because they can harbour various fish pathogens and parasites.
Earthworms	Small earthworms are ideal for large fish. Collect them from gardens that have not been sprayed with pesticides or other chemicals.
Microworms	Barely visible to the naked eye, these tiny worms are an ideal fry food. Rarely seen in the shops, but available as starter cultures (by post) from hobbyist fish breeders.
Grindal worms and whiteworms	Grindal worms (about 4-5mm) and whiteworms (about 20mm) are suitable for small to medium fish respectively. Easily cultured. Availability as for microworms.
Infusoria	These microscopic aquatic organisms are ideal first foods for very small fry (eg those of tetras and barbs). Easy to culture from [illegible] water in a container [illegible]
Note: Try your local aquarium and pond store for stock. Some of these live foods are seasonal.	
FROZEN FOODS	
Frozen live foods	Popular brands contain aquatic organisms that have been killed and preserved by freezing. Examples include frozen Tubifex, Daphnia, brineshrimp, bloodworms, mosquito larvae.
Gammarus shrimps, Mysis shrimps	Sold in metal foil or blister packs and stored in the freezer. Some manufacturers sterilise these foods (eg using gamma irradiation) to destroy any fish pathogens that the organisms may be harbouring.
LIQUID FOODS	
Liquid fry foods	These soup-like foods are ideal for feeding to tiny fry. One well established brand is available in two formulations: one for livebearer fry, the other for egg-layer fry.

How much, how often?

Most aquarium fish will benefit from two or three feeds per day. This is supported by studies of the Waltham Aquacentre who found that [illegible] achieved [illegible] higher growth rates when their food was fed in three small portions rather than a single large meal. Little and often is generally best.

Newcomers often overfeed their fish. This can be disastrous as uneaten food will rot in the tank or pond and pollute the water. Being cold-blooded, fish don't need to convert food into body warmth, so their energy requirements are far less than that of a mammal of similar size. As a rough guide, give only as much food as they can fully consume in about [illegible] minutes. Getting the amount right may require a little trial and error, but you will soon learn to gauge how much to offer them at each feed.

ABOVE: Sometimes fish will accept food quite happily from your fingers.

obtained via the diet. These are known as essential amino acids (EAAs). Fish foods must contain all 10 essential amino acids in the right quantities. Similarly, fish must get some of their fatty acids from the diet, and these are known as essential fatty acids, or EFAs.

Do tropical and marine fish have different dietary requirements?
Yes, notably in their requirements for certain essential fatty acids. There are two main families of fatty acids, known as the Omega 3 and the Omega 6 series. Marine fish need Omega 3 fatty acids, whereas freshwater fish require fatty acids from either one or both groups.

What do fish eat in the wild?
The types of food will vary according to the species of fish and its stage of development. Factors such as seasonal changes in the availability of food items will also influence the fish's diet.

Studies on the stomach contents of various wild-caught fish have shown an amazing array of foods including micro-organisms, algae, plants, nuts, fruits, insects, worms, shrimps, snails, amphibians (eg tadpoles, frogs) and other fish.

Few species, however, will feed on this entire range. In fact, some fish are very specialised feeders, such as the pikes and others that prey almost exclusively on other fish.

Is it safe to feed kitchen treats?
Certain kitchen foods are OK if given in moderation.

Lettuce and, in particular, spinach (blanched and weighted down with a stone), or thin slices of cucumber will be relished by sucking-mouth catfishes (common plecs and lookalikes in particular).

Frozen prawns: these should be thawed and crumbled into small, bite-sized pieces.

Foods to avoid are animal meats including burgers or sausages, cheese, chocolate, cake, crisps, biscuits and the like.

Why are red meats harmful to fish?
The main problem relates to the saturated fat in meat. In warm-blooded animals these fats are fluid and easily transported around the body. But if fed to fish, which are cold-blooded, they will set solid at the lower body temperature, causing digestive problems and liver damage.

Can dry foods meet all the nutritional requirements of fish?
For most fish, yes. A few fish will only accept fresh or live foods – this is true for certain marine species as well as some predatory fish that may only take live, moving foods.

Some fish-breeders supplement the diet with frozen or live foods to condition the adult to spawn. Many fish fry will only snap at tiny live prey.

Is it best to feed a variety of dry foods to fish?
There is generally no need for this provided a quality food product is given. But sometimes a supplement is beneficial. For example, if you keep lots of herbivorous fish you may wish to give one or two feeds per week of vegetable flakes in addition to their staple flake diet.

Some hobbyists mix foods from different manufacturers, feeling that a particular brand might lack some essential nutrient. This cautious approach reflects the early days of the hobby when commercial fish foods were of dubious nutritional quality, some comprising little more than dried-up biscuits!

What is 'target feeding'?
This refers to delivering the food so that it selectively reaches an individual, particular species or group of fish. Target feeding may involve throwing food in the direction of a single fish, as in public aquariums when feeding the sharks to ensure that each receives its daily ration.

In the home aquarium, this involves using dry foods that either float or sink, thereby targeting top- or bottom-feeding fishes. Another form involves giving an extra feed an hour or so after the aquarium lights have been switched off to give the nocturnal foragers (eg many catfish) a chance to eat. Sinking catfish tablets can be fed this way.

What effects will a poor diet have on fish?
Diets lacking in one or more essential ingredients will cause health problems. For example, a lack of vitamin C results in stunted growth and sometimes red patches (haemorrhages) on the skin or fins. A lack of vitamin A may cause the fish's eyes to bulge outwards.

Dietary-related diseases generally take weeks for symptoms to manifest, such that the fishkeeper may fail to link poor diet with poor health.

If a poor diet were to suddenly make fish sick, fishkeepers would be far more discriminating in what they buy and feed!

What is the best way to store dry foods?
Pots of dry foods (eg flakes, pellets) should be kept in a cool, dry place, away from direct sunlight. This is especially important once the seal is broken. Always replace the lid after feeding and avoid buying too much food at a time: choose a size that will last your fish about three months' maximum. This is because the vitamin content will start to decline after opening.

Fatty acids required by fish

Omega series	Examples
Omega 3 series	Linolenic acid Eicosapentaenoic acid (EPA) Docosahexaenoic acid (DHA)
Omega 6 series	Linoleic acid Arachidonic acid

Further reading

The following two books are written by PFK contributors John Rundle and Dr David Ford.

Live foods for aquarium fishes by John Rundle. Published 2004 by Interpet Publishing. ISBN 1-86054-260-5. This is a practical guide to culturing and feeding a range of aquarium live food organisms.

Feeding aquarium fishes by Dr David Ford. Published 2002 by Interpet Books. ISBN 1-86054-269-X. This easy-to-follow book covers the essentials of fish nutrition. Both books are in the Practical Fishkeeping series. To order a copy, call PFK's Dempsey Freefone on 01733 ...

Fish nutrition edited by John Halver and Ronald Hardy, 3rd edition, published 2002 by Academic Press, New York. Heavy going unless you have a science background, but an excellent book.

News

The latest events in the fishkeeping world and dates for your diary.

On the PFK website this month

www.practicalfishkeeping.co.uk

PFK reader breeds 'sterile' GloFish

Singapore may follow America's lead

Fish fact ... [illegible] guppy can deliver [illegible] broods

OBITUARY

DEREK LAMBERT

It came as a great shock to learn that Derek Lambert passed away suddenly on February 2[illegible].

I knew Derek since the early days of my involvement in the organised hobby, from the late 1970s when I began attending local open shows. [illegible] at the time and [illegible] Derek [illegible] relied on my parents for transport to the open shows.

Derek was a passionate fishkeeper, his first love being livebearers. [illegible] remember him [illegible] the Swordtail [illegible] from [illegible] in the early 1980s.

Over the years Derek's passion for livebearing fishes brought him into contact with many key figures [illegible] the late Mervyn Strange, John Dawes, [illegible] Colin [illegible], Peter McAllister and Brian [illegible] [illegible]. Derek was highly regarded [illegible] hobby for his dedication and enthusiasm. Derek was involved with the Southern Livebearer Aquatic Group, and was a founder member of [illegible] [illegible] Service. He was also a member of Kingston and District Aquarist Society.

Until a few years ago he was an [illegible] judge for the Association of Aquarists, and it was always a relief to have him on board to judge the livebearer classes as his knowledge on them was second to none.

Few [illegible] associate Derek [illegible] — he was also interested in keeping rainbowfish and barbs amongst others. I remember [illegible] on [illegible] with Derek and his mother [illegible] which we [illegible] the various members of the barb family, and I know [illegible] Derek had [illegible] his interest in those fish.

Derek wrote for Practical Fishkeeping, prior to becoming editor of Aquarist and Pondkeeper [illegible] [illegible] fishkeeper.

Derek's [illegible] with [illegible] served to [illegible] Mexico and [illegible] of livebearers and other fish.

He was [illegible] fishkeeper, breeder, [illegible] judge, lecturer, aquarium journalist, published author and, perhaps most importantly, an ambassador for the hobby [illegible]. Derek was heavily involved in the organisation of the Festival of Fishkeeping, an annual event held in Dorchester [illegible] and [illegible] other open shows and specialist society events.

It was a pleasure to have known Derek and to have been able to share in his passion for fishkeeping. My heartfelt condolences go to his mother, [illegible] and his partner [illegible]. [illegible] Derek will remain in our thoughts for many years to come and he will be sadly missed as one of the hobby's finest.

CHRIS RALPH

[illegible] Association of Aquarists and all [illegible] had the pleasure of knowing Derek [illegible] the family.

GM fish pose extinction threat

A new report suggests there's a risk of some fish species becoming extinct if certain types of transgenic superfish are released or escape into the wild.

Lead author Richard Howard, from Purdue University, USA, said: "This study shows that genetically modified fish have better mating success than wild types."

The scientists worked on Medaka, Oryzias latipes, inserting a salmon growth hormone gene into the

fish, resulting in fish 85% larger than normal wild-type counterparts.

These larger transgenic specimens out-competed wild males during spawning by fertilising up to 73% of broods. Based on this, some species could be driven to extinction within 50 generations.

Other scientists have calculated that just a single GM fish could be sufficient to cause a problem through this 'Trojan gene' effect.

The GM fish [illegible] growth hormone [illegible] methods are being investigated for use in aquaculture. – United Press International

Diary dates

[illegible]

News in brief

GIANT CRABS INVADE EUROPE: Millions of Giant King crabs, [illegible] from Russia weighing up to [illegible] are threatening [illegible] Europe. [illegible]

RARE SHARK CAUGHT: [illegible] have caught a rare [illegible]

PIRANHA FOUND IN RIVER THAMES: A [illegible] in the Thames [illegible] released [illegible] the UK.

[illegible sidebar text]

RIGHT: Substrate can make or break your tank – choose wisely.

Tanks, décor and yes, probably rocks, caves, bogwood, plants, décor, thermostats and so on. But what about substrate? Few people realise how important this layer of sand or gravel is to the occupants of an aquarium.

Nature's floor

The substrate is the floor of the fish's world. Bottom dwellers are clearly [illegible] this. From the [illegible], the sandy [illegible] of [illegible] Nature has devoted [illegible] people about hundreds of sandy-coloured or sand-spotted catfishes and [illegible] aquariums.

The camouflage [illegible] many young fish [illegible], even from [illegible] are [illegible] fry, for example, are [illegible] dark and light, making them difficult to see against a gravel background. Sometimes this camouflage can [illegible]. There is [illegible] colour [illegible] against a [illegible] predators, both aquatic and [illegible].

Many fishes, especially those that live on the bottom, have taken this camouflage one stage further and have [illegible] they are [illegible] dark above and light underneath. Seen from below, they are invisible against the [illegible]; from above, they merge in with the [illegible] substrate [illegible].

A psychological essential

Imagine what it would be like to live in a skyscraper with glass floors so that wherever you looked down, you could see all the way to the ground. You would probably find this very unsettling and never entirely [illegible]. This [illegible] fish must feel when kept in a tank with no substrate. And how much worse when [illegible] the light from the [illegible] below shining up through the floor, where [illegible] should be [illegible] light [illegible] solid.

There is evidence that some fishes use the direction of light as an aid to orientation. Experiments have shown that some fish kept in a bare-bottomed tank with light from below will swim upside down or on their sides if the light is from the side. [illegible]

Some fishes are more susceptible to 'bare bottom stress' than others. Apparently these are bottom dwellers including many cichlids, especially the smaller ones obliged to be in constant proximity to their [illegible]. Large cichlids [illegible] because their [illegible] them to have a [illegible] view. They are also usually [illegible] of the world outside their glass box.

Naturally nervous fishes – those that have to contend with higher predator pressure in the wild – are made more nervous by a lack of camouflage and the disconcerting [illegible] bare glass. [illegible] we see them in dealer's tanks [illegible] huddled in a [illegible] corner, the darkest [illegible] spot they can find.

We do not want nervous fishes: stress weakens immune response, reduces appetite, and has a greater tendency to disease. And do we really want to see [illegible] fishes [illegible] desperately to be [illegible] in order to [illegible] themselves?

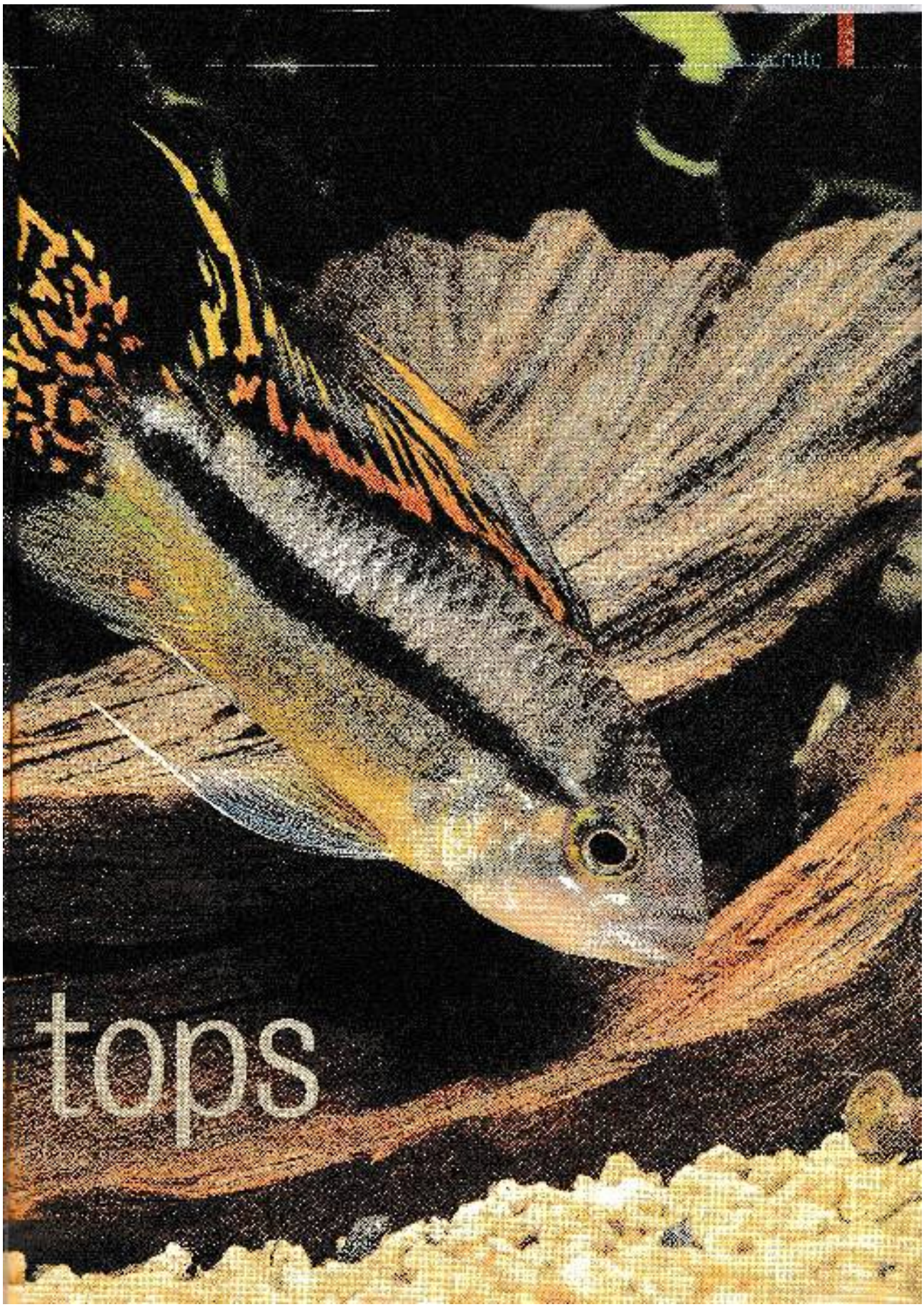
Substrate as a tool

Some fishes don't just [illegible] they [illegible] it. For example, open breeding substrate-spawning cichlids such as many Central American [illegible] dig nursery pits in which they place their newly hatched larvae.

This digging forms part of the pre-spawning behaviour [illegible]

Bottoms are

Why is substrate so often an afterthought? Mary Bailey of the British Cichlid Association argues for more consideration.


tops

Gravel fights

[illegible]

pairing, and probably helps trigger spawning behaviour. Without substrate, they may not spawn or may fail to bond properly so that fights between the pair ensue. With nowhere to put the larvae, they may eat them, or the larvae may be scattered around the bottom and lost, or sucked into the filter inlet.

Cave-breeders usually dig one pit inside the breeding cave. Apistogramma go one further – the female chooses a cave with a small entrance and then blocks this with substrate to keep the male and other predators out. With no substrate, they may fail to spawn.

Some Lake Tanganyika shell-dwellers bury their shells so that only the entrance remains clear, level with the surface of the substrate. This makes it less conspicuous and prevents it from being carried off by *Neolamprologus callipterus*, as well as keeping the shell in place in any current. To these shell-dwellers, a loose shell is the equivalent of a derelict house – no one in their right mind would raise a family there.

Then there are the mouthbrooders which build spawning sites, sometimes highly complex 'sand castles', for attracting females and spawning, geophagines and sand-sifters that sift the substrate for food, *Aulonocara* that dive into it for invertebrates, Cyrtocara that bury themselves in it for concealment, and so on.

Cichlids are probably the best known users of substrate in fresh water, but others like some loaches live in it and shift it around as part of their everyday existence. These will be stressed if there is no substrate.

Other uses of substrate

Obviously substrate is useful for growing plants – those potted in the tank in pots don't grow as well, and don't look very nice either. Substrate is also essential for supporting rockwork. It protects the bottom glass against cracking if the heater holder comes off, causing the heater to land on the bottom. It also has an aesthetic appeal, creating the sort of natural underwater world to which most of us hobbyists aspire.

However, substrate has another huge benefit to offer – one which very few hobbyists seem aware of.

Most of us know that undergravel filters draw oxygenated water through the gravel so that bacteria coat every grain to produce a huge amount of biological filtration. This in turn breaks down wastes plus ammonia and nitrite.

What most people don't realise is that the top layer of the substrate is oxygenated and develops the bacterial waste-disposal ability even if no filter is installed. So if there is gravel on the bottom, even only a single grain thick, this provides much more surface area for bacteria than the plain, flat bottom glass.

Bare tank enthusiasts will probably retort that their filter collects these wastes, or that they syphon them off every day. But unless the filter constantly sucks up solids (and makes life uncomfortable for the fishes), wastes will remain on the bottom and start to decompose. A lot of toxins can be produced before the next syphoning off. Yet a nice layer of bacteria-coated gravel will break down wastes all day, every day.

I once tried rearing young fish in bare tanks for hygienic purposes, but quickly discovered I always had problems with nitrite. Once I added gravel, the problem was solved!

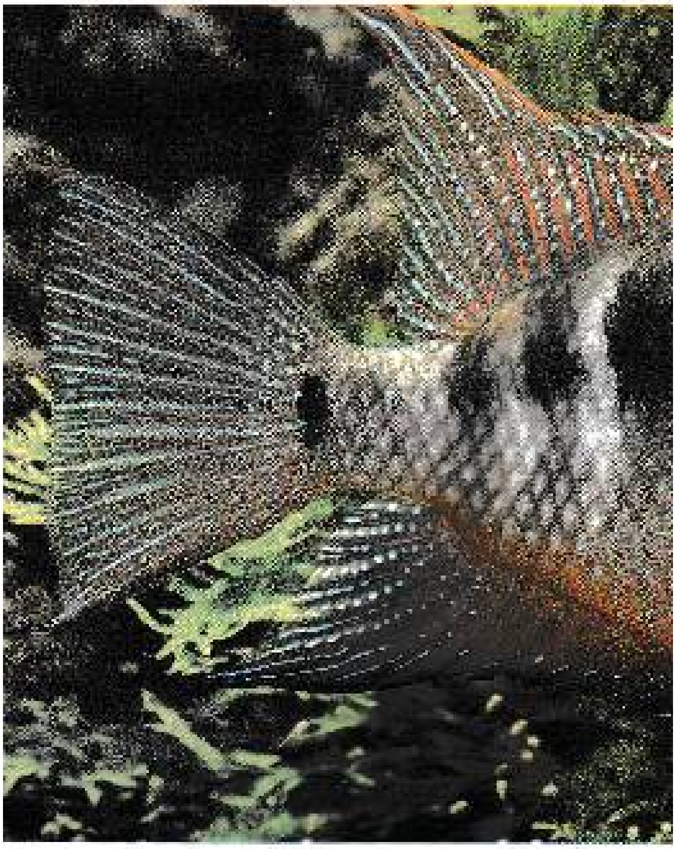
Which to choose

Grain size is important. Small cichlids (Apistos, shell-dwellers) can't pick up large-sized gravel. Bottom sifters require a fine substrate, and this should be water- or weather-worn so that it doesn't have sharp edges to cut delicate gill tissue. In any case, always avoid sharp gravel (crushed rock chippings) as sharp edges can cut mouths or cause abrasions to the underside of catfishes and loaches.

Large gravel leaves gaps between the grains, and this allows droppings and food particles to find their way deep into the gravel where there is no aerobic (oxygen-requiring) bacterial action, and then they rot and affect water quality.

Large gravel also offers less total surface area for bacteria and is not ideal for undergravel filtration. Nor is fine sand – it clogs easily and impedes water flow. Fish that require a sand substrate are best kept with other types of filter. For most purposes, a gravel with a grain size of 3–5mm, ie normal aquarium gravel, is ideal.

Colour is also important. A light-coloured substrate is likely to make light-coloured fishes, especially those living on or near the bottom, as they try to blend in. If the only suitable material is a light colour, camouflage it with low-growing plants and a scattering of dark pebbles. Use dark

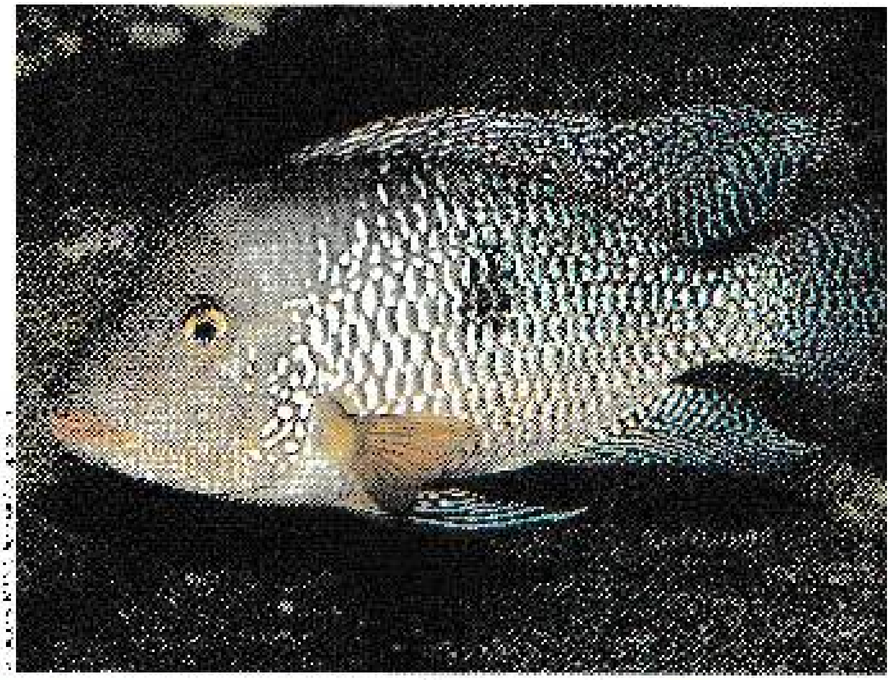


materials for the rest of your decor.

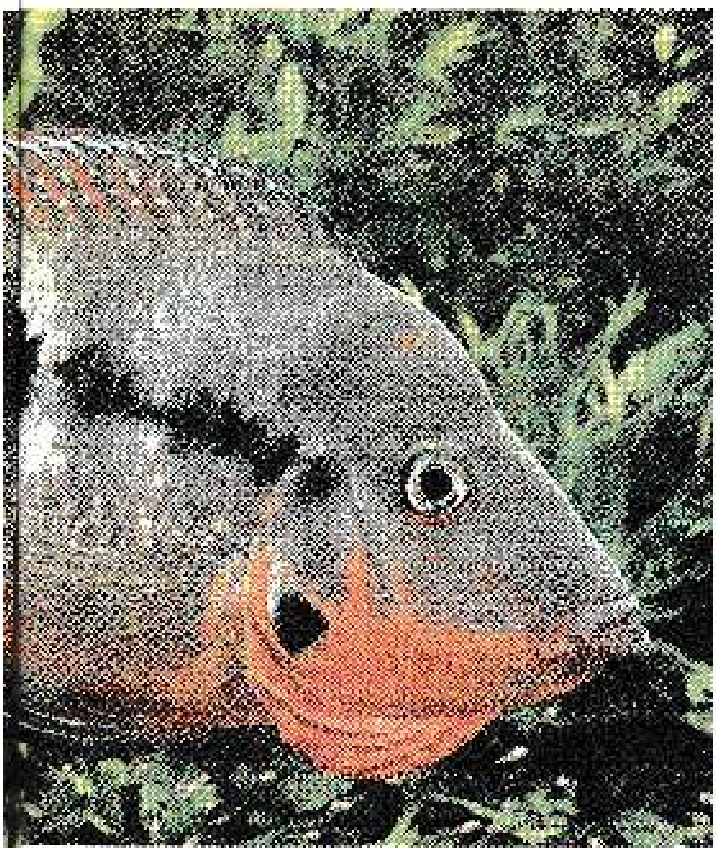
Substrate can also have a dramatic effect on hardness and pH. Many gravels are fine for a community of most busy or softwater fish, but I've often met more serious softwater fishkeepers who have collected rainwater, bought an RO unit, but their water is still too hard and refuses to stay soft. The prime suspect is the substrate. Substrate for softwater tanks should always be tested before use, preferably before purchase (ask for a small sample).

Even more bizarre is how many fishkeepers use coral sand that is actually meant for marine fishkeepers and rift valley cichlids. Coral sand hardens water and raises pH. Apart from being an unnatural colour, it contains fines that break down into tiny particles that are suspended in the water and can cause gill and skin irritations. About 10-15% coral sand mixed with ordinary gravel is sufficient [illegible].

If possible, buy gravel and sand sold specifically for the aquarium. Swimming pool filter sand and play sand are also safe. Gravel sold by garden centres is intended for



ABOVE: Pearl cichlids, *Geophagus brasiliensis*, lay their eggs on the substrate.



LEFT: Firemouth cichlids, *Thorichthys meeki*, are substrate sifters, looking for edible matter.

ornamental [illegible] not tanks. Caution is also needed if collecting your own substrate. Many years ago [illegible] there were [illegible] present [illegible] only 10 [illegible]. Besides, collecting sand or gravel is not strictly legal – ask permission first.

As for dyed gravel, apart from the fact that it's unnatural, the dye may leach into the water. Nowadays such gravels may [illegible] they are safe [illegible] plastic [illegible] and if you see [illegible] dig or use a gravel cleaner, the coating will [illegible] away.

Preparing the substrate

Always wash the substrate before use. It's amazing how much dirt comes out of pre-washed gravel!

How much to use depends on various factors. An undergravel filter bed should be at least 5cm/2" deep, particularly when supporting extensive rockwork. Different plants require varying minimum depths, but none are likely to grow in less than 5cm/2" – and more is better.

Cichlids that dig should be given sufficient depth. [illegible] than 10mm/3/8" is no [illegible] and to avoid substrate plunging [illegible] on the bottom [illegible] is required. Always do your research in case your fish or plants have special substrate needs.

For a huge brood...

...you can't beat the Dwarf gourami. But as **John Rundle** explains, although easy to breed, this popular species does present its own challenges.

FACT FILE

Common name: Dwarf gourami
Scientific name: [illegible]
Size: [illegible]
Origin: [illegible]

The common name Dwarf gourami is a bit misleading because we now find a number of fish under this name. Along with the fish that have the natural beautiful red and turquoise blue markings of the males, there are man-made colour varieties of the fish. [illegible] These have common names such as Neon Dwarf gourami, Red Dwarf gourami and Turquoise Dwarf gourami. While these coloured sports make attractive fish, the natural coloured fish is not seen so often as the other varieties.

I have in the past obtained and bred the Dwarf gourami and raised progeny that bore the striking natural colours of the parents. What follows can be used to breed any of the Dwarf gourami varieties.

Rogue characters?

A number of readers say that they have a rogue Dwarf gourami in their community tank. They all tell of the male constantly attacking other tankmates. Well, this is really part of the natural make-up of this fish, especially if there is also a female Dwarf gourami in the tank.

These fish will often attempt to breed in a tank that contains other fish, and the male will protect his territory at all costs. It is not unusual to find this aggression in fish like the Blue and Gold gourami. A lone fish of these types can be pugnacious.

Sexing should not be a problem, with the males being brightly coloured and the females quite drab. When in breeding condition, the female's belly region becomes plump.

These fish are not very demanding insofar as water chemistry is concerned. They will survive and breed in water that has a pH from fairly acid to slightly alkaline, and a hardness from soft to moderately hard. However, make sure that extremes are avoided and that they are not exposed to sudden changes.

Breeding and tank set-up

The Dwarf gourami is a labyrinth fish that lays eggs that float. The male builds a bubblenest that he protects with vigour.

These fish have very large broods which can number 400 to 600 – but the tiny fry fall prey to other tankmates at exceptionally high levels, so the brood size will drop drastically. While it may be possible for the bubblenest and eggs to be scooped out and placed in another tank along with the male, the chances are the nest will break up.

A more practical method is to set up a separate breeding tank for the pair to spawn in, which passes control over to you, the fishkeeper.

I use a set-up based on the bare tank method as it is practical, allows control over the breeding procedure, and keeps the tank clean. The size of the tank is important. I do not recommend any tank under 60 x 30 x 30cm/24" x 12" x 12".

Three-quarters of the water is taken from the main tank with a quarter being fresh tapwater. For some reason, I have better breeding results using mature tank water.

Always make sure that the tank has a tight-fitting cover glass to ensure that the air space over the surface is free from drafts.

Float Indian fern, *Ceratopteris*, though you can use any plants that float. On the tank base I place clumps of Java fern, *Microsorum pteropus*, and Java moss, *Vesicularia dubyana*. The floating plants are used by the male to add to his bubblenest, while the plants on the base of the tank provide cover for the female should the male become too boisterous while breeding. In fact, there have been cases where the male can drive a female that is reluctant to breed to death.

As for filtration, I use a sponge-type filter and set the temperature to 27°C/80°F, though the Dwarf gourami will spawn at temperatures lower or higher than this. Just be aware that water which is too warm can cause the nest to break up.

Also ensure that the water surface movement is not too fierce as this may damage the bubblenest.

Spawning

The courtship ritual is fascinating to observe as the male displays his best colours and dances before the gravid female. This is usually carried out in the area where the nest is to be built, and can carry on for some time before the female is enticed under the bubblenest. This comprises small, mucus-coated bubbles with pieces of the floating plant added to it.

Note that the male will sometimes attack the female, but in a heavily planted tank that is large enough for her to swim beyond the male's breeding zone, she should escape without too much damage.

When the female is ready, the pair will embrace in the typical fashion of fish from this genus. Locked in this embrace, the female releases a number of eggs – about 40 to 60 eggs each time. The male also releases sperm at this time.

The female then often sinks to the bottom, while the male searches for any eggs that did not float up into the nest. Once the female has recovered, she rejoins the male to continue spawning.

The same procedure is carried out several times before the female has released all her eggs, which could number up to 600. Once spawning is complete and the male has collected all loose eggs, remove the female as he will become aggressive and guard the eggs against all – including the female.

Fry bring on surprises

The Dwarf gourami is one of the easiest fish to sex and to make for spawning. There is another problem. [illegible]

[illegible] there are now colour varieties that will breed true. This means that a pair of the Neon Dwarf gourami will produce Neon fish young.

But there is a chance that the pair will produce a mix of [illegible]

[illegible]

Feeding and raising fry

At the suggested temperature, the eggs hatch in 24 hours. The male will replace any of the fry which have dropped from the security of the nest. Within three days, free-swimming fry are seen taking refuge around the floating plants. The male can now be a little frustrated as he will be trying to return them to the nest, [illegible] by this time starting to break up. So remove him.

This is a very important stage for not only do we have very tiny fry with very tiny mouths, but there are hundreds of them. A very small food is needed, and in large quantities.

I use infusoria cultured in advance. A large brood can easily go through at least 2 litres of this in 10 to 14 days. Thereafter they should be able to take brineshrimp nauplii. As for good aeration, always remove any uneaten brineshrimp – a bare tank bottom makes it easy to clean.

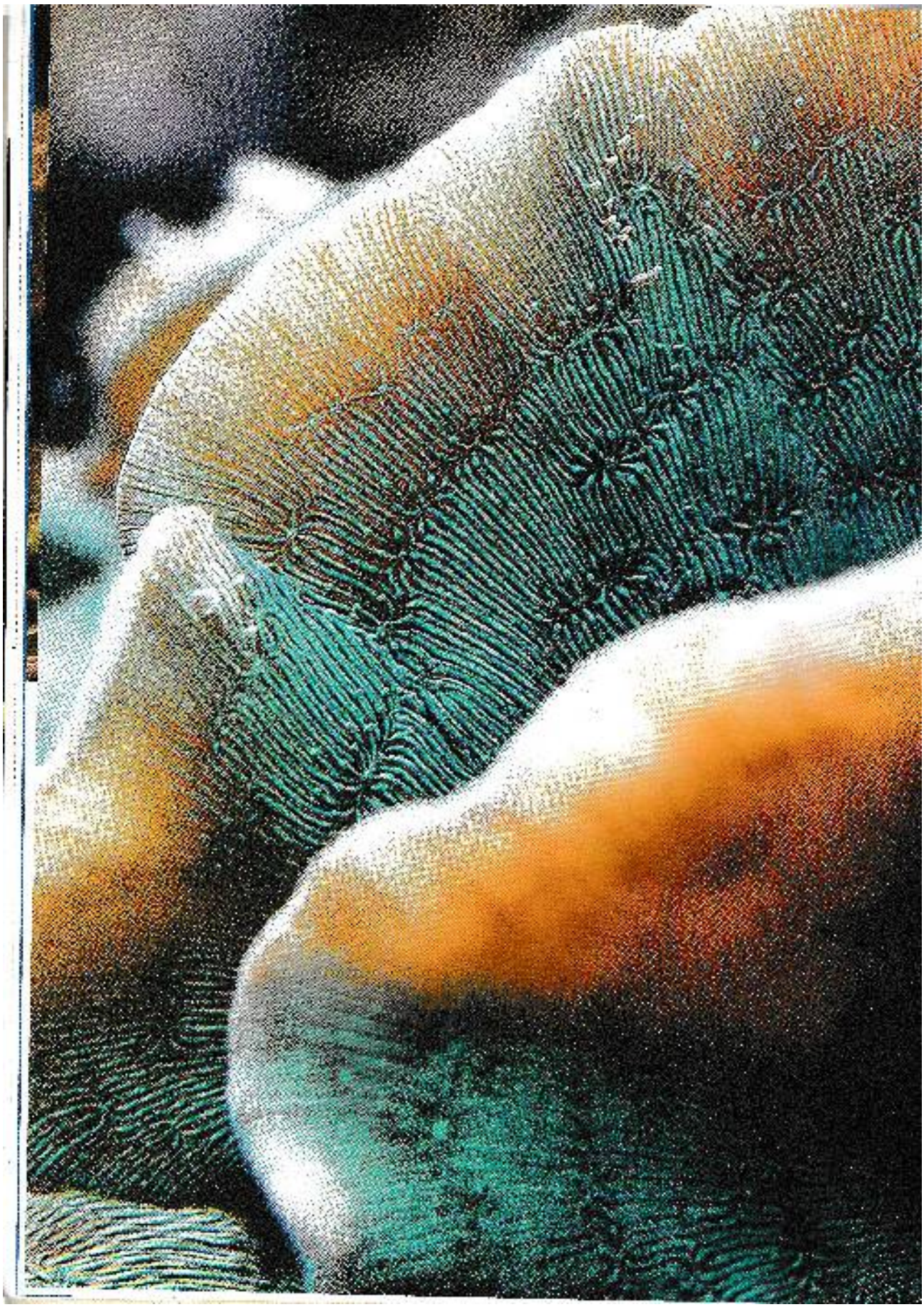
Like most gouramis, the young fish grow at different rates and it is not uncommon for the larger individuals to eat their smaller brothers and sisters. If you want to avoid this, sort out the biggest and move them into other tanks. Or cull the brood and only raise the best that you have space for.

At about four weeks old, the fish reach another critical stage when their labyrinth organ comes into full development.

In my experience, the Dwarf gourami is not a fast growing fish – with one brood it took nearly four months before they could be easily sexed.

TOP LEFT: While spawning, the male displays his best colours and dances before the gravid female.

BOTTOM LEFT: The male builds a bubblenest made up of small, mucus-coated bubbles with pieces of floating plants attached to it.



It's a natural thing to do!

Phil Hunt shows you just how easy it is to take the plunge and convert an existing marine tank to a natural system.

So you've decided to convert your marine tank to a natural system. It's not the cutest trick to turn existing systems into this type. Indeed, I'm sure, after viewing your marine set-up a couple of times, I hope you could be forgiven for not realising it's a natural system.

The heart of the matter

Living rock is at the heart of a natural system. Set this up in a new aquarium and everything will work in a simple, tried and tested way. It's understanding, really, how it works that's the key. Live rock comes from regions all over the world and is available in the UK.

The prime reason why live rock is collected is for its use in the aquarium trade for the production of calcium carbonate for shipping.

It comes in many forms, from fragments to huge pieces, and is usually shipped in water. Fully cured live rock is the ideal substrate for the natural filtration system. It's heavy, however, so it may be a wise move to purchase your rock in small batches over a couple of days from where it was first harvested in the sea.

Many marine tanks are plagued with nuisance algae, and still a huge amount is spent on algae control. The rock's chemical structure must alter once the curing process begins. This ensures that all algae matter will soon be broken down by the time the rock is in the tank.

There are several ways of curing live rock. Basically, you need to create the environment in your system of choice, which is usually a tank of water with a pump and heater. Add the rock and wait. The rock will release a lot of ammonia, nitrite and nitrate during the curing process, so you will need to monitor the water parameters. Ideally, you should have a separate tank for curing your rock, but if you don't have the space, you can cure it in your display tank. As well as giving a quicker cure, this has the added benefit of introducing beneficial bacteria and micro-organisms into your system.

It's worth noting that the rock will release a lot of detritus during the curing process, so you will need to remove this by siphoning it out of the tank. Do this every couple of days and replace the water with fresh, salty water. The rock should be ready in around four weeks. You can test it by placing a piece in a bucket of water and adding a few drops of ammonia. If the ammonia level drops to zero within a couple of hours, the rock is ready for use.

If you are adding living rock to an existing tank with fish or invertebrates, it can be a good idea to dip the rock in a solution of iodine. This will help to kill off any unwanted pests that may be present on the rock. Add the rock to the tank and watch for any signs of stress in the fish. If they start to gasp at the surface, you may need to perform a water change.

If you are adding live rock to an existing tank with fish or invertebrates, it can be a good idea to dip the rock in a solution of iodine. This will help to kill off any unwanted pests that may be present on the rock. Add the rock to the tank and watch for any signs of stress in the fish. If they start to gasp at the surface, you may need to perform a water change.

First steps

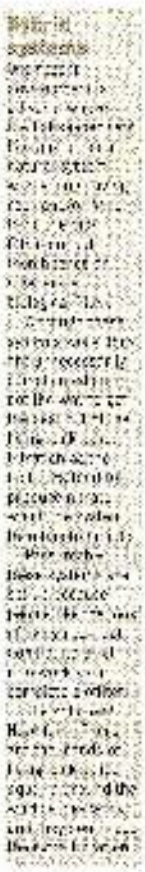
So how do you convert a marine tank into a natural system? Well, you first need to make sure that only live rock is present in the tank. Any rock, sand, fish or invertebrates that are present will need to be removed. If you've been using a canister filter, you will need to remove this as well. Any mechanical filtration will only serve to trap detritus and encourage nuisance algae.

In practice, however, this depends on the type of filtration you have. Some mechanical filters are easier to remove than others. Sponge filters, for example, are very easy to remove. Trickle filters, on the other hand, can be a bit more difficult. Undergravel filters are also easy to remove. Just make sure you have a good clean. You may need to have your tank ready to add the rock before you remove the undergravel, as there will be a large initial water change. It can be useful if you have a second tank or container to hold the rock and fish while you do this.

Undergravel know-how

You have two options for dealing with undergravel filters. You can leave the undergravel in the tank. The first option is to simply fill the tank with water and add the rock. The second option is to remove the undergravel and then add the rock. The second option is the best option.

Once you have your rock and sand in the tank, you will need to add a heater and a thermometer. You will also need to add a pump. You can use a powerhead or a submersible pump. You will need to add a heater and a thermometer. You will also need to add a pump. You can use a powerhead or a submersible pump.



Natural systems are becoming increasingly popular – and the results can be fantastic.

[illegible]

FACT: Live rock does not carry fish diseases!

FACT: Quality in a natural system is not compromised.

put it into buckets of tank water [illegible] with [illegible] place. Next, get [illegible] filter [illegible] up some of the [illegible] that you're about to [illegible]

Now you can scoop out the sand. Your [illegible] full of detritus [illegible] remove the undergravel plates and [illegible] the water. [illegible] filter's [illegible] deal with it.

Now return the live rock to the tank. [illegible] fish will be a little [illegible] with somewhere to hide [illegible] the rock on the [illegible] makes for a more stable structure.

Add the sand [illegible] evenly. [illegible] you can [illegible] the power [illegible] and that's it.

Other filter systems

It's easier to convert a tank [illegible] filter. The first steps are the same [illegible] water [illegible] your live rock. Then all you have to do is remove the old [illegible] filter [illegible] ahead [illegible] simple. [illegible] a huge step.

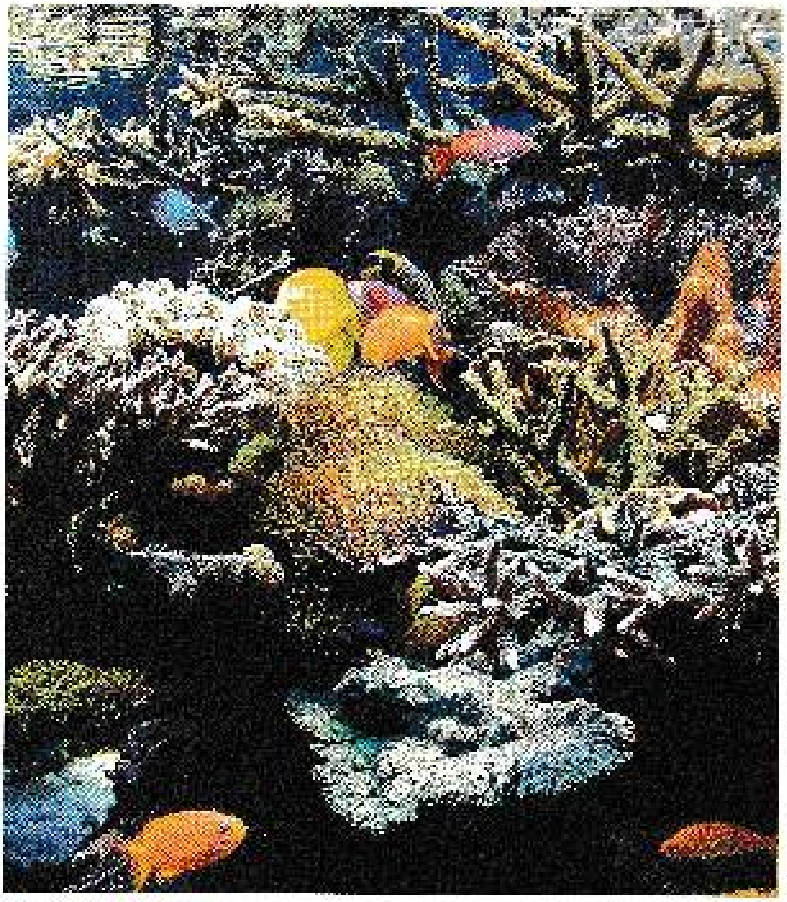
Nothing terrible will happen if you remove the filter [illegible] in one go. But if you're [illegible], you [illegible] to take out your old biological filtration [illegible] and sacrificial [illegible] you could keep the [illegible] in a bucket of [illegible] water [illegible] You can also test the water for ammonia and nitrite. If all goes well, you can remove the rest of the media.

Starting from scratch

If you are starting a new tank, you can install a very simple natural system. All you need is a power [illegible] the most [illegible] volume 10-20 times an hour, [illegible] kg/[illegible] live rock [illegible] of water [illegible] 50-60mm deep [illegible] sand or 30-40mm [illegible] sand [illegible] net media bag of carbon which can be hidden [illegible] You could use [illegible] packed with carbon [illegible]

For a fish-only tank, you can use as much [illegible] you need for a tank with corals, you need more [illegible] but that's all you need for a successful natural system. Setting up such a tank is also easy. Fill with water, get it up to temperature, [illegible] salt, check and adjust the specific gravity, get the [illegible] going, allow the water to mature for a few days, add the live rock and the sand [illegible]

Allow a few more days [illegible] ammonia and nitrite [illegible] and when they are both zero [illegible] days, you can begin stocking.



Oh, those myths...

Although natural systems are [illegible] reef aquaria and are rapidly becoming accepted for fish-only tanks, various myths [illegible]

Live rock introduces fish diseases

This is entirely without foundation. [illegible] fish diseases. The [illegible] responsible are usually present on healthy fish, and stress of some kind allows them to produce an infection.

Few fish parasites can survive for long without a fish host, and live rock that has been kept without fish for any length of time should not constitute a disease risk.

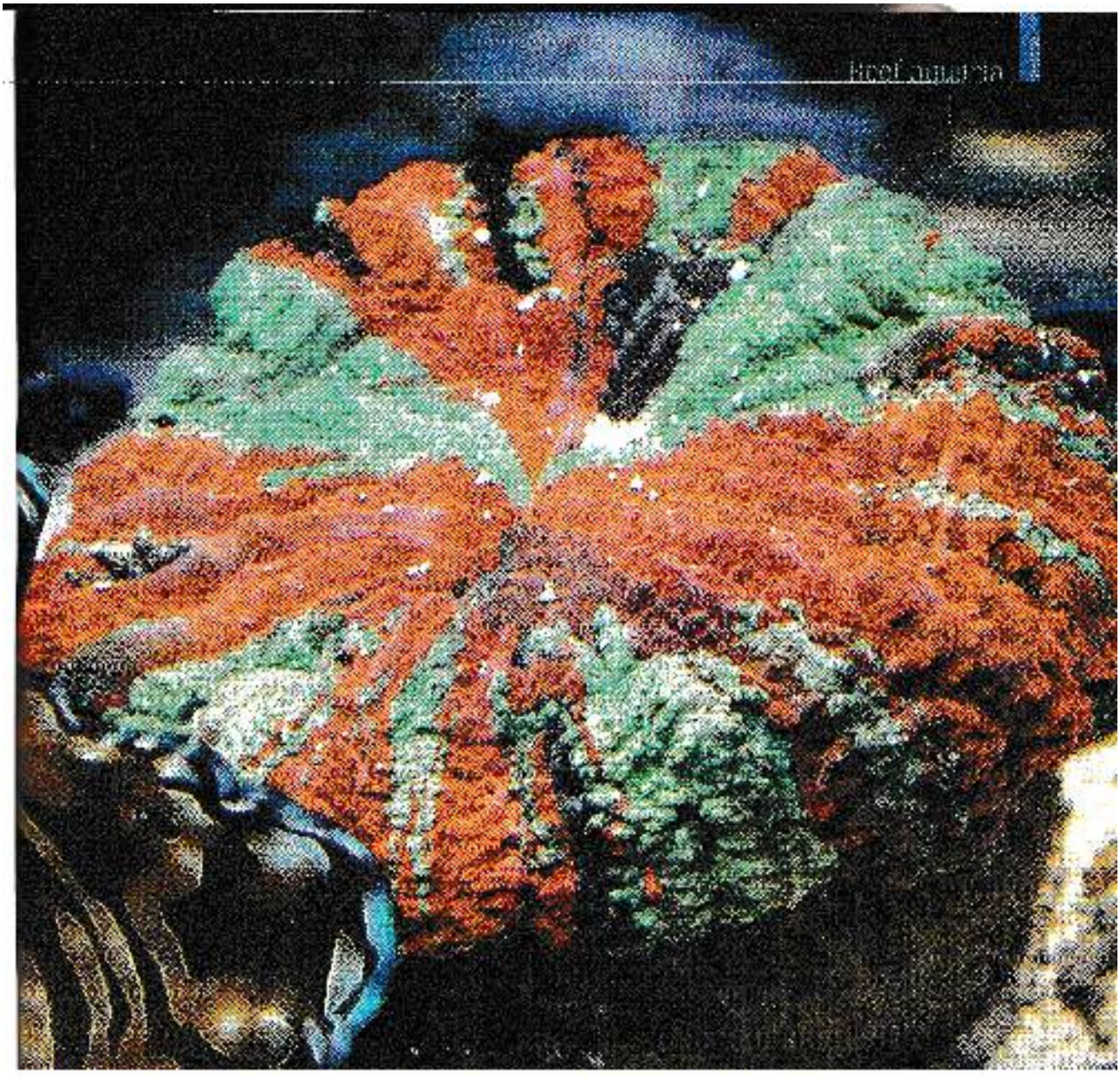
Live rock is full of nasty creatures that will cause lots of problems

There is some truth in this [illegible] can be introduced in live rock. These include Aiptasia anemones, Mantis shrimps, crabs and large bristleworms, but the [illegible] trouble they cause are exaggerated.

Some fishkeepers [illegible] and worry that [illegible] Mantis shrimps [illegible] bristleworms [illegible] Any living thing seen on the rock becomes the [illegible]

However, Mantis shrimp and big worms [illegible] can be caught and removed. Crabs are more common, but these can be trapped.

The most common pest is Aiptasia. These are only a problem if you keep corals in fish-only tanks



Cured rank has a clean, fresh smell, like good seafood.

You get lots more algae problems in natural systems

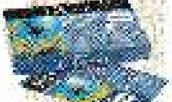
Natural systems can't support large fish populations

Natural systems accumulate nutrients and will eventually release them back into the water with disastrous consequences

Ask the Experts

Got a query or a fishkeeping problem? PFK's expert team of fishkeepers is on hand to help.

TROPICAL LETTER OF THE MONTH



THE SENDER OF THE TROPICAL LETTER OF THE MONTH [illegible]

What cooked their goose?

Q **I have kept fish for many years, and my hobby has taken me to rivers, lakes and oceans in Africa and Australia. I keep five tanks of oddballs that took me ages to collect.**

In January, all the fish in my 600 l./132 gal. tank died overnight after a water change, while the other tanks were fine. It was home to a pair of Oscars, a 25cm/10" catfish and my prized *Synodontis decorus*. As the water was very cold, I used an old 20 l. aluminium industrial pressure cooker to heat it on the stove. This did have a bit of corrosion, which I cleaned off with a pot scourer before I started. Could I have poisoned my fish?

ALAN AITKEN, MAIDSTONE

A Aluminium can kill fish, and its toxicity is greater under acid water conditions. But whether lethal quantities of aluminium could have leached from the pressure cooker is hard to say. If your aquarium water was very acid, this is possible.

Another possibility for the deaths is gas bubble disease. You mention [illegible] the storage water was aerated and very cold.

When oxygen-rich water is quickly warmed it will release gas. This can enter the fishes' blood causing a potentially lethal condition similar to the bends experienced by divers.

Although aluminium was not necessarily to blame, I would refrain from using the pressure cooker again.

To prevent the occurrence of gas bubble disease, always aerate cold water that has been heated rapidly. [illegible] minutes of moderately vigorous aeration should suffice. Obviously, do this before adding the warmed water to any aquarium housing fish.

It might seem that aeration would make matters worse, but it actually helps by driving excess gas out of water and into the air.

PETER BURGESS

Company for my Angelfish

Q **I have a 90 x 38 x 30cm/36" x 15" x 12" heavily planted aquarium with slightly soft and acidic water, presently containing four Angels. What interesting 10-15cm/ 4"-6" catfish (possibly *Synodontis*) would make suitable tankmates?**

JASON WILSON, ABERDEEN

A These are my suggestions, all are peaceful towards their own kind and will not harm your Angelfish or vice versa.

Apart from the *Synodontis*, which originate from Africa, these catfish are from South America and in keeping with your set-up.

[illegible] *Corydoras*, between two and four Bubblenest catfish, [illegible] Porthole catfish, [illegible] [illegible] *Synodontis* [illegible] Upside-down catfish *Synodontis nigriventris*, Pyjama catfish, *Synodontis* [illegible]

CHRIS RALPH

How do I sex these babies?

Q My Glass catfish have bred, which I believe is an unusual occurrence. First I noticed unusual behaviour, as a pair of 15cm/6" fish separated from the other four and swam side by side. When I got home from school, there were tiny transparent eggs on the Cabomba, but these went missing after lights-out.

I keep the water hard and alkaline, with the pH at 8.0.

My question concerns baby Kribs. Is it possible to sex them? I have three, all about 2cm/3/4" long, and they all look the same.

ROB EMBERSON, VIA EMAIL


Glass catfish are not the easiest of fish to breed.

A First, congratulations on your learner's skill [illegible] the Glass catfish – they are not at all easy to breed.

The eggs were almost certainly eaten, possibly by the pair or their tankmates. Although you keep Kribs in the same tank, they could well be the culprits.

I suggest that if you have future spawnings, you remove the eggs on their plant to a separate rearing tank.

At 2cm, Kribs are difficult to sex, but when they [illegible] grown, the males will have pointed dorsal and anal fins while the females develop red in the belly region and are more rotund, with blunter fins all round.

With only three babies, it is quite on the cards your fry are all of the same sex. The pH can have a bearing on the male/female ratio, and at 8.0 your water is much more alkaline than that found in their natural West African habitat.

In any case, it is not good to breed [illegible] unless to fix an unusual and wanted for characteristic of colour or [illegible].

JOHN [illegible]


Clown loaches will eat snails in the aquarium.

Wanted – snail clean-up crew

Q I have inadvertently introduced snails into my 90 x 60 x 60cm/36" x 24" x 24" community tank. Are there any fish I can add that will control them?

WILLIAM ALLISON, IPSWICH

A Clown loach, Botia macracanthus, and others of the genus, such as Candy stripe loach, [illegible], and Pygmy chain loach, B. sidthimunki, are the most suitable snail eating fish for a community aquarium.

Clown loaches can ultimately grow to 30cm/12", but the other species will stay small.

A catfish such as the Striped talking catfish, Humbug catfish or Striped dora, Platydoras costatus, also eats snails. It grows to around 20cm/8" and is nocturnal, but can eat small fish, so is more suited to larger tanks containing robust fish.

Puffers are excellent snail eaters, but can be aggressive.

JASON SCOTT

YOUR TROPICAL EXPERTS

[illegible] questions@practicalfishkeeping.co.uk [illegible]

PLANTS [illegible]

HEALTH [illegible]

[illegible]

UNDERWATER [illegible]

CATFISH [illegible]

[illegible]

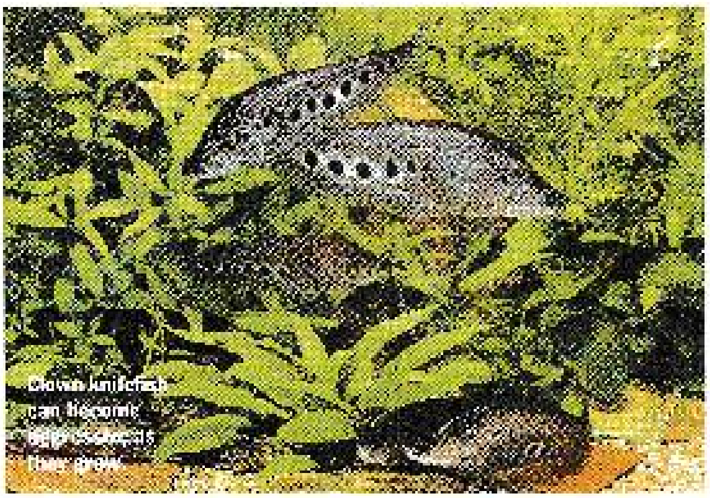
WATER [illegible]

[illegible]

Harem is hell for a fighter

Q I kept one male and four female Siamese fighters. The females attacked the male to the extent that his fins were ragged. I got rid of the main protagonist, but the remaining three continue to harass him. Is this normal or should I get rid of them?
[illegible]

A [illegible]
[illegible]


Clown knifefish can become aggressive as they grow.

Knives, ghosts and stingrays

Q I should like to keep four Black ghost knifefish in a 180 x 75 x 75cm/6' x 2' 6" x 2' 6" tank. What water chemistry do they prefer, and can I also keep a Fire eel, Clown and Tiger knifefish, two Black lancer catfish and a stingray?
[illegible], STEVENAGE

A [illegible]

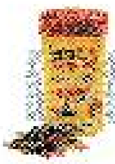
RICHARD HARDWICK

Losing the battle of the bulge

Q Soon after dropping her fry, a female Guppy swelled and the scales on her stomach stood out before she died. What happened, and how can I prevent my other fish going the same way?
[illegible], EASINGTON

A [illegible]

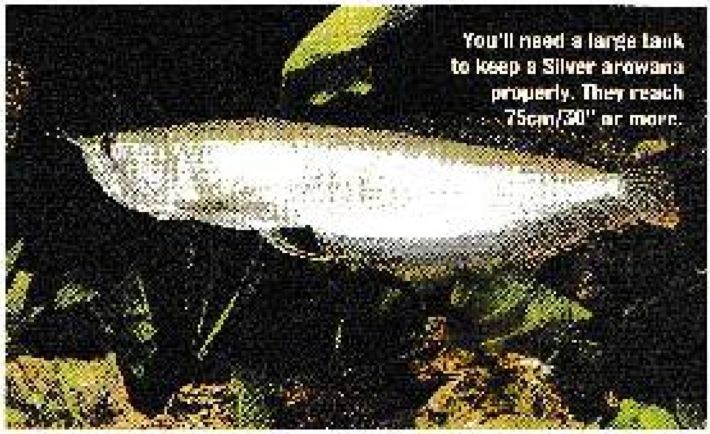
PETER BURGESS



Blisters or lympho-cystis?

Q What causes the blisters that gouramis are prone to? One of my Dwarf gouramis has them.
MAY SINGLETON, SCUNTHORPE

A [illegible] Dwarf gouramis [illegible] more prone to ulcerative infections of the skin, usually caused by bacteria. [illegible] shallow craters with red [illegible] difficult to cure.
[illegible] Lymphocystis. [illegible]
PETER BURGESS



You'll need a large tank to keep a Silver arowana properly. They reach 75cm/30" or more.

Think big for an arowana

Q I recently ordered a Silver arowana, but I am not sure what I can keep with it. At the moment I have a Sailfin, a Royal and a Tiger plec, but I should like to add Angelfish and possibly a shoal of rainbowfish. Would these mix with the arowana?
DARREN WYATT, POOLE

A [illegible] The Silver arowana, *Osteoglossum bicirrhosum*, from South America grows to [illegible] Your tank will need to be [illegible]
The Sailfin plec, *Glyptoperichthys* [illegible] Royal plec, *Panaque nigrolineatus*. [illegible] Tiger plec [illegible]
[illegible] Rainbowfish and Angels [illegible]
Provided you [illegible]
RICHARD HARDWICK

DID YOU KNOW?

Wood-eating or xylophagy is seen in two different genera of plecs, or loricariids. Those species that eat wood, such as *Panaque*, have specially adapted spoon-like dentition.

FACTFILE

Common name: Panda corydoras
Scientific name: *Corydoras panda*
Origin: [illegible] Peru
Size: [illegible]
Water conditions: pH [illegible]
Diet: [illegible]
[illegible]
Aquarium: [illegible]
Sexing: [illegible]
Note: [illegible]

Panda corydoras had a price tag of £50 each back in the 1980s...

Stuff you need to know about...

fish identification

In the second part of this series on fish identification for experts, Matt Clarke explains how meristics can be used to tell similar species apart.

What are meristics?

[illegible]

What are the basic rules?

[illegible]

Why is counting features so difficult?

[illegible]

How do you actually do the counting?

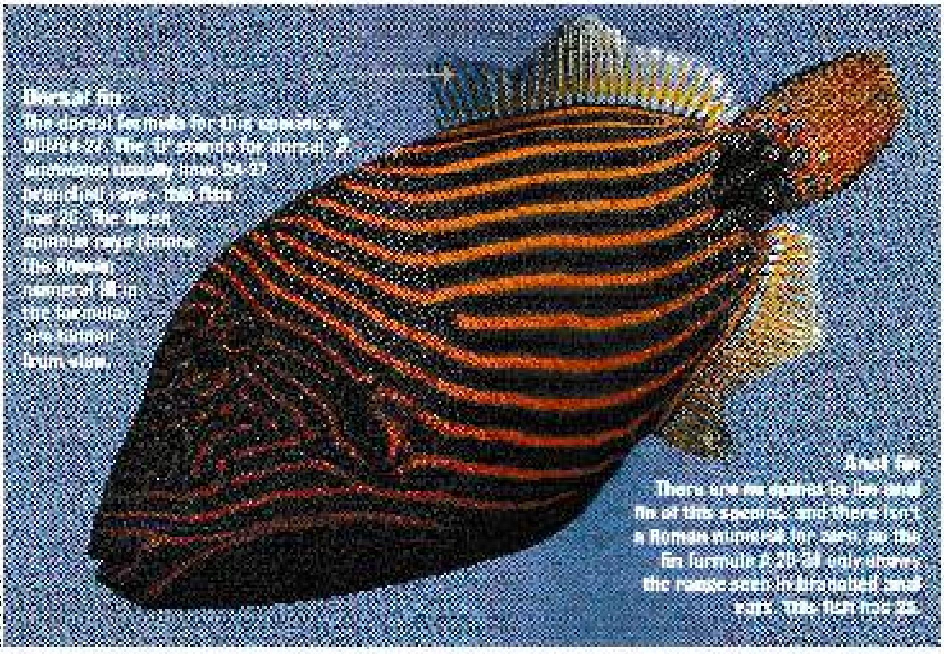
[illegible]

How do I count fin rays?

[illegible]

I'm trying to identify a South American cichlid, but the description contains loads of incomprehensible codes like D XII,10-12. What's that all about?

[illegible]



specific shorthand language for describing the fins.

The first letter stands for the fin, so D here stands for dorsal. Other letters such as A for anal and P for pelvic are also used.

Roman numerals, such as XIII, refer to the number of spiny rays in the fin, while Arabic numerals, 12-13 in this example, denote the number of soft segmented rays.

The range covered, 12-13 here, shows the typical counts seen across the species [illegible] variation. Not all members of the same species are identical.

Sometimes you might see lower-case Roman numerals used in the same formula alongside Arabic numerals, for example, iii, 5. These differentiate between branched and unbranched rays.

The lower-case Roman numerals refer to the unbranched rays and the Arabic numerals refer to the branched rays.

The rays of the caudal fin or tail are counted by adding up the number of branched rays and adding two, for the upper and lower principal rays. Sometimes the count is split into two bundles of rays, the dorsal group on the upper half and the ventral group on the lower half. So principal caudal rays of [illegible] shows that there are [illegible] rays: [illegible] on the dorsal lobe and [illegible] on the ventral lobe.

Some fish, like [illegible], may have more than one dorsal fin, while others have a dorsal which is divided.

If one fin is divided, a slash shows the position of the split. [illegible] shows a dorsal fin that's [illegible] after the [illegible].

If there are several dorsal fins, each gets a separate number and formula.

How do I count the scales?

Fortunately, you won't have to count all of the scales, only those in specific places.

The most common scale count looks at the number of scales along the lateral line – the sensory line on the flank of the fish.

This normally looks at the number of scales on the lateral line which have pores in them. The scales on the caudal peduncle, [illegible] of the tail after the lateral line, don't get included in the count.

But not all fish have a lateral line, and even where it's present, it's often only partially complete. In these cases you simply count along an imaginary line.

Other common scale counts include counting the scales below the lateral line to the base of the pelvic fin, and the scales from the insertion of the first dorsal fin to the scale above the first lateral line scale, counting the number of scales around the narrowest part of the caudal peduncle. These 'circumpeduncular' counts [illegible] how many lie above and below the lateral line.

Where do I go from here?

Once you've recorded the key details on the fish you are trying to identify, you'll need to find a review of the genus, a dichotomous key, or a description of similar sounding species so you can narrow down your search.

The meristic and morphometric data on a huge number of fish species can be found in FishBase, a great database managed by [illegible] across the world. This is a fantastic resource when you know how to use it to its full potential. It's found at www.fishbase.org

CICHLID LETTER OF THE MONTH

[illegible]

Setting up for Severums

Q I should like to set up a 90cm/36" tank for a Severum and, if there is room, another compatible fish. Could you please suggest a few species?

Are there any particular problems or difficulties with keeping Severums?

ANTHONY PARKER, YORK

A An adult male Severum can measure up to [illegible] and such a large fish will require a [illegible] tank to itself [illegible] grow [illegible] large, so [illegible] [illegible] the prowl [illegible] species [illegible] Anything too big [illegible] be seen as a short-term measure only.

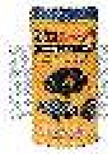
You could [illegible] your Severum [illegible] other [illegible] [illegible] larger barbs [illegible] catfishes. Alternatively, you [illegible] Severum and medium [illegible] (Congo [illegible] medium barbs, [illegible] and catfishes. [illegible] [illegible] ultimately you [illegible] Severum [illegible] [illegible]

You [illegible] [illegible] 90cm/36" tank [illegible] 120cm/48" would be better. [illegible] so you [illegible] [illegible]

Severums aren't [illegible] [illegible] water chemistry, [illegible] [illegible] They [illegible] vegetable food [illegible] plants [illegible] [illegible]

They are not [illegible] [illegible] [illegible] Severums come from [illegible] waters, so [illegible] [illegible] temperature should be in the range of 25-28°C/78-82°F.

Proximus group Geophagines make good tankmates for juvenile Severums - but you'll need a large tank to keep them together once adult.



Sponsored by Tetra - experts in fish health

Natural look for Kribs

Q **I am setting up a 125 l. aquarium in which I plan to keep Kribensis. What other fish would you recommend as tankmates and what sort of stocking density is best? Which plants would create a natural look? I want to try and keep decor, plants and fish that resemble the natural habitat.**
ANTHONY SENE, GIBRALTAR

A I have only [illegible] information on the natural habitat of [illegible], but here is what I do have.

Other fish found in the same waters include [illegible], [illegible], [illegible] and [illegible]. Your tank is not large enough to include any of the [illegible] [illegible] would be fine.

My books also mention [illegible]. The [illegible]

One [illegible] if you want more variety, any small [illegible] will be fine. [illegible] stocking [illegible].

Suitable fish include the [illegible].

As regards plants, these include various [illegible] species, *Nymphaea lotus* and [illegible]. You can also try [illegible].

I hope this helps. It should be a very interesting tank and I wish you good [illegible].

YOUR CICHLID EXPERT

[illegible] questions@practicalfishkeeping.co.uk [illegible]

Tone down that filter!

Q **I have a pair of *Neolamprologus brevis*. One fish is larger than the other, and the smaller one has the more rounded fins. They are in a 45 x 30 x 38cm/30" x 12" x 15" tank filtered externally. Substrate is a mixture of normal and coral sand, and there are about 20 shells scattered over it. How do I encourage them to breed?**
[illegible] WOOSTER, [illegible]

A You need to [illegible] the [illegible] [illegible] the filter [illegible] and [illegible] it away from the [illegible] the fish [illegible].

[illegible] a power filter on this size tank containing two tiny fishes.

[illegible] sponge filter is [illegible] and [illegible] to any [illegible].

Fascinated by Malawi cichlids

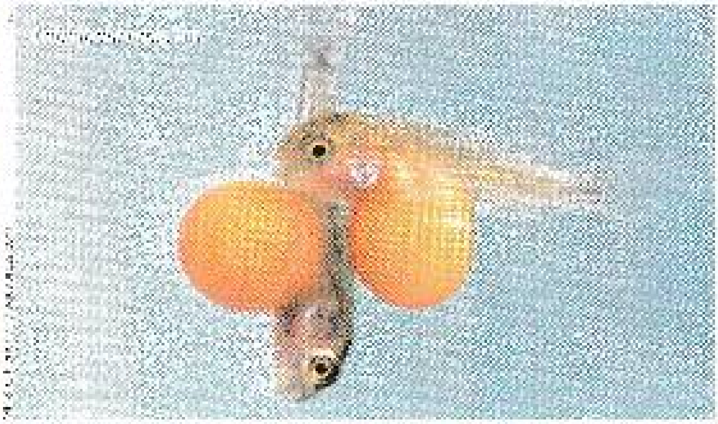
Q **I have become fascinated by *Labidochromis* species from Lake Malawi. My 90cm/36" tank was originally set up with all the equipment needed to grow plants including CO_2, filters, pumps and heating cable. I should like to keep the cable, but I am otherwise prepared to spend what it takes to keep these cichlids properly. My tapwater is pH 8.6, KH 12, GH 6.**
DARREN ANDERSON, HORNCHURCH

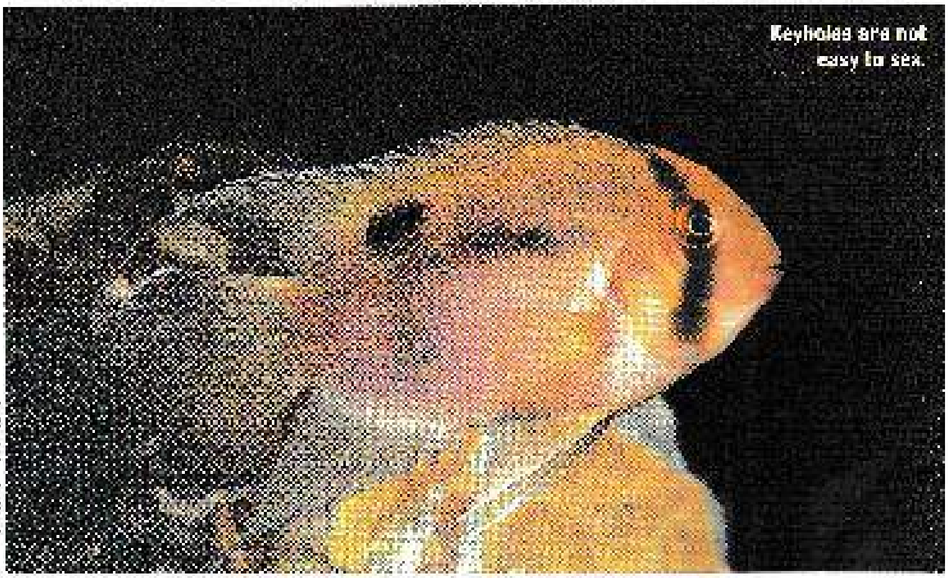
A Although *Labidochromis* are among the most peaceful of the Lake Malawi mbuna, they still need to be kept crowded in order to minimise territoriality.

Your tank will house about 15, and I [illegible] to the more peaceful species. As well as *Labidochromis*, these include [illegible], [illegible], [illegible] (formerly [illegible] zebra), [illegible] (red zebra) and [illegible].

You need lots of rockwork, and this could cause problems with your heater cable as the rocks need to be [illegible] on the bottom. A normal glass heater-stat would be better. There is no point in my telling you otherwise as I am sure you do not want to [illegible] yourself or [illegible] your fish through using unsuitable equipment, however expensive.

You will not need the CO_2 unit as these fishes require hard, alkaline water (pH at least 7.5).





Keyholes are not easy to sex.

Easy – with a true pair

I should like to know how to breed my pair of Keyhole cichlids, which share their tank with an Angelfish, three Black widow tetras, an African Glass catfish and a pair of Firemouths.
JACK BARBER, TEWKSBURY

[illegible]

you have youngsters.
Starting with five or six young fish is the best way to obtain a pair.
What you must do, though, is remove the Firemouths. These may not be the most aggressive of Central American cichlids, but they require hard as opposed to soft water and are definitely not suitable for the general community.

Two into one will go (sort of)

I have a 120 x 38 x 38cm/48" x 15" x 15" tank into which I want to transfer my Tanganyikan cichlids from two 60cm/24" tanks. The larger tank has the same water chemistry as the smaller ones, so I assume the fish will be happy in the new water.
I have a pair of *Neolamprologus brichardi*, two *N. leleupi* and one *Julidochromis ornatus*. I would like to add more ornatus, a few pairs of shell dwellers and a few *Tropheus* spp. Is this feasible?
[illegible], VIA EMAIL

[illegible]

FACTFILE

Common names:

Scientific name:

Size:

Distribution:

Habitat:

Aquarium:

Water parameters:

Temperature:

Diet:

Breeding:

Similar species:


Male Jade-eyes grow to 13cm.

'Appley' ever after?

I should like to add Apple snails to my 24 x 9 x 45cm/60" x 18" x 18" tank, which contains about 30 cichlids including several half-grown youngsters. Unfortunately, I have had to restock after a severe case of Malawi Bloat that manifested itself soon after I transferred my two *Tilapia buttikofeni* to a separate tank.

I asked my dealer about adding Apple snails and he said the buffies would almost certainly eat them. But can I go ahead now these fish are elsewhere?

MARTIN PRES, BOLTON

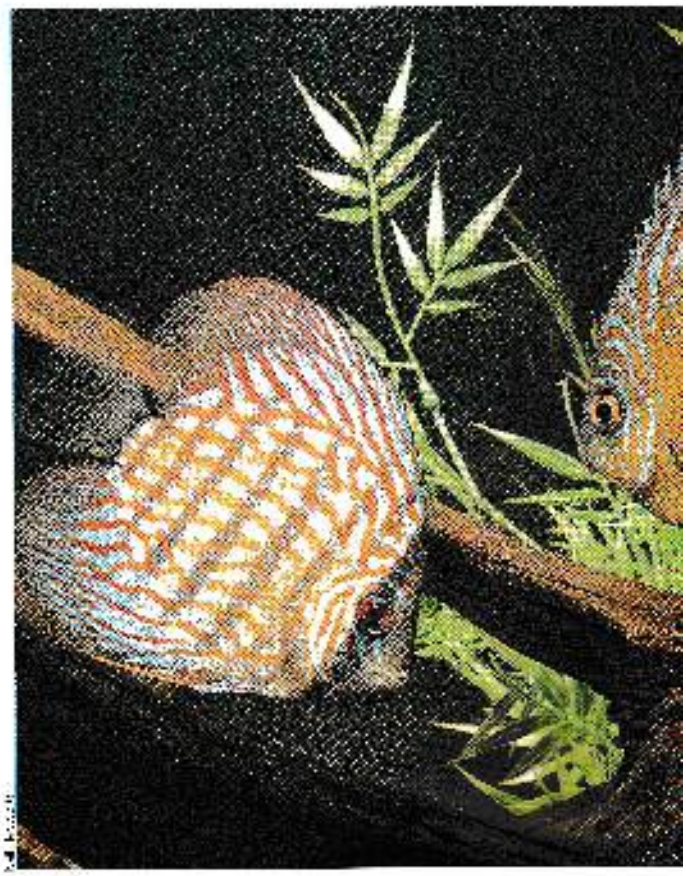

Frogfaces outsider

DISCUS LETTER OF THE MONTH

After all, Discus are still cichlids...

I have four similarly sized Discus in a 1m/39" tank, along with some Neons and Corydoras. They are perfectly healthy and seem content, but one, which is fractionally larger than the others, seems to bully them - nothing serious, just chasing them away from its chosen area of the tank. Will this behaviour eventually cease or get worse?

M. RANNEY, SALISBURY



Discus come in all shapes and sizes, like us!

I have eight Discus in total - six of which I bought six months ago at 5cm/2", and a pair added three weeks ago. Of the original six, three have attained 13cm/5", while the other three have 'stuck' at 8cm/3". Is it true that adult Discus release hormones which inhibit the growth of juveniles, or do they just grow at different rates?

And how long do Discus live?

EDDIE RINN, HARROW

Moving decor around may tame a temperamental Discus!

be done over a couple of weeks by simply increasing the hardness of the water at each partial water change.

Discus become sexually mature at around a year old, and the oldest one I know of reached 13, although 10 is a ripe old age.

MARK EVENDEN

How to get the pH down

Q My wife and I have always fancied a planted Discus tank and set one up around eight weeks ago. At present the tank houses 24 Cardinal tetras.

My problem is with the pH. The 400 l tank has undergravel heating and is filled with RO water (pH 6.8). I have tested the gravel with lemon juice and found no reaction.

The tank has a CO_2 reactor and the plants grow well. Ammonia and nitrite are zero, and nitrates are very low. The KH is 4 but the pH is around 8.4, and I don't know why.

I treat new water with Kent RO supplement at half a teaspoonful per 45 l/10 gal. Do you have any ideas?

COLIN WRIGHT, EMAIL

A Algae growing on plants, rocks and glass is a common problem in newly set-up tanks, and may be contributing to your high pH. Just like higher plants, algae takes up carbon dioxide from the tank water, which drives the pH up.

However, your CO_2 reactor should be countering this, as the gas dissolves in water to produce a weak solution of carbonic acid, which has the opposite effect.

My guess is that your undergravel substrate is indeed alkaline.

Testing it with lemon juice (or vinegar, another household product often recommended for the test) is useless. Lemon juice is a very weak citric acid which will not give you the fizz factor.

Much better, though hazardous, is to use with extreme care hydrochloric acid to test the gravel. If any calcium or magnesium salts are being released into the water, this product will soon expose them.

Before you strip out the gravel, however, remember that Discus and Cardinal tetras share the same habitat, and if the Cardinals are thriving, any Discus you add probably will, too.

Only if the Discus are wild caught, or you intend breeding them, do you urgently need to address the high pH problem.

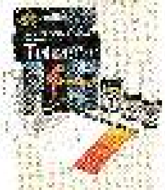
One final thought — is your pH test kit still within its use by date? Check readings against a new kit to make sure.

If Cardinals thrive, your Discus hopefully will too.

YOUR DISCUS EXPERT

[illegible] **questions? practical fishkeeping.co.uk** [illegible]

Don't miss this month's Discus special beginning on page 91.



MARINE LETTER OF THE MONTH

Not 'sumped' for good ideas

I have decided to add a sump to the marine set-up in my hall. To save money, I propose to use a 55 l bin, which will contain the summer. I shall have a wet-and-dry Eheim connected to it, and plan to use an Aquaclear 402 powerhead to feed the water out of the sump back to the main tank.

As the sump will be lower than the tank, I planned to syphon water into it, but I am worried that the powerhead may pump at a different rate to the syphon, so one tank overflows as the other empties. My idea is to have the syphon tube and suction from the powerhead ending 5cm/2" below the top of each tank, so if one starts to empty, it will not lose any more water once the 5cm/2" mark is passed. Is there a better solution?

[illegible], VIA EMAIL

[illegible] from food-safe plastic [illegible]

[illegible]

TIM HAYES

Shrinking away from the light

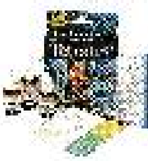
Over the past couple of weeks, the Malu anemone in my 120 x 60 x 60cm/4' x 2' x 2' mixed marine tank has begun to shrink, remaining closed for long periods, and its mouth is permanently open. The tank is lit by two T5 lights, one marine white light and one Blue Moon, but three weeks ago the marine white light failed and I have only just replaced it. Could this be at the root of the problem?

IAN MURPHY, VIA EMAIL

[illegible]

TIM HAYES

Anemones need a good water flow to aid gas exchange.



Sponsored by Tetra - experts in fish health

Royal grammas are a good choice for the reef tank.

Common name:
Scientific name:
Origin:
Size:
Diet:
Aquarium:
Notes:

Will marines be happy in a reception room?

I am moving house, and one consideration is whether or not it will be suitable to accommodate my 600 l/132 gal. fish-only marine aquarium. Can I site it in a reception room, or would condensation and stress to the fish rule this out?

ALAN HADDEN
YAXLEY, PETERBOROUGH

DID YOU KNOW?

Puffer fish contain a potent toxin called tetrodotoxin. However, there is a lot of evidence to suggest that this is not actually produced by the fish at all, but rather by bacteria inside the puffer fish. Many people die every year after eating puffer fish that have been incorrectly prepared and still contain deadly levels of tetrodotoxin.

Water conditions could be suspect

I set up a Juwel Rio 240 for a Common clownfish, a Foxface and a Spotted pufferfish. When I first added the puffer, it was very active but now it does not swim very much except at feeding time and it hangs on the bottom of the tank.

I am feeding flake, brineshrimp and cockles. I am considering adding an external canister filter as the tank gets rather messy. Would this improve water quality, and maybe the health of the puffer too?

ADAM [illegible], BOURNEMOUTH

I would need more information before giving you a complete answer. How long has the aquarium been set up, for instance? If it is new, the biological filter may not be fully established and poor water quality may be the cause of the puffer's lethargy. Mind you, puffers commonly sit around sometimes and become active only at feeding time.

Does the tank have [illegible] in the [illegible]? What is the water circulation like? Biological filtration can be achieved in part by having a [illegible] substrate (sand, gravel [illegible]) in the aquarium with sufficient water flow to keep much of the substrate well oxygenated.

You could use either an external or a canister filter for polishing the water in which you could place activated carbon, and a protein skimmer should be on your shopping list.

Cockles are excellent food for puffers, but you should also offer shrimp, [illegible] shellfish and frozen fish such as smelt. Add a vitamin supplement to the food.

JULIAN SPRUNG

Puffers often spend time just "sitting around"...

When is it best to light my refugium?

Caulerpa, if used in a refugium, should have 24 hours of lighting a day.

Which is better - to keep the lights on all the time in my refugium or just at night?

[illegible], VIA EMAIL

This really depends on how the refugium is set up. If planted with Caulerpa, it would benefit from light 24 hours a day or being on a reverse photoperiod, which is lit at night but off during the day when the main tank is lit. In this way, you can minimise or even eliminate fluctuations in pH over a 24-hour period.

If the refugium contains photosynthetic [illegible], for example, it must run [illegible] reversed photoperiod rather than risk stressing the [illegible] with an unnatural day length. This may still help stabilise the pH.

If there are no plants or photosynthetic animals in the refugium, it needn't be lit.

[illegible]

'Turbo-charged' tank still fine

My tank, which has been established for about 15 months, contains eight fish, inverts and thousands of baby Turbo snails! At night the rocks are covered with them. Are they contributing to my high nitrate level, which despite large regular water changes reads between 50 and 100 ppm?

My other problem is an infestation of bristleworms, which come out at night. They are pink, with white bristles, and up to 8cm/3" long. Despite all the above, my fish and inverts are healthy.

DAVE SHAPLAND, VIA EMAIL

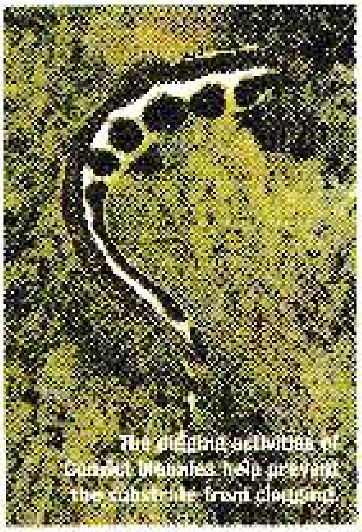
Try the [illegible] approach [illegible] the nitrate if your fish and inverts seem fine. The Turbo snails [illegible] Turbos, but [illegible] and they eat algae. These guys do no real harm, but they can get sucked into the intake of a circulation pump, possibly causing it to jam.

You can see a photo of these snails in [illegible] Aquarium Volume 2. It shows them on a [illegible] plant for them.

Bristleworms [illegible] problem. They can aggravate a small [illegible] if it is placed on the gravel, but are otherwise harmless. [illegible] shrimps eat [illegible] species.

[illegible] lower your nitrate [illegible] incorporating a [illegible] gravel bed to encourage denitrification. A [illegible] can help to keep the substrate free of clogging from detritus.

JULIAN SPRUNG


The digging activities of Convict blennies help prevent the substrate from clogging.

Running before you can walk?

I have a newly set-up marine tank into which I introduced two Common clowns when the ammonia had peaked. These were followed by three Green chromis.

As the tank is only 90 x 45 x 38cm/36" x 18" x 15", I can add at most just two more fish. What species would you recommend?

I have been unable to get the ammonia lower than 0.25 ppm, nitrite is zero. The pH is 8.2 and nitrate reads 20 ppm. These readings have been constant for two weeks now.

I would like to add some inverts, but first I need to get the water parameters spot on.

DARON GLEIVER, VIA EMAIL

[illegible] stocking your tank too early before the biological [illegible] was ready. The [illegible] way is to [illegible] levels of both ammonia and nitrite, and when both have peaked and fallen to zero, that's the time to add some fish.

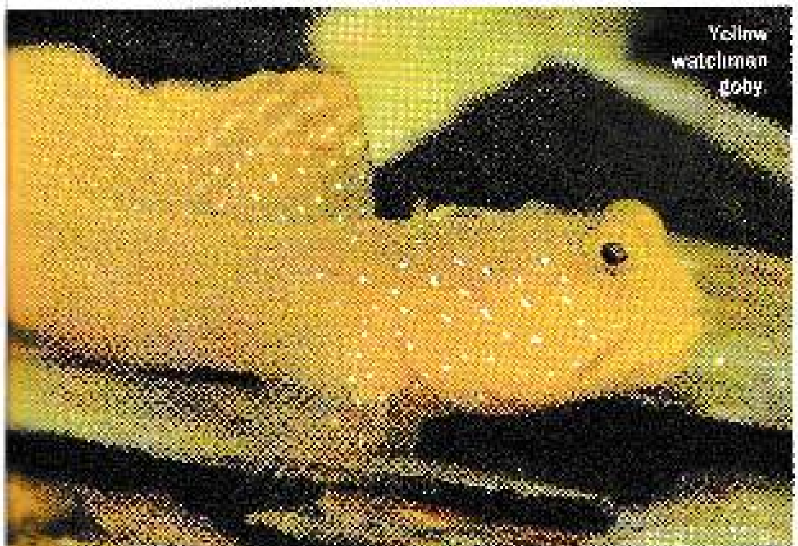
You [illegible] fortunate in that you have one of the [illegible] would have been killed [illegible] quite tough too.

While you [illegible] keep getting ammonia [illegible] levels, and only when both are down to zero, and stay, should you even think about adding more fish.

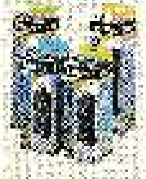
I'd suggest [illegible] more chromis, as these can get aggressive, but two should go [illegible] well [illegible] Pygmy [illegible], and a Yellow watchman goby [illegible].

You don't say anything about your lighting, which is one of the key things [illegible] what to buy.

PHILIP HUNT


Yellow watchman goby

COLDWATER LETTER OF THE MONTH



[illegible]

Weather loaches, like this *Misgurnus anguillicaudatus*, enjoy the odd piece of prawn.

Is my loach undersized?

I have a 120cm/4' tank containing two goldfish and a Weather loach, which is about 10cm/4" long and has not grown in the four years I have owned it. I have seen much larger specimens. Could there be anything wrong with mine? I feed it bloodworm, peas, flake and pellets.

RAYMOND WILKIE, [illegible]

I wonder [illegible] you have [illegible] Weather loach, *Misgurnus* [illegible] can grow to [illegible] and although they are [illegible] they [illegible] well in [illegible] tanks.

The [illegible] Weather loach, *Misgurnus* [illegible] is [illegible] larger than the [illegible] Weather loach [illegible] better suited to [illegible] temperatures. The [illegible] and less [illegible] found [illegible] the female [illegible] the species [illegible].

I would not worry [illegible] only 10cm/4" long. You are feeding a good [illegible] diet.

You might [illegible] earthworms. They also enjoy the odd tiny piece of prawn, as sold in supermarkets.

PETER BURGESS

So, which switch is which?

I moved to a house which has a garden pond, but was left no instructions as to the pump. Naively I turned on all three switches in the wall box, and to my delight the waterfall began to run.

The next day, the water level had dropped by about 30cm/1'! The fish are OK and have plenty of water for the time being, but how do I find out which switch I should have on and what type of pump it is?

NICOLA [illegible], [illegible]

You do not mention the size of pond or what type of [illegible] it is, but if [illegible] built [illegible] you [illegible] to worry about.

Presumably when you first switched on the pump, the water [illegible] and [illegible] water would [illegible] the pond and [illegible] what you [illegible] recirculating system, this would reduce the [illegible].

If there [illegible] connections, [illegible] the pond.

[illegible] check the hoses and connections for leaks. [illegible] Bear [illegible] ground subsidence that would lead to water spilling over and being lost.

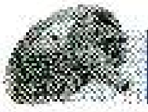
The third possibility is that there is a leak in the water course.

[illegible] the [illegible] system and a UV [illegible] for preventing green water.

I suggest you trace the cables back to their source. The pump is probably of the submersible type in the pond below water level, and somewhere you would see the cable, even if most of it is buried or concealed underground.

Such pumps tend to be located in the deepest part of the pond. [illegible] to find yours, because [illegible] become clogged and need cleaning.

NICK [illegible]



Sponsored by Tetra - experts in fish health

How did an eel invade my pond?

Nobody put it there, but I recently spotted a large eel in the gravel shallows of my pond. It is about 45cm/18" long and comes to mop up leftover pellets when I feed my fish. Will it do any harm? I am worried that there is more than one and that they will breed.

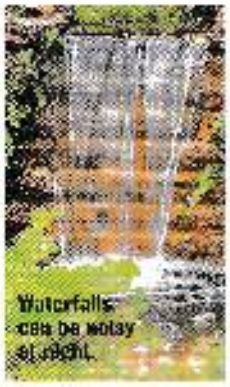
[illegible]

[illegible]

Reducing noise from a waterfall

I live near a motorway and find my waterfall great for masking traffic noise. However, at night with the windows open, the sound of splashing water keeps me awake. Is there any way to quieten this, short of turning the waterfall off after dark? I am worried that to do so might starve my fish of oxygen.

ERYONY RUDE, CHRISTCHURCH



[illegible]

NICK FREEMAN

Quarantine – best to be on the safe side

I am very worried by reports of KHV being found in Japan, even though I understand that it is mainly koi carp that have been affected.

I keep only goldfish in my small pond. I would like to add some more this coming spring, but should I now quarantine them first, just as a precaution?

SHANNA BUCKLAND, PENRYN

[illegible]

Do I really need a filter?

I have successfully run a pond without any filtration for five years: the plants grow well, the water is clear and the fish are healthy and breed regularly.

Would there be any benefit at this stage in installing a filter?

CHLOE RIVERSDALE, CB24 [illegible]

[illegible]

[illegible]

NICK STONE

YOUR COLDWATER EXPERTS

[illegible]

Frequently asked questions about...

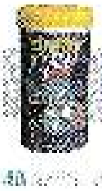
Which filter to choose...

Sean Evans explains just what filtration is, and the various methods available today.

How do I choose a filter that is right for my needs?

What are the most popular types of filter?

BELOW: Sponge inserts in internal power filters usually provide both mechanical and biological filtration.



tubes need to run between the tank and the canister. This may mean cutting holes in the hood. The canister needs to be sited below tank level, so space is needed below the tank.

External canister filters were reviewed in PFK November 2004.

What other types are available?

There are so many that a detailed discussion of them all is beyond the scope of this article.

Undergravel filtration was once the mainstay. It works on the principle of drawing water through gravel substrate, which is supported by a grid on the tank's base using a rising stream of air bubbles or a powerhead placed on an uplift tube. The gravel itself is the filter medium, and due to the large surface area, works quite well as a biofilter if properly maintained.

It also draws particles into the gravel. The problem with this is that, over time, the gravel can become clogged with debris. Such a build-up is associated with high nitrates, so lurking of the ... The gravel, therefore, needs to be vacuumed regularly.

You can't use this filtration if you want to use a sand substrate as the particles are too fine and will fall through the grid. It may also prove problematic with fish that like to dig, such as many cichlids. It is also less suitable for planted tanks because the gravel will be difficult to vacuum, root growth may clog the plates, and the unnatural flow of water past the roots is said to affect nutrient uptake.

A variation, known as **reverse flow undergravel filtration,** mechanically pre-filters the water. This is done using a canister filter or a special powerhead to pre-filter the water and force it down the uplifts and up through the gravel bed.

However, there is minimal circulation with this system and low oxygen problems may occur unless additional aeration is used.

Air-powered **sponge and box filters** can be useful in small tanks used for breeding, rearing, quarantine or isolation.

Sponge filters are ideal for rearing fry. Unlike power filters, there is no danger of fry being sucked in and they often use the surface of a sponge as a source of food.

The mechanical filtration is limited, but they work well as biofilters for small tanks and are an inexpensive way to filter several small fry tanks from one air pump.

Air-powered box filters are another inexpensive way to filter small to medium tanks and can supplement the filtration for older fry, or as a supplementary filter in any tank. They can also be filled with the media of choice to provide mechanical, biological or chemical filtration.

Fluidised sandbeds are based on a constantly moving bed of sand, which provides a very high surface area for bacterial colonisation, giving them a high biofiltration capacity.

Although very efficient biofilters, they do not perform any mechanical or chemical filtration, so good mechanical pre-filtration is essential. The filter itself does not normally include a pump. They are often powered by internal or external power filters, or powerheads with pre-filter cartridges.

They provide only limited circulation as the sand must be fluidised at a controlled flow rate to avoid losing any material. They are best used in situations where efficient biofiltration is needed, or where additional circulation will be provided by a second filter, such as an internal power filter.

Trickle filters may incorporate a series of trays or a trickle tower filled with plastic bio-media like bioballs which may form part of a larger sump filter system. Their greater efficiency is based on the wet/dry principle.

If water passing over the media is exposed to oxygen in the air, the conversion of ammonia and nitrite is more efficient. The wet/dry principle has also been incorporated into other designs including canister filters and the BIO-Wheel, used in the USA.

Filters based on these principles may be a good choice where very efficient biofiltration is required. They are considered less good for planted tanks because carbon dioxide required for growth is lost from the water by the increased contact with air.

Sump filter systems consist of an external unit (often a smaller glass tank) placed beneath the main aquarium. The water drains by gravity and is returned to the aquarium via a pump in the sump.

These are the ideal solution for large tanks as they can be custom-designed and often have large capacities. They also keep equipment out of the main tank. For example, heaters can be placed in them.

Sump filters are popular with reefkeepers as extra equipment like skimmers can be placed in them.

Top tips

Never clean any ... [illegible] ... the filter media in ... [illegible]

[illegible]

For biofiltration ... [illegible] ... is important ... best achieved with ... [illegible]

ABOVE LEFT: Oscars are messy feeders and require powerful filtration along with regular tank maintenance to prevent a decline in water quality.

Is hot water safe to use?

I perform regular large fortnightly water changes on my two tanks of Malawi cichlids, but I am worried about not equalising temperatures because of the volume involved. Is it safe to use hot water from a domestic boiler to get the temperature up? I've heard stories of metal poisoning, but wonder if this problem is limited to immersion-style heaters.

MATT HARDIN, VIA EMAIL

[illegible]

[illegible]

How to win the phosphate war

I have high phosphate levels in my brackish tank. Other water parameters are good. Would you recommend a phosphate remover or adding Mollies?

[illegible], VIA EMAIL

[illegible]

Reverse flow for unplanted tanks

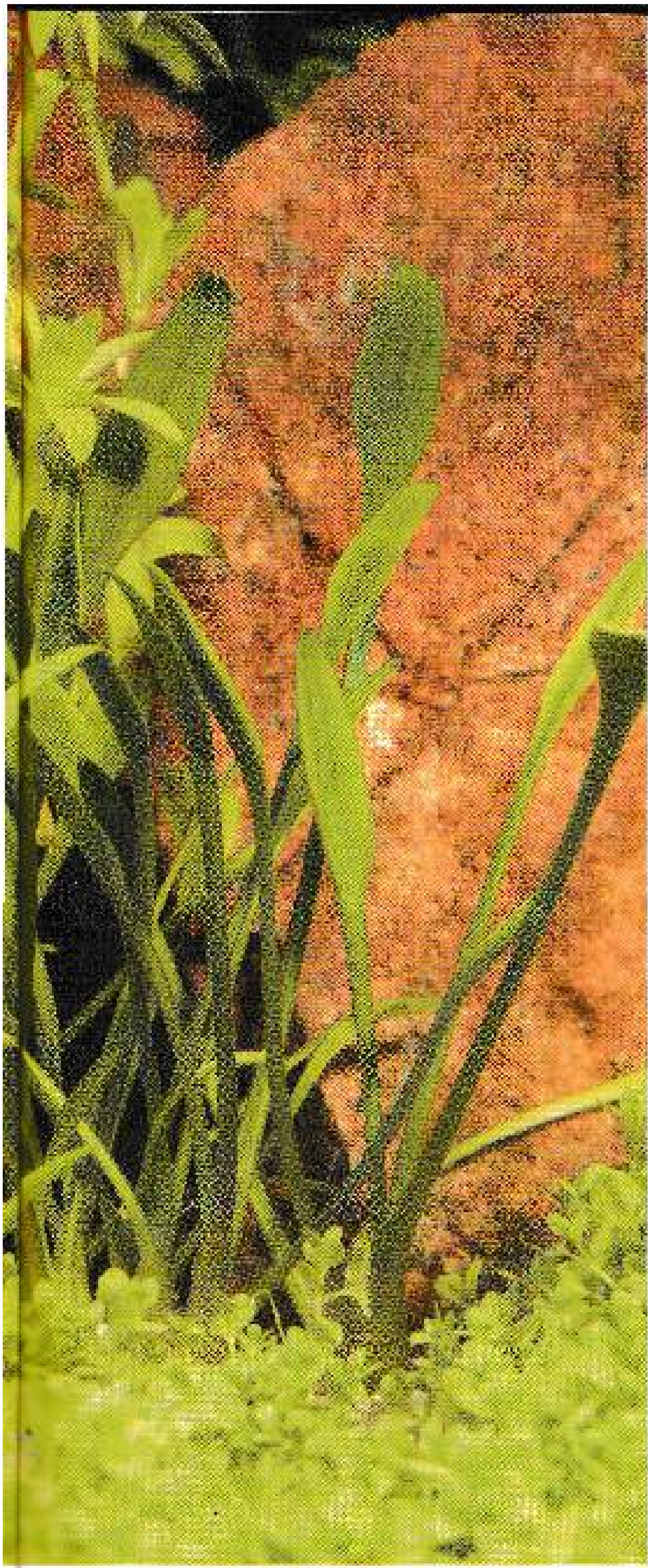
I wish to run an undergravel filter on my 120 x 30 x 38cm/48" x 15" x 15" unplanted aquarium. Would one Eheim 1048 Hobby pump be strong enough for this? The tank is also filtered by an Eheim 2215 Classic and an Eheim internal model with an output of up to 60gph.

[illegible], DERBY

An Eheim 1048 has an output of [illegible] 132 gal. per hour, so it would be adequate to circulate the water through a reverse flow system on a 120cm/48" tank [illegible]

Not a load of rot

Crypts have had bad press, but **Peter Bradley** sets the record straight on these versatile plants.



crypts that can tolerate temperatures above 30°C/86°F.

A really easy to grow species that will fill your tank is C. pontederiifolia. Its average height is 40cm/12" and it makes a very good mid-ground plant. Left to its own devices, it spreads by runners and will quickly fill your tank. It is one plant that does not suffer from rot.

Being a member of the Araceae family, these plants produce wonderful Arum lily-like spathes and the flowers can be more attractive than the leaves.

Plant them in pots containing loam or a good loam compost in a small vase and half cover with water. As the water slowly evaporates in spring and summer, you will be rewarded with beautiful flower spikes. The drop in water level tricks the plant into believing that summer has arrived, encouraging flowering.

Another novel way to grow crypts is in a pickle jar. You don't need a lot of space for this. I use a loam-based compost, to which I add ordinary tap water and place the jars in a shaded area.

To make the display more interesting, I mix varieties of green and olive leaves and shapes. As most crypts will tolerate moderate temperatures, they are quite happy in my centrally heated house. I do, of course, use good quality water and refresh them each week.

Apart from pickle jars, I like Ikea's 'Reagent' vase, which were a real bargain at 90p each. The shape is ideal, giving you room for the substrate and plenty of growing room. It holds about a litre of water. I have dozens of these vases that I experiment with.

The ultimate challenge...

The pinnacle is to try and produce flower spikes. This can be achieved in three months...

To encourage flowering, lower the water level to a few centimetres so the leaves are out of the water.

Applying heat or increased warmth also helps. I have had great success with heat mats. Even my crypts in pickle jars have flowered well, being stood on 25 x 15cm/ 11 x 6" heat mats.

These underrated plants have been around for over half a century, and with new varieties being developed all the time, are definitely worth a go. And if you are short of space in your aquarium, grow them in pots in vases or old pickle jars – they are well worth the effort.

GREEN LINE AQUATIC PLANTS

PLANT OF THE MONTH

Cryptocoryne balansae

Under code 4002 per [illegible] pot.

This [illegible] of the [illegible] delivery of good tall specimens with a good [illegible] pot. Tolerates many [illegible] needs some [illegible] [illegible] [illegible]

ANDY GREEN'S TIP OF THE MONTH

When buying crypts, ensure they are [illegible] grown [illegible] I keep all mine for several weeks before [illegible] them [illegible] [illegible] [illegible] established [illegible]

GIVEAWAY

We have five [illegible] to [illegible] packs of [illegible] crypts [illegible] send your name and address to **Plants (April), PFK, Bretton Court, Bretton, Peterborough PE3 8DZ** [illegible] the winners [illegible] drawn after the closing date [illegible] [illegible] Green Line catalogue [illegible] ad [illegible] back cover.

GREEN LINE
Tel: 0 [illegible]
[illegible]

A site for sore eyes

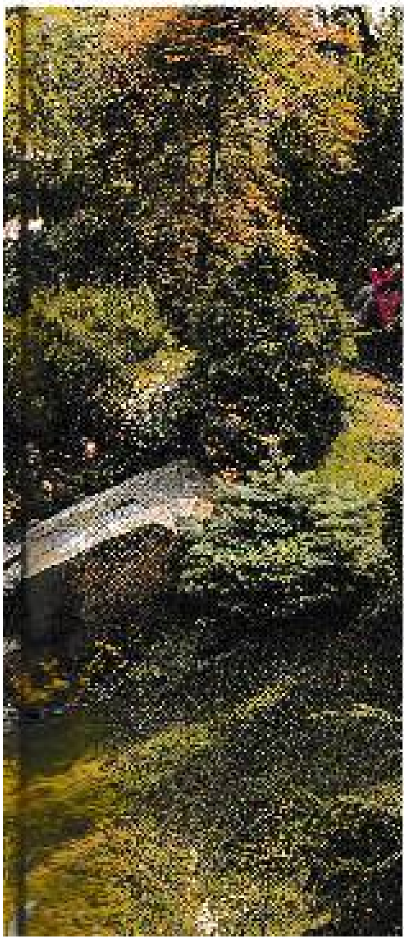
Bored with your pond? Is something perhaps missing from it? Nick Fletcher shows you how to revamp your pond...

uneven or unstable edging.

Let's take as an example a typical first-effort liner pond, which is usually 45cm (18") at its deepest point and sited plumb in the middle of the lawn. It's precariously edged with crazy paving that doesn't even match your patio, and while the kidney shape looks fine close to, the pond almost disappears when viewed from the house because its longest dimensions run east-west as you look to the south.

The filter is an off-the-shelf, classic, pump-fed, black box filled with foam and perched on top of your "waterfall" (an unstable pile of subsoil into which are dug deeply unconvincing plastic cascades).

What would you do with this eyesore? The first problem to address is depth, or rather the lack of it. Ponds should be a minimum of 75cm (30") deep for goldfish and 1.20m (4ft) for Koi. While it is possible in theory to extend butyl or PVC liners with bonding and tape, the joints are not likely to last. Better to bite the bullet. Remove the edging and strip out the liner and underlay to leave a bare hole in the ground.



Endless options now present themselves, one of which is to convert the kidney shape into a more formal circle or oval, improving the visibility of the pond from the house.

First, take the time to incorporate a concrete collar. Dig a trench 75cm (3") deep and 30cm (12") wide around the intended perimeter and fill this with a 6:1 ballast/cement mix to within 2.5cm (1") of the surface of the surrounding ground.

Make sure that this collar is level by hammering softwood pegs into the trench and equalising their height with a spirit level laid across a flat piece of wood. Trowel in the concrete so it comes to the top of each peg. This collar will serve as a firm support for liner flaps and any hard edging, and lessens the risk of the hole caving in as you enlarge it. Keep back turf and topsoil, which may come in handy in later landscaping. Stack it earth side up in the shade, and cover with damp sacking.

To achieve greater depth, you can dig out an area in the centre of the excavation, but a more efficient strategy would be to slope the pond gently down from the marginal planting shelves to a flat area. This, the deepest point, is where the filter pump will sit, or it can be the site for a bottom drain.

A concrete collar could form the foundations of a raised pond, which is another way to increase depth – but, in this example, a wall will hide the water from view.

While you're at it, what purpose does your waterfall mound serve other than to obscure the rear of the garden and save you the cost of a skip to get the spoil off your property? In nature, you never find ponds like this. The only time mounds look natural is when the pond is sited in a corner of the garden and the spoil forms part of a rockery or raised bed butting up to a boundary fence.

So get rid of your giant molehill. Pressurised in-ground filters will still run a UV and are virtually invisible. Conventional filter box filters can be disguised at ground level and hid under a deck or behind trellis, and then into background planting with patience and a wheelbarrow.

Ground zero, what now?

Now that you have stripped the pond down to a bare hole within a surrounding concrete collar, should you replace the liner or think about upgrading from a pump-fed to a gravity-fed filtration system?

A bottom drain is not just for Koi ponds; it will reduce your workload

and improve water quality in any system, and the filters can be completely concealed under decking.

Yes, decking may be old hat, but beside a pond, it serves many purposes. Extending over the water, it offers the fish shade. It provides a warm platform for those lazy summer days when all you want to do is bring out the sun lounger and doze off. Hinged, it makes the perfect cover for in-ground filters.

ABOVE: If you're stripping the pond right down, it might be worth adding a bottom drain (below).

A bottom drain and its associated pipework needs to be dug into the pond base before the liner goes in, and another excavation will be needed for the adjoining filter bays, which should offer a hard standing of slabs or, preferably, poured concrete.

It's easy to work out the depth of the hole if you allow for these foundations, and remember that the water in the pond and in the filter chambers will be at the same level. Before you lay in a new liner, remove all stones and sharp objects from the enlarged hole and use a proper non-woven underlay, sand, damp newspaper and old carpet scraps.

Consider a stream

A meandering stream can transform a stand-alone pond into a feature that follows the contours of your plot and ties the elements of water and dry land together in a much more cohesive way – a true water garden. It also increases the total pond volume (though not all of it will be available to your fish for swimming), improves oxygenation and adds the sight and sound of moving water to the equation.

If your garden is on a natural slope, so much the better. Dig your header pool at the highest point and make the stream course a combination of falls and shallow rifles. You can use old liner from the

An important decision

Above: Streams can transform your pond into a feature that follows the contours of your garden, but adding one to an existing pond is best done in stages, as it's a major job.

Right: Bridges should always be sited at the narrowest part of the pond.

Retail round-up

Our monthly forum for Britain's retail shops forms an important part of every issue of Practical Fishkeeping. We help you find the best shops with those all important high quality fish, and we hunt out the specialists in every area...

Discus with a 30-day guarantee

Changes at Cambridgeshire shop

Buy your Discus a hamper...

Club shoplifter

Competition winners